

An out-of-this-world adventure story PLUS fascinating facts about the Universe

GEORGE'S COSMIC TREASURE HUNT



UNABRIDGED

Includes
Enhanced CD with
Science Sections

LUCY &
STEPHEN

HAWKING

Read by
Hugh Dancy

АЖОРАЖ ИБОЛЬШОЙ ВЗРЫВ



Москва 2012



Люси и Стивен
ХОКИНГ

Иллюстрации Гарри Парсонса

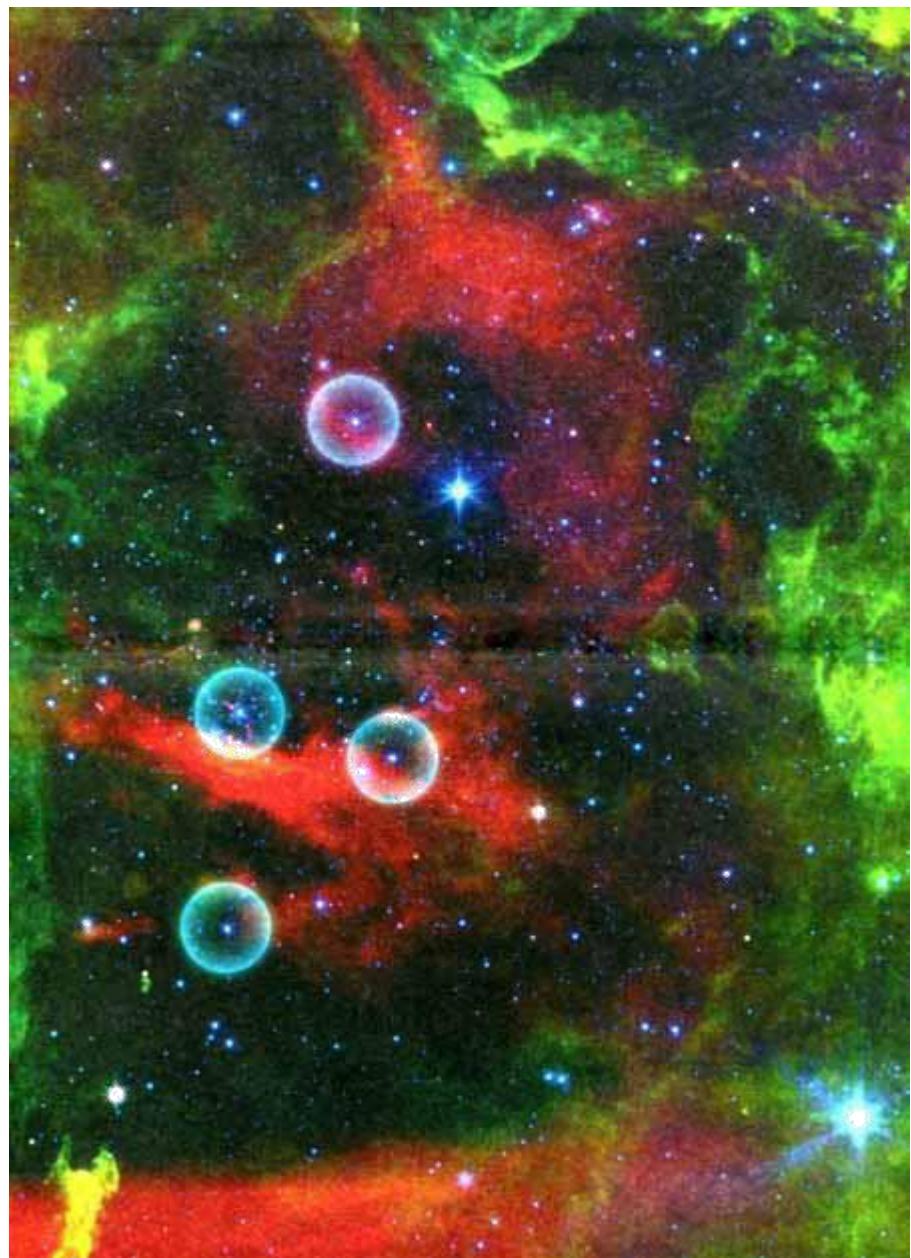


Photo on the flyleaf:

The Rosette Nebula, according to a study space telescope "Spitzer" (NASA), contains a number of very hot young stars of spectral type A. These stars give off a strong radiation, and they give off a strong wind, so that around each of them formed "danger zone" protyazhennostyu to 1.6 light years - or fifteen trillion kilometers. Any of the young stars, once the danger zone is likely to lose its emerging planetary system. The Rosette Nebula is more than five thousand light-years away.

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Will, George and Lola Rose, George, William and Charlotte - the book is dedicated to you

LATEST SCIENTIFIC THEORY!

The plot of the book are interwoven exciting scientific essays that introduce the reader to the latest scientific theories.

These essays are written by outstanding uchènymi our time.

The emergence of the universe

Stephen Hawking,

University of Cambridge, UK

Tèmnaya side of the universe

Michael S. Terner,

University of Chicago, USA

Are there many benefits of Mathematics at unlocking secrets of the universe?

Paul Davies,

Arizona State University, US

"Wormholes" (also known as "wormholes") and time travel

Kip S. Thorne,

California Institute of Technology, USA

ATTENTION: FOR ORIGINAL VERSION was taken FB2.

Editing, layout: Andrew D'Alembert (DARK STYLE) ||YA@DarkStyle.org

INDEX OF SCIENTIFIC SECTIONS

In this book, a lot of variety of scientific information. Some of them are highlighted in a special section. You may want to go back to these sections more than once or twice. To make it more convenient, we did pointer.

Our Solar System Dangers that

threaten our planet Moon Theory of

Everything

Big Bang - The

expansion of the universe

Lecture Vacuums

The space-time and relativity Andromeda

Galaxy Uniformity Particle collisions of

space Large Hadron Collider singular

quantum world of M-theory: 11

measurement!

Chapter first

"Where in the Universe is the best place for the pigs?" - Annie tapped the keys supercomputer named Cosmos.

- Space naydèt! - She said. - Oh, he will find the place better than this poor farm!

The farm, which is now inhabited Freddy - Former porosènok and now a heavy boar - really was not poor, but very nice, and thence all the animals looked happy. All but Freddie.



- Right place does not find - George complained, watching as the Cosmos, the greatest computer in the world goes through its billions of files in search of an answer. - Freddie was so sad, so hurt ... I Do not even looked at me.

- But to me it looked like eschè - Annie said, not looking up from the screen. - Just bored his eyes the pig! As if to say: "Save! Get me out of here! "

The farm is located on nepodalèku Foksbridzha, campus, where George and Annie lived. Mama Annie, Susan, in the morning they drove to visit Freddie, and returning them dnèm, was surprised to discover that George's face red and angry, and Annie is about to cry.

- Annie! George! What is it with you?

- Not us, and with Freddy! - Annie climbed into the back seat, and finally gave way to tears. - He was bad at this stupid farm!

Freddie, pet and friend of George, was a gift from her grandmother. She gave it to her grandson at Christmas, when this same Freddie was eschè porosènkom. Parents George fought to save the Earth from pollution, and this, among other things, meant that they were opposed to gifts for children. They resented that abandoned, broken, lose one's attraction toys turn into giant piles of plastic and metal that pollutes not only the land but also the sea, where they choke whales and seagulls. So my grandmother knew usual gift parents George simply will send back, which is why all the quarrel and razobidyatsya. And then she realized that was a gift from George, it must be a gift that prinesèt planet benefit, not harm.

That is why one very cold day before Christmas, George found on the porch of a cardboard box. In the box was a tiny pink porosènok, to which was annexed a note from her grandmother: "This kid needs a roof over his head. Take it to the

Me! "George was delighted. Oh, such a gift is sure to be allowed to leave the parents, and most importantly - he, George, now has its own porosènok.

But the thing: tiny pink piglets are growing property. They grow and grow until they become cramped in the back garden, where only a place and that the strip of land with a pair of run-down vegetable beds. But the hearts of parents were George vsè still good, so Freddy - so George called porosènka - lived in svoèm zagonchike until it has grown to an impressive size and become more like slonènka than porosènka. George it did not upset - he adored Freddie and spent hours with him in the garden: sometimes something told him, and sometimes happy in his extensive shade and read a book about the wonders of the universe.



But Terence, father George, porosènka disliked. Freddie was too big, too pink and even a pig svinèy: should turn away, as he had already danced the garden beds, trampling broccoli and spinach, and joyfully munching carrot tops. And last summer, when George was about to fly to America, and his parents - on the island of Tuvalu, the pope took the opportunity lightning found a place in a baby boar farm not filed Ye with grave ku, promised his son that they would take Freddie when they return.

However, he did not fulfill the promise. Returned parents returned George, all of their adventure ended successfully; then returned to their nearest neighbors - uchèny Eric, his wife Susan and their daughter Annie - lived for a year in America. And then my mother gave birth to George, twins girls, Juno and Hera, who wept agukali, smiled and wept again. And each time, when some of them stop crying, came the blissful, magical silence. That lasted exactly half a second, and then the second girl was taken to roar - and so long as George did not start to think that his brain was about vzorvètsya and potechèt from the ears. Mom and Dad vsè time was exhausted look, and George was ashamed of chèm something they ask for. So when the neighbors came back, George almost dwelt in them. He made his way into the neighbor's garden through a hole in the fence and stuck for days visiting Annie eè parents and supercomputer Cosmos - the smartest in the world. But Freddie now had no real home. When the baby was born, my father said that he had enough worries without voracious wild boar, which takes polsada.

- By the way - with pathos he said in response to the protests of George - Freddy - a living entity, a part of the planet Earth. He does not belong to you, and nature!

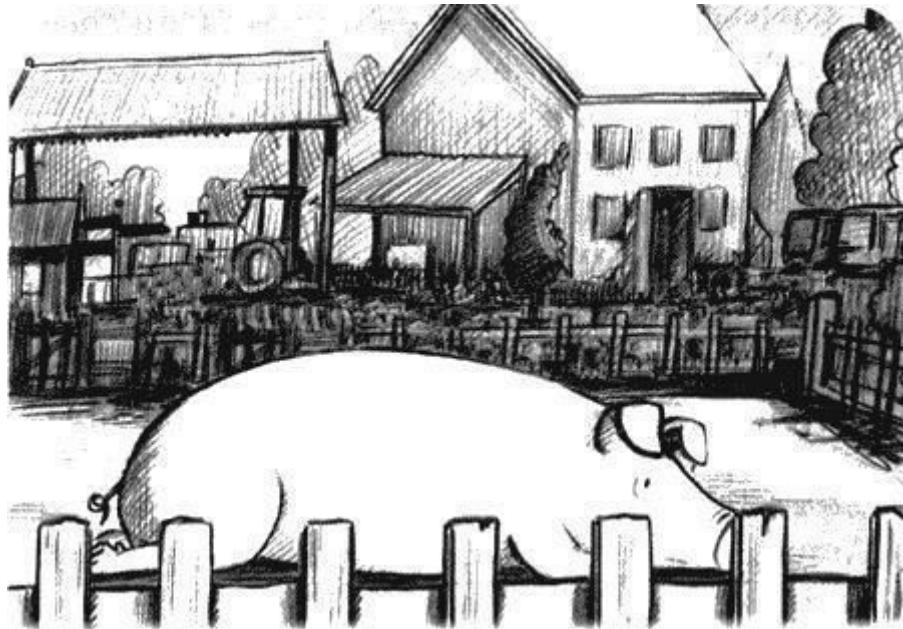
But in a cozy children's farm Freddie was not to settle permanently. In the summer holidays it is closed, and Freddie, along with other animals moved to a farm a little more. This was the real zoo, where the animals were kept most unusual species, and visitors to cut down the shaft, especially in the summer. For Freddie, I thought George, vsè it like for them to Annie's transition from primary to secondary school: vsè unusual and this little bit scary.

- "It belongs to the nature!" - George muttered, remembering my father's words. Cosmos meanwhile vsè eschè worked on a task: find the best place in the universe for the homeless pig. - Freddy, incidentally, has no idea that he was part of the planet Earth. He just wants to live with us.

- He was such a sad face! - Annie said. - Right to cry.

The day arrived in the morning on the farm, George and Annie found that Freddy is on the belly, spreading hooves; eyes had faded, drooping ears. The remaining pigs frolicked cheerfully. Paddock was spacious, clean farm ministers are friendly, but despite vsè this kind Freddie was an utterly. George became painfully ashamed. Vacations passed, and he did nothing to take home Freddy! Even the trip to the farm suggested Annie, not George - persuaded her mother to take them, and then pick up.

Children began to question among farm workers, what happened to Freddie. Those just shrugged. They called for a Woman veterinarian, she examined pig and said that he was not sick, just wasting away with longing. After all, he grew up in a quiet garden, and then lived on a small farm, where he visited a few friends of children. And here all around strangers noisy animals and crowds of visitors, and maybe it was too big a shock for him. Freddie had never lived among pigs, did not know how to conduct yourself with them, and generally thought of himself as a man rather than svinèy. He did not know what to do in this strange place, where a lot of people staring at him, hanging over the fence.



- Can we zaberèm him home? - George asked.

Ministers confused. They began to talk about animal welfare and transport rules and that Freddie is now simply does not fit in the garden behind the house.

- He'll get used to! - They assured George. - You'll see, next time it will be different.

- But he's here for a few weeks - said George. - Why is he still was not used?

To this the ministers said nothing - either did not hear, or pretended to.

Annie, meanwhile, come up with something else. As soon as they returned to her home, she began to realize his plan.

- So, so, - she said, including the Cosmos. - Pick Freddy back to you, we can not

- Your dad instantly otoshlèt it back. Take it to us, too, it will not work ... Alas, Annie was right. George obvèl look cabinet Eric. Space was at a heeling

pile of scientific articles around towered menacingly tottering towers of books, unfinished pyramid of cups with tea, everywhere strewn scraps of paper on which was scrawled the important equation - Space Annin helped Dad in the work on the theories of the origin of the universe. It seems that the task of finding a suitable home for the pig was not inferior to them in difficulty.

When Annie with parents only settled in the house, Freddy showed up uninvited guest to them - and wild boar swept the office of Eric, swept to the sides of the stack of books. However, if Eric was not angry: arranging a mess, Freddie inadvertently helped him find the book you want one. But it was a long time ago; now Annie and George knew that Eric will not be happy pig in the house. He has too much work to eschè tinker with the pigs.

- We have to find a good place for Freddy - tvèrdo said Annie.

Jin! The screen came to life and the cosmos flashing colorful lights - a sure sign that the greatest computer in the world is happy.

- I have prepared a summary of the data on the local space environment and their suitability for the porcine existence of life forms, - he said. - Point to a picture, you will get information about the possibility of living pigs on each of the planets of the solar system. I allowed myself - computer smugly snorted - illustrations provide all their own comments.

- Wow! - Annie admired. - Space, you're my hero!

On the Cosmos appears eight paintings entitled the names of the planets of the solar system. Annie started with Mercury ...

Меркурий

Свинья, опалённая Солнцем



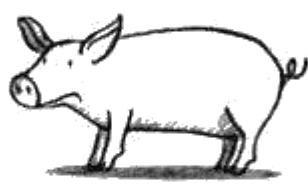
Юпитер

Свинья идёт ко дну



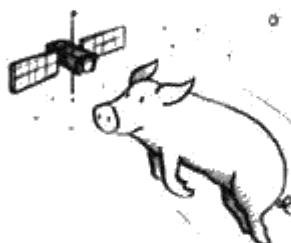
Венера

Пахучая свинья



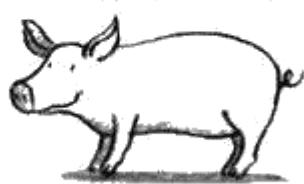
Сатурн

Орбитальная свинья



Земля

Счастливая свинья



Уран

Свинья вверх тормашками



Марс

Прыгучая свинья



Нептун

Свинья на ветру



Our Solar System

Chapter Two

- No, in the solar system Freddie will not survive, - said George, looking at pictures. - On Mercury it will burn, Saturn will sink in clouds of poisonous gas, Neptune its general wind unesèt nowhere. Will fly and think, "It would be better, I sat myself on the farm!" In short, all these planets are not suitable.

- All but Earth - Annie muttered, wrinkling his nose: it meant that she thinks best. - Earth - the only planet in the solar system, suitable for life ... And pigs

- They are the same people! - Suddenly she said. - I mean, for the pigs have to look exactly the same planet as for the people! Do you remember my dad talking about the search for a new planet on which humanity would live if our Earth has become uninhabitable?

- That is, if we ran into a giant comet? - George said. - Or would come global warming? Or if everywhere on Earth began erupting volcanoes? Or if she had turned into a barren desert? - From his parents, ecologists, activists and fighters for the salvation of the Earth, George knew about all the horrors that can happen to a home planet if humanity does not come to his senses and immediately nachnèt not take care of her for real.

- Yes Yes! Dad says mankind must look for a new home - Annie said. - It's like we're looking for a home for Freddie. Pigs are suitable for life around the same terms as men. So if we naydèm in the universe is a place where people can live, hence, our Freddy there is also good.

- It turns out that Cosmos need only to find a new home for mankind, and there too we naydèm, where to place Freddie?

- Exactly! - Annie fun confirmed. - And we can sometimes see him in space, so that he again did not become sad and lonely.

Both were silent, feeling that their plan dalèk from perfect.

- That's how much time we look in space pridètsya house for Freddie? - Finally I asked George. - Your dad vsè looking and looking for a new place for mankind and is not sure nashèl ...

The dangers threatening our planet

- Hmm. Maybe it's better we did settle vsè Freddie somewhere closer to home? Thus, temporarily, just in case.

- Yeah, - George agreed. - And it would be good vsè still on planet Earth. But that's what I thought, wherever it was this house, on Earth or in space, as we have to drag Freddie? He did not porosènochek!

- This is the main genius of my brilliant plan! - Annie brightened. - We will help Space. If he have with you on a journey through the universe, that he

should throw a little pig from one place to another Earth? Space, am I right? Well, tell me!

- Annie, you're definitely right - solemnly proclaimed computer. - Thanks to his wisdom and intelligence, I can easily perform any of the tasks mentioned above - or both.

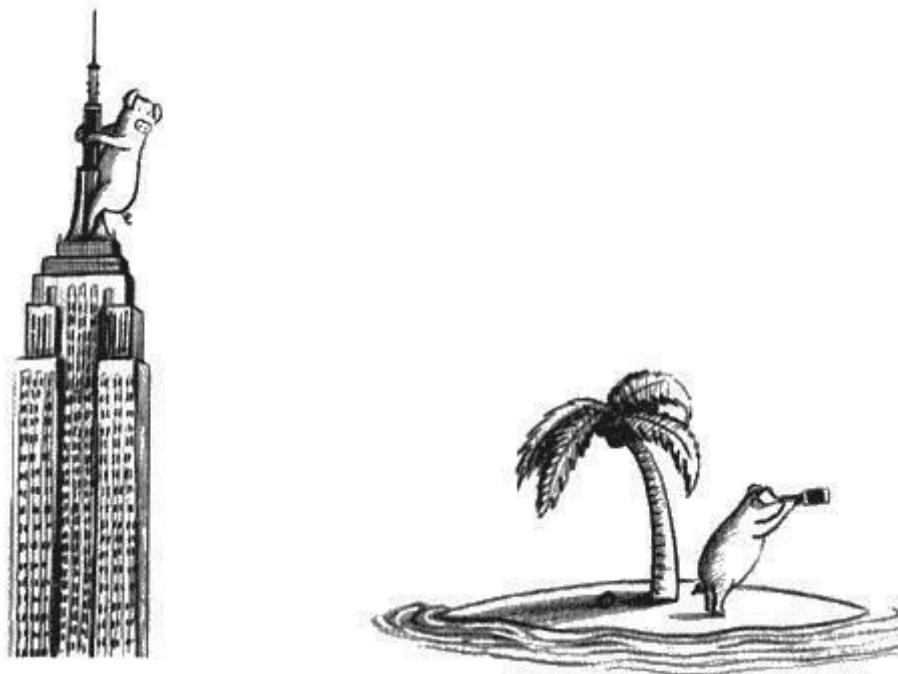
- But it is possible? - George asked. - I mean, your dad did not get angry if he found out that we use it to move the pigs supercomputer?

- I have no reason to inform Eric about this with you co pig-moving, - humbly proiznès Cosmos. - Of course, if you do not give me such a command.

- Got it? - Annie said. - If we ask Cosmos to move Freddy in a comfortable and safe place, he would do it.

- Hmm ... - George grunted doubtfully.

From my own experience of travel through the universe, George knew when Cosmos chooses the destination, the consequences are unpredictable. And he, George, do not want propihnuv Freddie created the Cosmos Portal - the entrance into the universe - suddenly discover that the hog was in the sausage factory. Or on the roof neboskrèba. Or on a deserted tropical island, where Freddie is going to suffer from the heat, not to mention the loneliness ...



- Space - politely proiznès George, - tell me, please, as you could when podberèsh right place, first show it to us, and not to send immediately to Freddy? And eschè: it should be close to us with Annie could go on a bike ride, - because, you know, if we vsè time will ask for your help, we're caught quickly.

- The request is processed, - said Cosmos.

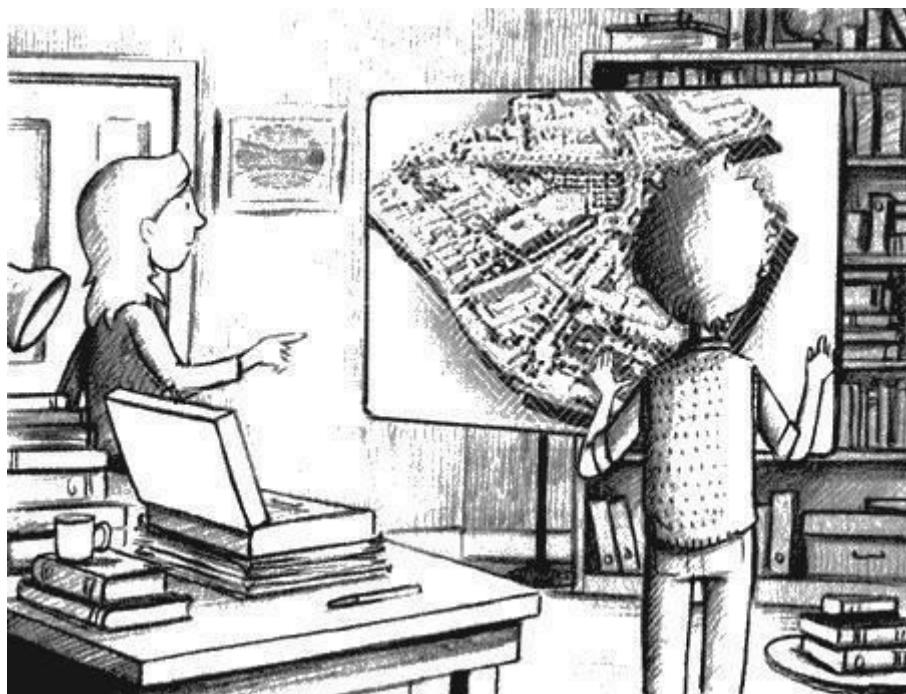
A year earlier, the Cosmos has experienced very tyazhèlyu damage. Eric was able to fix it, after which the supercomputer has become much friendlier than before. There was a quiet hum of the room and there was a picture soedinènnaya with the Cosmos two thin rays of light.

- Map! - George guessed. - It looks like ... Wait, it's Foksbridzh!

- It's true - proiznès Cosmos. - Trèhmernoe image. I can vsè the same as that of your Google, only better. Upstarts sassy! - Space snorted.

- How beautiful! - Annie gasped.

On a map of the cosmos were deposited every single part of an ancient and glorious campus Foksbridzha - streets and alleys, walls, towers and spiers, chetyrèhugolnye yards colleges ...



In the corner of one of these courtyards glowed tiny red ogonèk.

- This is my father's college! - Udivlènno said Annie. - Where ogonèk flashes. Why do you show us the father's work?

- According to the information in my files, pigsty must be spacious, well ventilated, quiet, tèmnym, but with access to sunlight. Place marked on the map - it's empty wine cellar located in the basement of the ancient tower. It is equipped with a ventilation system, the air is clean, there is a window on the ceiling. Cellar for many years not being used, so that your friend there will be warm and comfortable - on the condition that you will catch a straw farm.

- Are you sure? - George has doubted. - And he will not be there to feel like a prison?

- Your friend is happy provedèt a few days in peace and quiet, - said the Cosmos - and you in this time podberète him permanent residence.

- The main thing now - to take him to that farm, so hurry! - Annie picked up. - It is urgent, urgent to save him, while he was not withered!

- Can we look into the cellar? - George asked.

- Of course - said Cosmos. - I will create the window so you can verify the validity of the information received.

Map instantly melted into air, and began to draw Cosmos Portal - a rectangle of light rays. Annie and George many times used the portal to travel through the universe, and then the portal was a door. But now the Cosmos is not going anywhere to send their children - he just wanted them something to show, therefore, drew a small window.

- How amazing! - Annie jumped. - Why we have not figured out that you can travel with the cosmos and our planet, not only for others!

The window darkened. George and Annie struggled peered into the blackness.

- Cosmos, nothing is to be seen! - George said. - I thought you said that the natural light there? I do not want Freddie thought if he was in prison!

- I checked the location - in the Cosmos's voice sounded confused. - The point on the ground is correct. Perhaps curtained window?

- Wow! - Annie whispered. - This darkness ... it is moving!

Indeed, the impenetrable darkness outside the window as if swayed.

- Do you hear? There's voice!

- Excluded - said Cosmos. - According to my information, the cellar for a long time is not used.

- Then what are all these people doing? - Annie asked in confusion. - Look, look!



George stared - and saw. It was not an empty temny cellar - it was a basement jam-packed with people in the robes of ferrous. All these people, apparently, stood with his back to him: George saw only their heads and shoulders.

- They will not notice us? - Annie whispered.

- If they turn around, they can see a portal, - said Cosmos, quickly scanning the room. - I have to admit that although it is completely contrary to logic, probability theory, and common sense, the wine cellar is clearly filled with human beings.

- Ji-alive? - Choked voice asked Annie. - Or mèrtvymi?

- Breathable and functioning, - said Cosmos.

- But what are they doing?

- They...

- ... Now turn to us! - Terrified George interrupted. - Space, shut up!



Space portal shut so fast that no one in the basement did not have time to notice the tiny flashes of light. And if I saw vsè still none of these people would not have occurred to him that their secret meeting observed two frightened children and one very puzzled supercomputer.

Here to Annie and George, who were neither alive nor dead, donèssya voice from the wine cellar:

- Long live the false vacuum, the giver of life, energy and light!

It turned out Cosmos so hurry to close the portal that is only switched off the display and the sound left. Now they did not see what was going on in the cellar, but well heard.

There was a dead silence. Annie and George were afraid even to breathe. Finally, as if in a very terrible auditions, the voice sounded again.

- Dangerous times! - He hissed. - There were, perhaps, a few days before because of a tiny bubble, encompassing the energy of the cosmic explosion, the universe is smashed to smithereens. Uchène-attackers at the Large Hadron Collider will soon begin a new experiment with high energy. The last time we were able to stop them, but now the situation where serèznee. At the very moment when these maniacs include your car, a catastrophe that will destroy the universe. Because of their excessive ambitions we all simply disappear without a trace.

The crowd in the cellar greeted these words with angry shouts and whistles.

- Quiet! - Shouted a voice. - I give the floor to our distinguished expert. He vsè explain.

There was a new voice - low and middle-aged:

- Supervises these dangerous madmen somebody Eric Bellis uchèny of Foksbridzha.

Annie screamed and covered her mouth with his hand. Eric Bellis! It's eè Dad!

- It Bellis is the experiment on the collision of high-energy particles. This experiment, which is held on the ATLAS detector of the LHC, now entering the most dangerous phase. If Bellis will receive the collision energy, which seeks, then, to my raschètam, with a high degree of probability nachnètsya self-destruction of the universe - from the fact that a particle of true vacuum will be created. If the collision of particles in the collider will arise even the tiniest puzyrèk true vacuum, he nachnèt

expand at the speed of light, replacing him false vacuum and destroying all matter! All atoms of the Earth will disappear in less than one-twentieth of a second, and after eight hours and will not be the solar system. And this is just the beginning ...

The voice began to weaken and move away. Cosmos struggled to troubleshoot the connection, but the portal is now came a sinister shèpot.

- This puzyrèk will expand forever. Thus, Bellis had done the unthinkable - it will destroy the entire Universe ... - And his voice trailed off.

George and Annie were frozen like statues. For a moment the room was silent mèrtvaya.

First started up the cosmos. On his screen appeared and flashed a big red letters: "Danger zone! Moving pigs is not recommended!"

- Yeah, Freddy we did not lodge! - Annie said, as if waking up. - There is nothing to do around these loonies. Especially if they say nasty things about my dad!

George swallowed. About chèm vsè still we were talking these people?

- Listen, - he said in a hoarse with emotion, - who are they?



Chapter Three

- What are those "who are"? - I heard a voice vesely.

The door opened, and in the office of Eric appeared in person: rastropannyе chernye hair, glasses, a tweed jacket, in his right hand a steaming cup of tea, under the left arm armful of scientific articles.



- Hi, Annie, Hello, George! Enjoy the last days of vacation?

Friends stared at him. The faces of both were stone.

- It seems that the answer is no - Eric smiled. - Something wrong?

In recent years, the face of Erica did not leave a smile. If these days are asked to describe George treh neighbor in words, he would have said: "In the ears happy." Or this: "According to the ears busy." Generally, the stronger Eric was busy, the more he was beaming with happiness. Ever since he returned from the United States, where he worked at the World Space Agency and searched for traces of life on Mars, ucheny vsye time and hurry vsye time was in good spirits. He was happy at home with semey, he liked to teach mathematics at the University Foksbidzhskom and esche he was delighted with the grand experiment, which took place under his leadership at the Large Hadron Collider in Switzerland.

This experiment was a continuation of work begun uchennyi hundreds of years ago. The aim was to find out what is in the world and how the tiny elementary particles

interact and pervades the universe. To do this, Eric and other uchèneye attempted to create a theory that would allow them to vsè understanding of the universe.

Theory of Everything

This theory, which was given a simple name - "theory of everything", was the greatest goal of science. It could explain uchènym not just when the universe was created, but also, and maybe even how and why it occurred.

With the new results obtained at the Large Hadron Collider, it seems that the emergence of a theory of everything - not far off, and it is not surprising that Eric was in a good mood. This is good, that he did not even scold the children for vklyuchènnyy without demand supercomputer.

- Looks like someone turned on the Cosmos? - Eric frowned slightly, but his eyes were laughing. - Keys strawberry jam though not stained, like last time? - He leaned over the computer and prochèl on the screen: "Where in the Universe is the best place for the pigs" - Yeah ... Now I understand ... - He ruffled hair daughter. - My mother told me that you and George are worried about Freddie.

- We were looking for him a new house - Annie said.

- And how found? - Eric drove to his old rickety chair and sat on kolèsikah between children.

- Space searched the entire solar system, - said George, - but we still did not choose.

- That's nice, - muttered Eric. - Hardly imagine Freddie on Pluto.

- Then we thought - George continued, - if naydètsya planet on which people could live, that she and Freddie podoydèt. But so far we have not found this.

- And then - Annie intervened - we began to look closer to home, well, here in Foksbridzhe, some place to settle there Freddie a couple of days until we podberèm his planet. And we saw in the basement of a terrible chèrnom people who say that your experiment at the LHC will destroy the entire universe!



Eric prishèl instantly enraged.

- Space! - He roared. - What are you got up here ?!

- I just wanted to help - plaintively bleated supercomputer.

- Galactic compote! - Eric cursed. From his complacency was gone. - About chèm were you thinking when allowed children to overhear these idiots ?!

- They said that you will destroy the false vacuum - George remembered - and that because of this, the whole universe will disappear. It's true?

- Of course not! - Eric said angrily. - This utter nonsense. Do not pay attention to them. They deliberately intimidate all, because they do not like our experiments in Switzerland.

- But these people were just in twoèm college! - Annie squeaked.

- In college, shmoledzhe ... - Eric growled. - Yes, even if the World Academy of Sciences! From this delusion that they are not perestaèt be nonsense.

- So you know them?

- Not quite - Eric admitted. - They hide their names and faces. We only know that they call themselves "secret antagonists of the Large Hadron Collider."

- Secret antagonists of the Large Hadron Collider ... - Annie repeated. - It turns out "tobacco".

- Exactly! Excellent sokraschenitse - Eric laughed. - It is immediately clear that one of them harm. And most importantly, that their cause tobacco!

- But what do they want?

- In the last year, - said Eric - this tobacco - and am now call them - demanded that we stop working on the collider. They said that by starting the experiment, we thereby create chèrnuyu hole. We, of course, continue to work quietly. As you can see, we are still alive and well, and our world is not absorbed chèrnaya hole. we

We thought that after that, they would sit quietly and not stick out. But it was not there! They invented this nonsense with the "vacuum" and want to prevent us to begin a new, unprecedented experiment
c high energies.

- But why should they? - George asked. - Why did they invent vsè time some stupid theory?

- Because they do not want us to have happened - Eric explained. - Because our goal - to understand the universe, the whole, entirely. We need to learn not only how it works, but why. Why it exists at all? Why do we exist? Why are the laws of nature what they are? That is the main question concerning the universe and life in it. And they do not want us to find an answer.

- So this puzyrèk that will destroy the entire universe - fiction? Exactly? - Just in case I decided to make George.

- Nonsense cosmic proportions! - Eric confirmed. - But despite this, - then he frowned - vsè more people start to believe what he says TOBACCO. So we changed the plan for a new experiment - in case TOBACCO again prepared for us some sort of dirty trick.

- And when nachnètsya experiment? - George asked.

- It has already begun! - Eric said. - Accelerator works detectors are permanently enabled, a few weeks ago we even have raschètnoy power. That's just - udruchènno Eric shook his head - because of tobacco, we are forced to remain silent as a fish. Okay, forget about these assholes. Where do we send the same vsè Freddie? What do you say, Cosmos?



Cosmos, though slowly amends hastily brought to the screen a new image. It was a beautiful landscape: grove in the valley Slight breeze stirs the leaves, flowers pestreyut, dancing butterflies, the sun is setting ...

- This is the right place for your pig - prodrebezzhal Cosmos.

- Well? - I was inspired by Eric. - Suitable? Do you want to settle there, Freddie?

- Very nice, but ... - George began, intending to ask, where is this place, but Eric, obviously in a hurry, without listening.

- That's fine! - Uchèny drummed on the keyboard. - For children, though it is difficult, we now prepare to build a double portal ...



Annie and George did not have time to blink an eye as Kosmos opened a portal leading to the farm Freddie, Eric and jumped into the pen. Kabanchik so taken aback, that did not resist when Eric began to gently push it to another portal, created the cosmos helpful. Freddie obediently squeezed into the second portal ... and trotted into the grove, which is still visible on the screen.

George and Annie eyes round with astonishment watched as Freddy, a moment out of sight, appears again and happily runs through the valley, pushing the sides tall grass.



Eric backing came from the portal and prudently closed it behind him.

- He eschè we need when we visit Freddie, - he said. George noticed that
κ corduroys Erika clung straw. - By the way, it is necessary to come up with something that was not on
the farm commotion. After all, they decide that the boar escaped into the wild, catch, and throw it.

- And what did you tell them? - Annie asked.

- I have no idea! - Honestly, Eric. - But once I was able to explain the origin of the universe, then,
hopefully, I'll be able somehow to explain the disappearance of the pig.

The screen space until the text "on the movement of pigs The mission is successfully completed. Pig
safe. Good mood. Food, water and shelter are provided. threat level
- Zero. "

- And now, - said Eric tvèrdym voice, meant as the children were well aware that the conversation was over, - I've got to prepare for tomorrow's lecture. And you - the first day of school.

Friends reluctantly left the office. Summer vacations are over. At Annie stayed exactly one night to perform the tasks that it vsè summer left for later. George it was time to go home. In the morning he would be the first time to go to a new school, and he hoped that the baby would not cry the whole night - and give him a good sleep.

- Bye, George - Annie sighed.

- Bye, - sadly, George answered.

Both finished the sixth grade and now moved from primary to secondary school: Annie - in private, George - an ordinary town.

- Here the question arises, why should we go to high school? - Annie could not stand. They stamped at the front door - both did not want to leave. - Why do we not give in space research school? We were there to round honors! Well, who, besides us, I saw right at the nose of the rings of Saturn, he landed a few steps from the methane lakes on Titan ...

- ... I looked like one sun goes down, the other goes, - picked up George, remembering the planet in a binary star system, where they were by mistake once.

- It's not fair! - Annie concluded. - Forces us to pretend to be ordinary kids when we - extraordinary!

- Annie! - Donèssya of the office of Eric's voice. - I hear vsè! Those who do not do their homework, space is not allowed! These are the rules, and you know them well.

Annie made a face.

- Yes Force be with you - she whispered to George.

- And you! - He said, then turned and headed for home.

Chapter chetvèrtaya

The first day at a new school turned to George endlessly long corridors and confusion in the schedule. Time and again he did not get into his class and not on their lesson. Vsè unknown, too many people, too much noise - from all that George was very uncomfortable. Perhaps, he thought, the same feeling and Freddie in when native zagonchik the house suddenly appeared first on a single farm, and then on the other, huge. No wonder that Freddie so sour.

The boys, who in the old school, behaving like the masters of life, here, wandering the corridors and floors to find the right office, looked shy and confused. In elementary school, George and some of them did not get along, but vsè like when you see familiar faces like something quieter. Here, among all these strangers almost adult men, even former sworn enemies seem best friends.

When George began a little to understand the maze of corridors, passages and stairs, lessons suddenly ran out, and he walked to the gate of the school. Once upon a time it every day after a call from school was hiding in the locker room and waited until all go, then to go home without fear of pursuit.

But that was before, when he did not yet know how to travel through the universe and unravel the mysteries of eè. Ever since George became friends with Annie and learned about the wonders that surround our planet, he forgot his earlier fears. Togo, who faced nose to nose with a crazy uchènym in a distant solar systems, not so easy to scare.

But the real life George changed not space travel on their own. The knowledge and experience they priobretènnye - that's what made him fearless. He believed in themselves and know that to cope with any difficulties.

Remembering the events on the way home last night, George thought up to drop to Eric and ask if they can not now visit Freddie. He reproached himself for having not figured out where is the grove in the valley. Seemingly there is certainly very nice, but George was not even sure that it is on Earth. What if dodgy Space perenès pig on dalèkuyu unknown planet suitable for life? George consoled himself with the fact that Eric knows where Freddie, but it would be much safer if he knew it too.



George flew into the kitchen, greeted her mother and tiny sestrènkami entirely stuffed in her mouth pea and cabbage cake (my mother prepared solely from the fact that they grew in the beds, and the recipes are sometimes picked weird). Then he ran to the backyard, where Freddie had lived through a hole in the fence, slipped into the neighbor's garden, pronèssya the path and banged on the kitchen door. No one answered. George pounded harder.



Finally the door opened, and Annie seemed to zelènoy new school uniform.

- Oh, it's you, George.

- Hi, Annie! - George said cheerfully, ignoring the fact that Annie did not seem to him too happy. - Well, like in school? I is horror, but in general, in my opinion, there is not so bad.

- I ... um-m ... vsè ok - she said somehow quiet. - And you ... uh-uh ... you wanted something?

George asked. He ran to Annie every day, and she had never asked him why he prishèl.

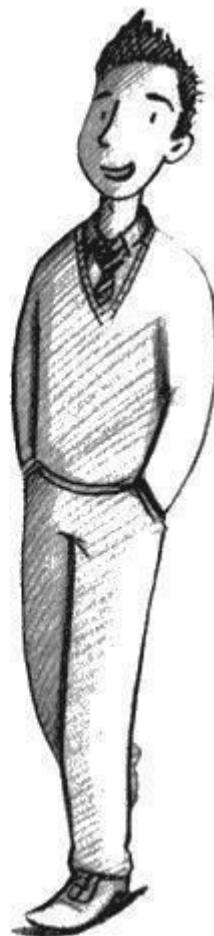
- Well, - he said, slightly flustered. - I wanted to ask your dad, like name of the place where he had sent Freddie. So we can see him.

- Pope not at home, - she said apologetically. - I'll tell him that you came. And he will respond to you via email.

And Annie - George could not believe my eyes - started to close the door in his face. But it became clear after a moment vsè.

- Who's there? - Donèssya voice from behind her, and a voice that clearly belonged to a guy older than George.

- Yes, it's ... uh-uh ... this is our neighbor - Annie helplessly turned her head back and forth, as if not knowing on which of the two to watch. - He's my dad to prishèl.



She opened the door a little wider, and George saw the owner of the voice. It was a boy a head taller than him, dark, with hair sticking up chèrnymi dressed as Annie in zelènuyu form.

- Hi! - He nodded to George over the head Annina. - Unfortunately, Erik was not home. So you go. We tell him that you came.

George jaw dropped in amazement.

- I am, among other things, called Vincent - the boy casually.

- Vincent from my school. He is also the first day of her today - Annie said, trying not to meet with George glances.

- Serèzno? - George eschè more surprised. - You, too, in the seventh grade ?!

Vincent oskorblènno cocked his head.

- I'm in the tenth. We have long been familiar with Annie - not at school.

- That's how, - said George.

- In Vincent's dad - rezhissèr - as if by chance, Annie said, but only a blind man would have noticed that she is fascinated by this Vincent. - He knew my dad, because I was shooting a television series about his work.

- Rezhissèr ... - George repeated, feeling that it knocked out. - Very cute. And my dad is engaged in organic farming. - He defiantly looked at Vincent.

- Idèm, Annie, it's time, - said Vincent. - The board do not forget!

- We're going to ride a skateboard, - explained George Annie. - Mom will throw us to the park. Vincent - the champion of skateboarding.

- Ride ... - George said again, trying to keep his voice as though chèm had happened, but he did not really happen. - Well, let's roll!

He turned abruptly and walked to the hole in the fence. Annie and Vincent watched him go.

George wanted neprinuzhdènno easily slip into the hole like a hundred times before, but according to the law of meanness, hit his head on the fence with a thud and flopped to the ground. Annie and Vincent stood in the same place, which was very very disappointing and dishonest. The main thing when he knocked on the door, he did not open - and now stick out here as driven.



Gathering strength of will in a fist, George got to his feet and with dignity stepped into the hole, as if nothing had happened. In fact, he was uyazvlèn deeply. In just the first day of the school year - and please, Annie has a new friend!

What this means for him, George? Nothing special. It's just that it is no longer not only Freddie and Annie. George gripped a keen sense of loneliness. Head down, he poplèlsya home.

A little later, do it all the lessons and home affairs, George decided to sneak over to the neighbor's back porch - suddenly Eric was back as Annie rolls in the park with his champion?

The door was ajar, and George slipped inside. Everything was quiet, dark and somehow cold, as though suddenly began winter, although still outside were the first days of autumn, tèplye and solar. The house seemed empty - but if the rear door is open, it means that someone here vsè still there! George paused and listened: no sound. Looking around, he noticed that breaks the pale blue light from under the door of the study. George gently drummed his fingers on the door.

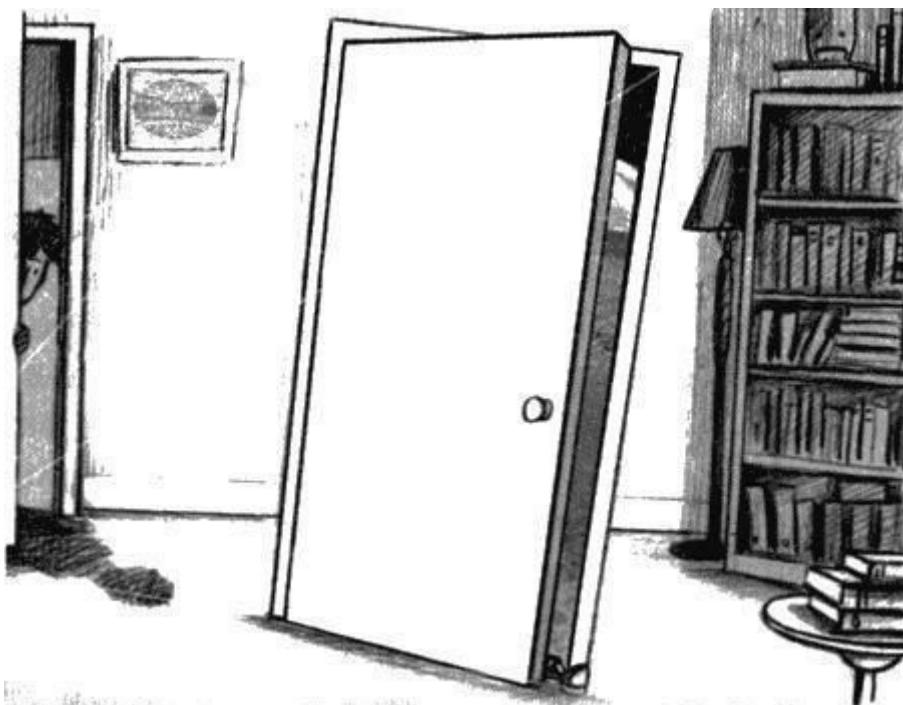
- Eric! - He called. - Eric?

He put his ear to the door, but did not discern any sound except lègkogo buzz - then Cosmos vklyuchèn and running.

George hesitated. He did not want to interfere with Eric - he suddenly considering another important theory - but also miss the opportunity of speaking alone also did not want him. Quietly, with his fingertips, George pushed open the door.

Inside it was not a soul, unless, of course, do not take a living soul Cosmos supercomputer that demonstrating full alert all the lights blinking like a Christmas garland on èlke.

From the screen differed two beams of light, by which the cosmos is always painted portal - the starting point of space travel, George and Annie. Portal itself is hung in the center of the room, held by these thin rays. The door was open to the universe, and that it is not slammed shut, was slipped under neè Erikova worn shoe.



Through the crack was visible desolate, cratered surface on a background of impenetrable blackness. George opened the door a little wider in the hope to see something eschè, but then podnès hand to his eyes, osleplènnny sunlight.

He stepped away from the portal, looked around and suddenly noticed on the chair his own well-worn suit. George grabbed it and quickly pulled over and checked the levels of oxygen in the bottle, buttoned, as taught by Eric, and prepared for the spacewalk.

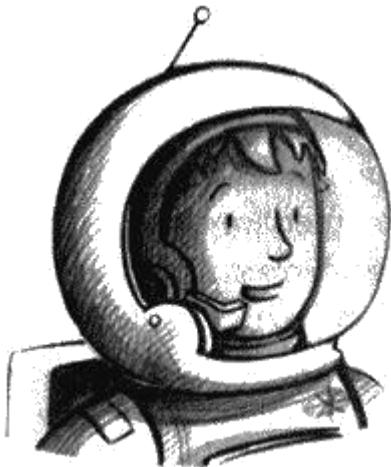


Wearing gloves kosmonavtskie, George opened the door portal. Before him lay the surface of the moon - the closest to the Earth a heavenly body. On all sides, as the eye could see, stretched grayish dusty lunar landscape; hillsides were covered with blinding sunlight, been laid in the crevices of harsh shadows.

Moon

Between the mountains and the portal George discerned tiny figure in a white suit, huge jumps are moved to one of the craters. By George jubilant jump immediately guessed it, Eric. On Earth, Eric is usually barely plësya and he looked dreamily scattered - but in space it vèl as though finally shrugged off his load of earthly cares and can now frolic without interference, heartily enjoying the wonders of the universe.

George boldly crossed the threshold and put it on the surface of the Moon, first right, then left foot. Earth was left behind. George flew high and fell again; lunar soil crunching under his feet. Due to the weak gravity on the moon, you can easily jump to a few meters, it is only a little push.



- Hello Earthlings! - He yelled, moving giant leaps vperèd. He knew that no one in the world will not hear it, but he just had to say something, to mark the first steps on the moon. Against the background of the sky chèrnogo planet Earth looked like zelèno blue precious stone streaked with white clouds. Although they are with Annie before been in space, never eschè George did not see their home planet so close.

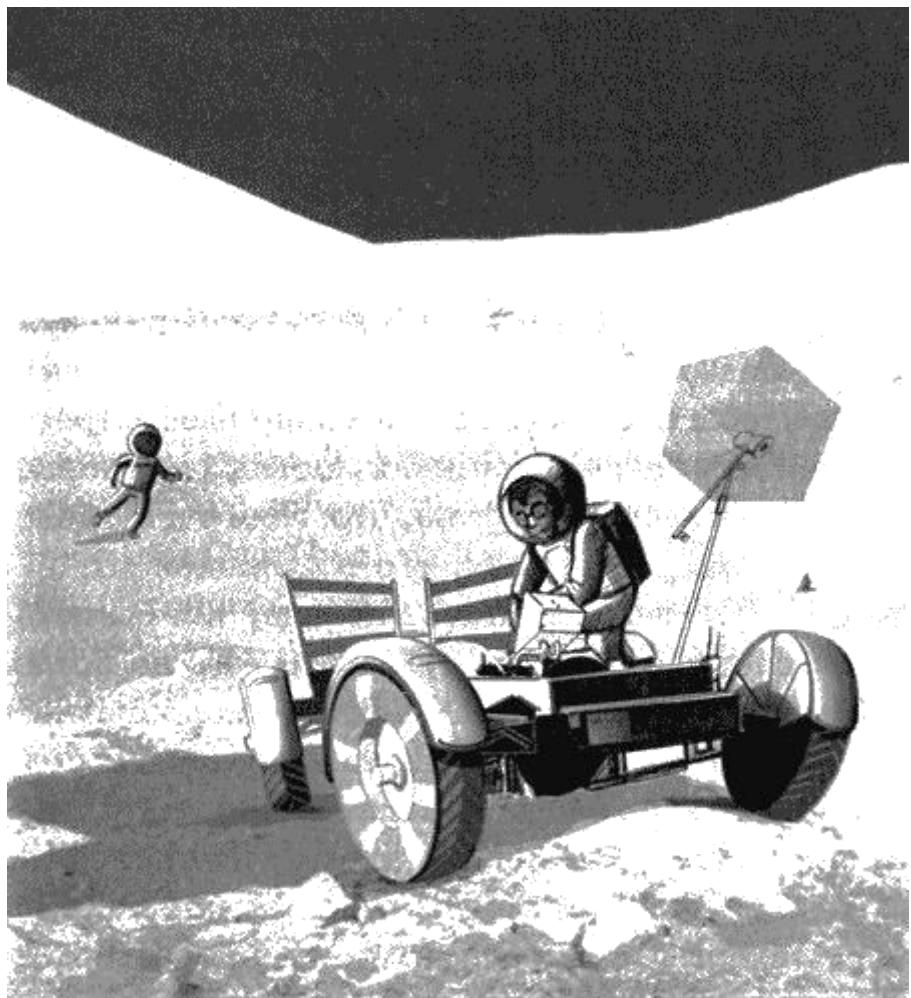
C Mars it seemed a tiny point of light in the sky.

C Titan eè they were unable to see at all because of the thick layer of gas clouds which enveloped this quaint promèrzshy Saturn.

From the system of double star 55 Cancri Earth is also to be seen. Even if George and Annie there was suddenly a telescope, they could guess where the Earth, except for a barely noticeable color changes in the light of our sun.

And here, on the Moon, George was close enough to Earth to see eè in detail, and at the same time far enough away to be stupefied by eè incredible beauty.

Plenty admiring home planet, he jumped to Eric, quickly overcoming the distance between them. Uchèny meanwhile descended into a shallow crater and looked at it some car covered with a thick layer of dust.



Eric! - George shouted into the microphone, built-in kosmonavtsky helmet. - Eric, it's me, George!

- The forces of gravity! - Anxiously he exclaimed Eric, looking up from the lunar rover. - Well, you scared me! I was not expecting to meet anyone here.

Eric did not hear the jubilant shouts of "Hello, Earthlings!" Because the built-in transmitters in spacesuits designed for short distances.

- I voshèl in your office, I look, and there is a portal - George explained. - What are you doing here?

- Yes, I'm all for a moment - proiznès Eric, if defensively. - I wanted to take the lunar stone, then to consider it carefully. I have an idea naschèt extraterrestrial civilizations. You know, I think that if some time in the past - let's say, a hundred million years ago - we were visited by aliens, they have left no traces. And, in my opinion, no one did not yet explored the lunar rocks for extraterrestrial traces. So I decided to look at the moon rock with a fresh eye - it suddenly show signs of life? Earlier this no one came into his head. Well, I ran here for the stone - and see what nashè! It's a lunar rover.

- And Does It Work? - George asked, quickly sliding to Eric the slope of the crater.

Rover looked like a machine with wide tires on any drive on the beach sand. As if someone ride on it on the moon, and then dropped.

Eric got into the driver's seat.

- Think zavedètsya? - George doubtfully looked at the rover.

- Batteries must have long been exhausted, - said Eric, wiping the dust from the rover sleeved suit.

- A steering wheel is not present, - said George. - How do they manage?

- Good question. - Eric wiped his sleeve on leg, causing a white suit appeared wide strips gray lunar dust. - First you need to make it ...

He podèrgal T-shaped lever between the seats, but nothing happened. Lever, it seems to have been built into the control panel. Wiping thumb gloves dust around the arm, Erik discovered breakers with the words "ON", "Power Drive", the "Power Drive".

- Aha! - Eric said happily. - Houston, we have a problem!

George jumped into the rover, sat next to Eric and asked ozhivlènno:

- And what will happen if poschèlkat switches? Should we try?

If only Eric had not remembered that he was an adult, George thought, and did not say that you can not touch other people's rovers. But Eric did not podvèl.

- Of course we try! - He said.

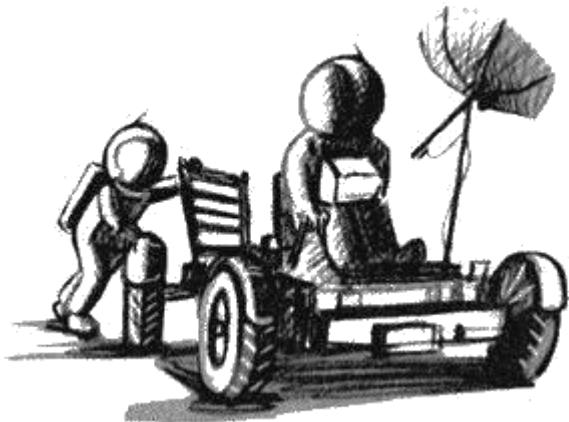
Eric turned on one by one, all three switches, then pulled the lever - and the rover pulled vperèd so quickly and unexpectedly, that both of them thrown into the air and thrown out of the car.

- Hooray! Goes! - Erik jumped back. - George, please, push him from behind! With the local low gravity it should be a piece of cake. And I try to get out of the crater.

- Why should I push? - Growled George. - Maybe I want to keep ...

However, he obediently stood behind the rover and prepared. Eric pulled the lever again. Kolèsa rover whirled, showering George fountain of dust and stones.

- Strong! - Eric shouted.



George pulled hard as I could, and crawled out of the crater the rover to the plain.

- There is! - Eric breathed. He happily potèr kosmonavtskikh hands in gloves and jumped down from the driver's seat. - That's better! - He lovingly patted the rover. - Which car as well? Forty years pylilsya - and please work as pretty. That's what I understand, the technique!

- And it is whose? - Asked George, from head to toe covered in lunar dust.

- The astronauts left - Eric said. - The crew of one of the "Apollo". Look over there. You know, what is it? The landing stage of the lunar module. - He pointed into the distance, on a mysterious chetyrèhnogiy thing. - Here it is, the history of the cosmos, right in front of us!

Both respectfully silenced. Then Eric winced and shook his head, finally realizing that he neither had happened in chèm walks on the moon in the student-neighbor companies.

- George, and you, then why run after me to the moon?

- I zashèl ask about Freddie - George explained. - You did not tell me where his new home; I do not even know on what this planet.

- Oh, quasars-raspulsary! - Eric slapped his helmet. - I do not know either! We must ask the Cosmos. But do not worry, Freddy exactly safe and feels good ... you just have to figure out where it is. Interestingly, and more I have not forgotten anything?



Eric Forgetfulness was legendary in chèm himself with lèkgostyu admitted. Vsè really important he is well remembered - for example, his theory naschèt universe - but could easily forget to eat lunch or put on socks.

- No, nothing, - I assured him George. - Here I am - forgot ... or rather, had not you something chèm ask.

- About chèm?

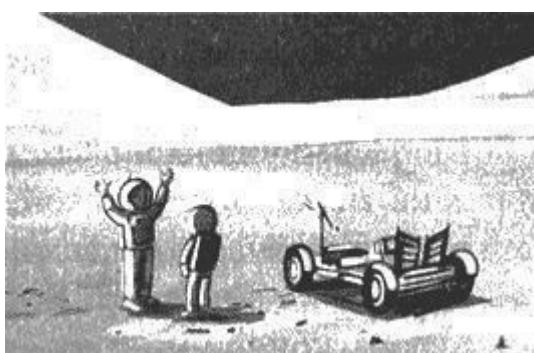
- About your work. Look at the very beginning of the universe - it is not dangerous?

- No, George, - tvèrdo Eric said. - This is not dangerous. More than that, I think it would be dangerous if we did not think about the beginning of the universe, if in questions about how we were and what we do in this world, we were content with guesses, not facts. That would be dangerous. And we are trying to understand how there was this wonderful, wonderful universe! - Eric obvèl arm around him, pointing to the ridge of lunar mountains, endless sky and chèrnoe hanging over the lunar landscape zelèno blue ball - the planet Earth. - We want to know how and why it came vsè: all those billions of stars, the endless and beautiful galaxies, planets, chèrnye hole, an incredible variety of life on Earth. To find out, we're trying to trace back the history of the universe before the Big Bang. It is engaged in cosmology - the science of the origin of the universe. The Large Hadron Collider will allow us to recreate the beginning of time, the first few moments, to better understand how the universe was created. It is not dangerous, but dangerous and very Collider. The only real danger comes from people who want to stop us. The question is why they do not want the mystery of the birth of the universe was discovered? Why do they need to make people afraid of science and eè achievements? That is, George, for me the biggest mystery.



- But what if they try to hurt you? Uchènym you and others?

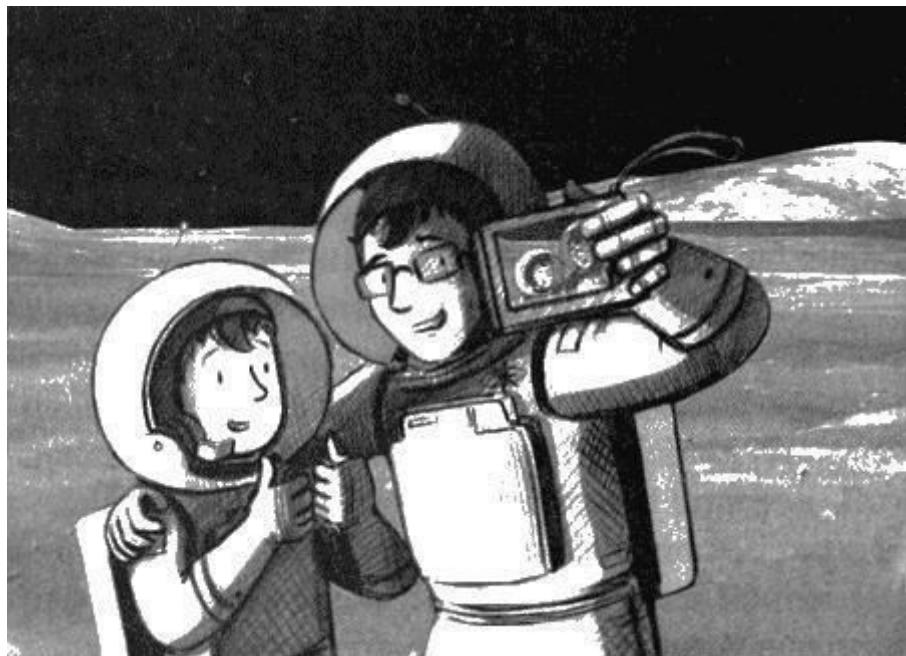
- Little hard to believe, - said Eric. - Finely fouling surreptitiously - is they can, but something serèznoe - hardly. They're cowards. Even their faces open their powder is not enough. So nothing to fear. A handful of losers - that's who they are. Forget about them, George.



George breathed a sigh of relief. So, do not worry - neither for Freddy, nor because of the beginning of the universe. Vsè not so bad! To have fun, he followed Eric bounced away for a shimmering portal. Usually, going to space travel, it closes the portal, but Eric was going to pop out for a couple of minutes, because podpèr door and old sneakers.

Almost before the portal Eric pulled out his camera space.

- It is necessary to take a picture! Attention, say cheese! Probably, it will be a bird lun! - He held out his hand and took a picture of himself and George, who had raised just two thumbs.



- And no one will notice that we have touched the rover? - George asked when Eric hid device.

- Only if you are very careful, - said Eric. - This part of the moon is not under constant surveillance, so I chose eè.

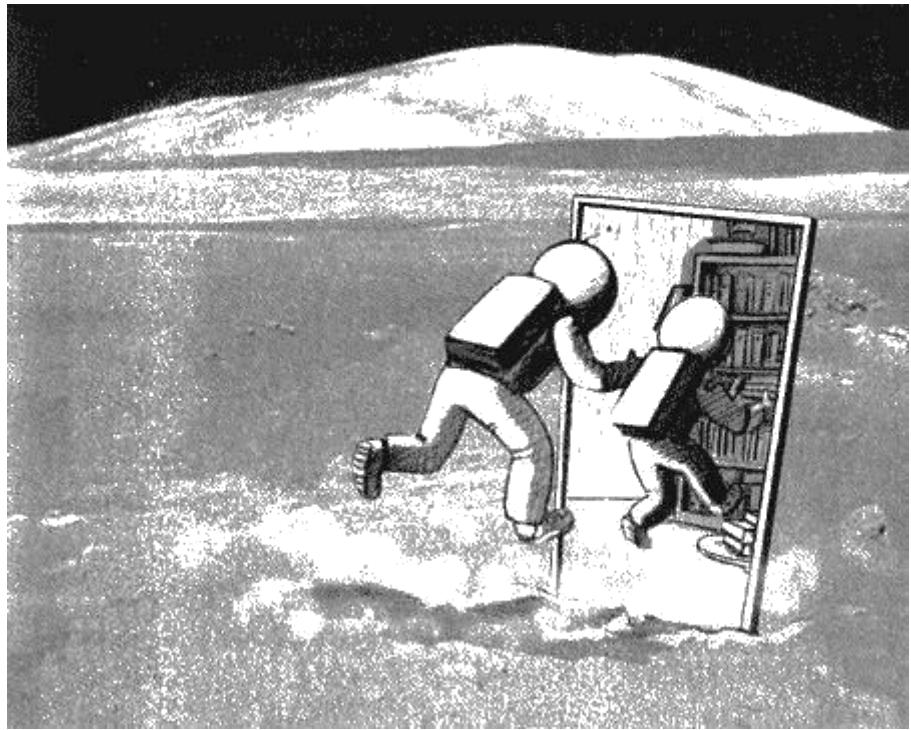
- Even if you will notice, it is unlikely to be angry - George reasoned. - We pulled the rover out of the pit, and he has earned from us again as good as new.

- Wait a minute. - Eric looked at the sky. - That this light over there - what is it? This is not a comet!

According to him chèrnomu sky flying point of light.

- And what?

- I do not know, but whatever it was, it is done by people, so there's nothing we hang around here. The stone in my pocket. Home is more!



They rushed to the portal, hurrying back to where it all begins their space adventures - in Eric's office.

The emergence of the universe

Chapter Five

Jumping into the office, where, as usual, prevailed inspired mess, Eric and George did not stay on his feet and rolled head over heels on the floor, tangled in suits - is, alas, not white.

- The portal is closed, - notified their Cosmos. - You are again on the third planet from the sun.
- Space, your IQ extends to infinity and even è limits - George said, knowing full well that the Cosmos loves compliments.
- Technically, this is not possible, - said the Cosmos, and its screen is flushed, as always, when a supercomputer embarrassed - but still have to agree with you.

As soon as George managed to get to his feet, he began to get out of the suit. Now the suit lying on the floor, resembling an empty caterpillar cocoon, from which just broke the will of the butterfly. Eric vsè eschè in the suit, carefully wrapped pieces of priceless Moonstone. And then the door could be heard hurried footsteps.



- Hush! - Eric hissed. - Hiding suit!

George shoved the suit in the closet. According to the Cabinet circled lunar dust particles.

- Hi! - Shouted Eric unnaturally cheerful voice. - Is that you, Susan?

After the last adventure, when Eric, George and Annie almost stuck forever in zvèzdnoy system at a distance of forty-one light-year in the depths of the Galaxy, Susan is strictly prohibited children to accompany Eric in his space travel.

- Yeah, - Susan responded, but the office was not included - eè steps retreated in the direction of the kitchen. Then came the stamping, announced that Annie is also at home.

- It was superkruto! - She said, bursting into the room. - Dad, you gave me a skateboard on the day ro ... Oh, Dad, why are you in the suit? And George here ...

- Tm-sh! - Eric put his finger to his lips.

- Can not be! You could not ... Really ?! You are in space without me ?! - Annie gave George a withering look.

- You ride a skateboard - politely reminded George. - It's been superkruto! It is much better than on some kind of moon.

Annie seemed on the verge of vzorvètsya. Eric puzzled looked from neè George, as if they were aliens and speak Vulcan, and he had forgotten connect your translator.

- Well, I have time to go home, have dinner, - said George. - Bye, Annie! Eric, Susan, goodbye!

When George was already at the door, Susan called after him:

- Do not forget, George, tomorrow you idèsh us a lecture! Your ticket for me.

The next day, shortly before the start of lectures at the University of Eric George, as it was agreed podoshèl to the neighboring house.



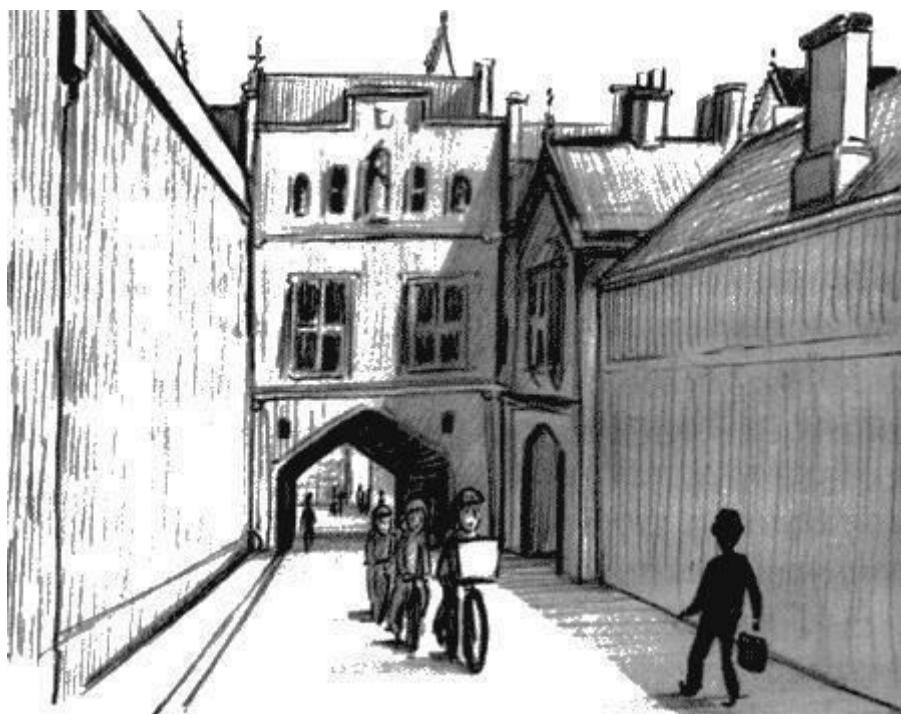
- And as it was on the moon? - Angrily asked Annie, as they zastégivali bicycle helmets. - Well, can not say - I bet a trillion pounds, there is a longing zelènaya.

- But you went to ride! - Outraged George. - With Vincent. Me, you, by the way, was not invited.

- I do not know what you're interested - Annie snapped, jumping on his bike. - You never said you wanted to ride on the board. But you knew I wanted to go to the moon! Stronger than anything in the world! Of the entire universe I most want to go to the moon! And you poshèl there without me. A friend called.

What injustice, George thought. And then she is so angry? What a difference her where he was and what he was doing, if she herself while having a great time in the company rezhissèrskogo son? But George did not ask these questions Annie. He silently wound circles in front of the porch until Susan came with a large cardboard box, which she could hardly attach to the handlebar of your bicycle.

- Vperèd friends! - She said cheerfully, as if not noticing that eè daughter of George and hard do not look at each other.



Vtroèm they drove into the town center. Faculty of Mathematics for centuries housed in an impressive building in a narrow street in the heart of the ancient Foksbridzha. However, turning to the cycle path on the street, they found that it is impossible to pass on - it is crowded with people.

- Who are these people? What are they doing here? - Annie was amazed.

- Let's leave the bikes here - proposed to Susan, pointing to velostoyanku - otherwise we will not get.



Parked bicycles, they began to squeeze through the crowd to the stairs leading to the double-wing glass doors on either side of which rises a column. Before the door hovered University guard, anxiously glancing at the audience.

- Wow, how many people came to the lecture your dad! - George whistled. - You see, everyone goes to the same place we are.

The crowd buzzed and pressed in, trying in an old stone building, on the portico of which was carved an inscription in Latin: PER ASPERA AD ASTRA - «Through thorns to zvèzdam».

- Why did it happen? - Annie wondered, trying to keep up. - Why suddenly so many people want to hear, as the Pope says about all the math?

Ducking and dodging, they finally got to the door, but the guard blocked their way.

- At the lecture is not to start up! - He snapped.

- Excuse me, - politely said Susan. - I am the wife of Professor Bellis, and it is his daughter Annie and è friend George. We arrived early to help prepare the room.



- Oh, I'm sorry, Ms. Bellis, - guiltily proiznès guard. - In general, we at this faculty do not keep guard, there is always peace and quiet. - He took out his handkerchief and mopped his brow. - But your husband seems to be a real celebrity.

Susan and children looked. Suddenly on the far side of the crowd started a commotion.

- Down with the villainous uchènogo! - I heard a shout from a group of people in chèrnom, with masks on their faces. - Do not allow science to destroy the universe!



At the guard's face showed confusion.

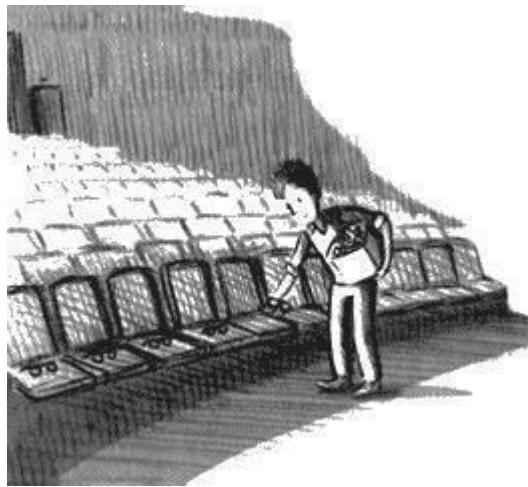
- Department of Mathematics. Send reinforcements! - Quickly said he was in the radio, and then turned to Susan: - Come on, Ms. Bellis. - He opened the door and let Susan and children. - And with these we razberèmsya, - he grumbled. - We will not tolerate such Foksbridzhe. Nothing of the sort had happened here and will not be!

Chapter Six

Susan quickly dragged crazed children through the lobby and led into a large lecture hall, reminiscent of a cinema.

- Forget about the fact that it was on the street, and here it lay on the chairs - Susan said quietly and handed the children on a cardboard box with chèrnymi points.

Annie and George made their way between the rows and each seat put glasses. Eschè bit - and vsè will be ready for the first public lecture of the new professor of mathematics, Eric Bellis, in a very old and very famous Foksbridzhskom University.



Annie still trembled slightly.

- Mom, it's vsè mean? Maybe these people are of a secret organization, about which we told Dad? TOBACCO?

- It's hard to say for sure - Susan said softly. - But, apparently, they do oppose the father's experiments on the origin of the universe. They believe that such experiments are too dangerous and that uchènyh must be stopped before they went too far.

- But that's stupid! - Outraged George. - Experiments which holds Eric, are perfectly safe. And they can really show us how the universe! It's like ... like the last piece of the puzzle that uchènye collected for many centuries! You can not throw this detail, and not seeing the whole picture!

By this time they had already spread throughout the audience points, down from the last row to the first.

behind the last row of a sudden the doors flew open. The tall boy boom pronèssya the hall, jumped off the skateboard, landed next to George, picked up the board - kolèsa eschè spun - and triumphantly exclaimed:

- Both on!

- Vincent! - Annie yelled enthusiastically. - I Do not know what you pridèsh. Well, when there are at least one of each! - She said emphatically, defiantly looking at George.

- And I thought, here no one is allowed, - grumbled George.

- Just started to blow, and I clocked - Vincent pointed to his skateboard - and immediately proved to be ahead of the queue!

- And those in chèrnom - they're gone? - Annie asked.

Hall, meanwhile, began to fill: those who wish to listen to the lecture took place, with curiosity and perplexity considering tèmnye points.

- Yeah, pull up, - said Vincent. - Psychos. What does that even happen? "Villainous uchèny"! Here are idiots!

Annie looked at Vincent from the bottom up, and smiled so that George longed dèrnut eè hair - just to make this smile with neè slipped.

- One of them, by the way, tried to talk to me - added Vincent, deftly tossing board left foot.

- And what did he say? - George asked.

- I do not really make out - Vincent admitted. - At the same mask he was nèm, and sounded as if he had in his mouth a wool sock. But, in my opinion, he has named.

- What? - Interested in George.

Vincent looked at him.



- Honestly, dude - he proiznès - it seems that it was twoè name. It's kind of like "George," he said.

- But if he protests against science at George chèm here? - Annie asked in confusion.

- Well, maybe he did not say "George" - reasonably assumed Vincent. - Maybe it was just some similar word. Or, on the idiots in chèrnom language it means something else. That's my dad, for example - he screwed up as if by chance - as soon as the premiere of the film, so necessarily a problem because of the wacky fans. What are you a celebrity, if you do not have at least a couple of half-witted fans? It is as if to say so, the inevitable side effect. The downside of fame.

- Premiere of ... - dreamily repeated Annie. - Stunned!

- Yeah, - absently said George. - Premiere of the film ... stunned ...

He was not mimicked by Annie - just mechanically repeated eè words, think about why would someone from these geeks mentioned his name. Surely, he thought, there was a link between the demonstrators and the strange gathering in an abandoned basement under one of foksbridzhskih towers. Who would have guessed eschè to call Eric "villainous uchénym" as not these faceless people chèrnom who think that because of his experiences universe can in a minute shatter? But, on the other hand, what they care about, George? ..

In the hall several times blinked light, and a mechanical voice, in which George and Annie recognized the voice of the Cosmos, invited all to take their seats in places.

- Ladies and gentlemen - continued voice - as well as children and space travelers, today you will be an adventure, what in your life did not yet happened. So, ladies, gentlemen and young space explorers, prepare for a meeting with his universe!

And at these words, the hall was plunged into darkness.

Chapter Seven

George, Annie and Vincent quickly took their seats in the front row at the edge. The last chair, next to George, remained empty. It was the only available space - the room was packed. Finally everyone was seated, and there was silence.

- Dear space travelers! - Voice boomed over the heads of the Cosmos. - We have to overcome billions of years. You are ready? Ready to be launched in the beginning, ready to learn why and how vsè started? Then please put tèmnye points! You will see something dazzling, so watch out sight!



Above the heads of the audience in the darkness there was a white point of light, unbearably bright. And then George said that at the empty space next to him someone sits down. Just at this moment Cosmos lit room a bright flash, and George managed to see

to the neighbor completely unusual spectacles: stekla they were not transparent and not temnye and bright zhelye.

Previously, George saw such points only once in a lifetime. When he and Annie and Eric pulled from the Cosmos chernoy holes on Eric somehow they had the same zhelye points. It was not his glasses, and the question of how they found themselves in the supermassive hole chernoy, remained unanswered.



- Where did you get those ... - George was started, but his words were drowned out by the voice of the Cosmos:

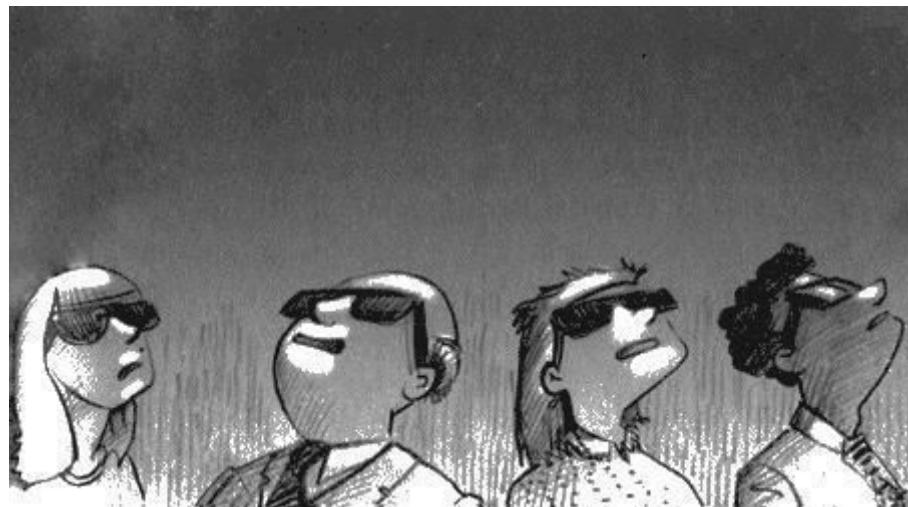
- Our story begins thirteen point seven billion years ago. - Above the hall still hanging luminous point. - It was then that arose vsè that we'll see in the universe, and vsè what we do not see, because it is invisible. It appeared as a tiny point is much smaller than a proton. The space was too tiny, so vsè in nem had to be tightly compressed. If you look back so far that there's nowhere, it turns out that physics can not describe exactly what was happening at the time - was too unusual conditions. But, apparently, the space, as we know it, began with a tiny point of thirteen point seven billion years ago, and then began to expand.

The point of light suddenly began to swell like a balloon. This ball was slightly transparent over its entire surface vortex circled colorful patterns; but inside, it seemed, there was nothing.



- This hot broth - continued Cosmos - and becomes our universe. Note that the universe - only the surface of the ball; It is a two-dimensional model trèhmernogo space. When the ball rastèt, its surface expands and vsè that it has stretched. Along with space and time began. This is the traditional picture of the Big Bang, in which vsè, including space and time, there is at the beginning of the history of a sudden.

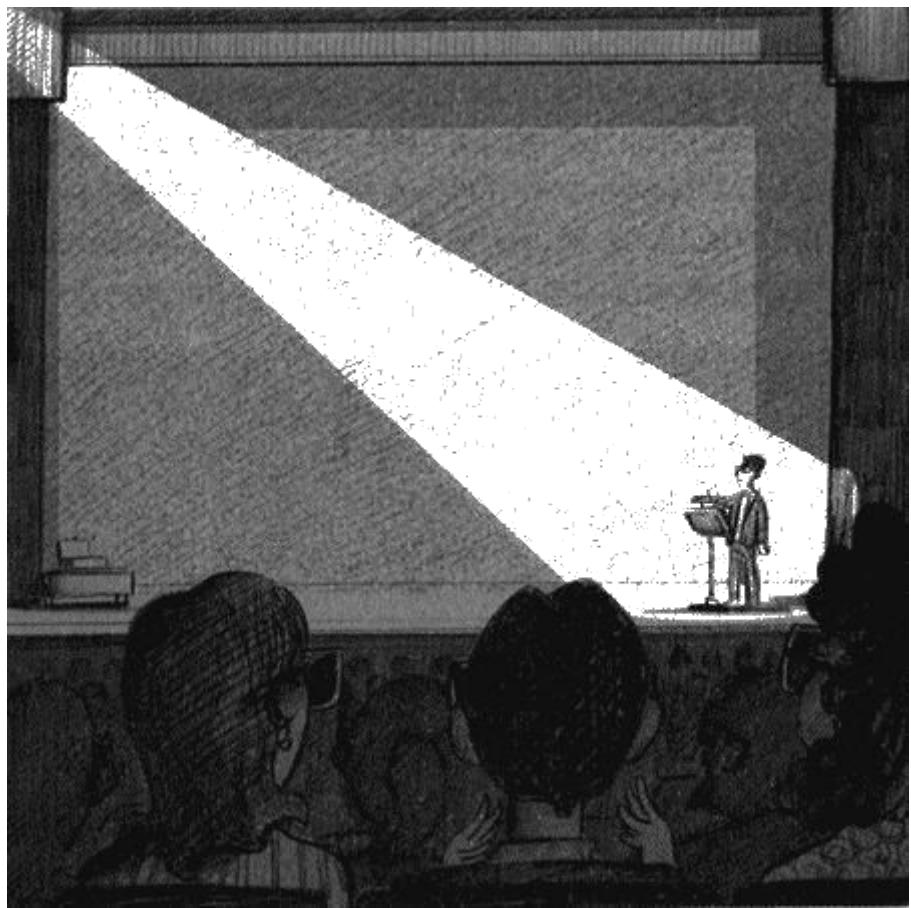
Bowl over the heads vsè swelled and finally burst. Snake bright patterns intertwined, then faded and vanished like a cloud, leaving the audience in the dark. Everywhere they swept izumlènnye oohs and aahs.



A moment later, chèrnom ceiling began to emerge and begin to move the pale light spots; taking the form of galaxies, these spots are expanded and removed from each other until they disappear one and all - and the hall again swallowed by darkness.

- But is vsè this was really the case? - Once again came the voice of the Cosmos. - Some uchènye doubt that the Big Bang was really the beginning of history. We do not know for sure, but let's try to get involved in the history of the universe in just a tiny fraction of a second after the entire observable universe was compressed into extremely small, smaller than a proton, space.

- Imagine ... - proiznès another voice, and a strip of light snatched from the darkness of Eric, who was standing on the stage and smiled broadly. Hall burst into applause. - Imagine that at this very moment, at the beginning, you are sitting in the universe ...



Big Bang - lecture

Chapter Eight

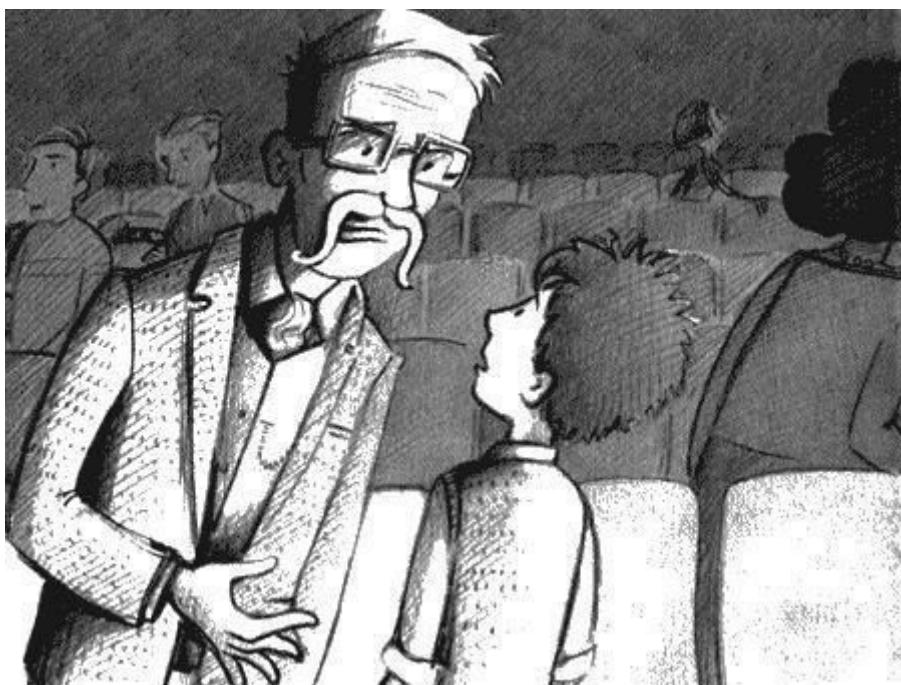
When Eric graduated from a lecture hall and zazhègsya light, students jumped to their feet and applauded wildly. The ovation lasted a long time. Smuschènny Eric weighed several bows awkwardly jumped off the stage into the hall, where he immediately found himself in the ring enthusiastic fans, and photo and video cameras recorded his every move. The ring around it was so dense that Annie and George did not even hoped to break through to Erica. On the contrary, the crowd pushed into their vsè away from him.

Annie, flushed with excitement, and then repeated in the space: "Stunned!"

- That was awesome! - Once again it has issued, referring to Vincent.

His appearance was that woozy, as if he had looked into the heart of the star burned down and now can not return to reality on planet Earth.

George heard behind him a polite but tvèrdoe cough and turned and found a man sitting next to him at the lecture. He noted that this old man, quite gray, with long drooping mustaches. The old man was a tweed three-piece suit, dangled from his waistcoat pocket watch chain.



The old man grabbed George's arm.

- You're sitting next to his daughter Erika, - hot shèpotom he said. - Do you know Eric?

- Yes ... - George recoiled long gray mustache almost touching his face.

- What's your name?

- George - George replied, continuing to retreat.

- I need it! - Asked the old man. - I have to talk to him urgently! It is very important.

The old man were now the most ordinary glasses. George even thought I do not whether it zhèltye stèkla imagined.

- Who are you? - He asked the old man. He frowned:

- Do not you know me?

George frantically recalled. whether he met this man before? No, not likely. And it was in vsè nèm something vaguely familiar.

- You've heard me the truth? - The old man insisted. - Come on, my name, speak!

George does not just brains dislocated, but could not remember who it could be. He shook his head apologetically.

- Really? - The old man's face fell in disappointment. - And in the old days I was known to all. About my theories knew every student. Are you really not heard about Professor Zuzubine?

George made a sad face. He was terribly embarrassed.

- No, Professor Zuzubin. Sorry...

- It is unfortunate to hear that - sadly said the old professor. - I'm, you know, was a mentor Eric.

- Exactly! - George sighed with relief: at last he could say anything good. - That's where I saw you - on the student's photo Erika. You - the one his teacher!

Professor Zuzubin did not cheered at these words.

- Teacher Erica ... - bitterly proiznès it. - So, this is how I will remember ... That's how I will think about if I do not ... - He interrupted himself in mid-sentence. - Okay, do not pay attention - he said emphatically. - Tell Eric I'll wait in his office. Hurry up, George!

Break through the crowd to Eric was not easy. "Do not push!" - Angrily hissed at George, but he stubbornly moved vperèd. Eric, meanwhile, disabled Cosmos from the network, closed it and took under his arm.

George finally got to Eric and whispered in his ear:

- There's a professor Zuzubin. He wants to talk to you. He said that this is very important.

- Zuzubin ?! - Izumlènno asked Eric. - Here, in this room? Are you sure? The same Zuzubin?

- Yes, Zuzubin - George confirmed. Vsè this time it tried to push and push, but he remained undaunted.
- He zhdët in your office. He says it's urgent.

- I'm on my way! - Eric loudly clapped his hands, and the noise in the room fell silent. - Thank you for having listened so attentively - he thanked his fans. - A month is a new lecture
- Come, please, we'll talk about holes of ferrous and end of the universe. Good evening everyone, ladies, gentlemen and children!

Under another applause Erik left the room. George shèl frowning after him. There was a professor Zuzubine something - maybe glasses with zhèltymi stèklami, maybe the tone in which he proiznès name Eric - which is why George cat clawing at heart. Whatever is meant for Erica meeting with this man, he, George, must know about it.

- What it is? - Professor Eric Zuzubin laid before some picture and pristuknul on the table with such force that the pile of books trembled, and with unfinished cup of tea rattled plaintively. - What, I ask you?

- Professor Zuzubin - Eric mumbled, blushing and shuffling from foot to foot, - I ... I ...



George stared at Eric's mouth agape. He never did not yet seen the famous uchènogo scolded like a boy.

Professor Zuzubin stood silently, expectantly looking at his former pupil.

- Eric Bellis - proiznès he finally - I know that there has not been without you. Kindly explain, please, what it means vsè. I am waiting.

George stood on tiptoe, trying to see the photo. On nechëtkom image was visible only grayish surface pitted with craters, and the side - two vague figures in spacesuits.



- Oh-oh - Eric whispered.

- That's right - "oh-oh" - pripechatal Zuzubin.

- In vsém my fault alone - quickly said Eric. - George here at chém.

- George ?! - Zuzubin exploded. - So, now we are children to drag him into space? I wonder what's next? Excursions on the moon for kindergarten? What do you think, I wonder?

- It vsè because of me. - George gamely stepped vperèd. - I poshèl for Eric to the moon, because I wanted to ... I had to ask him one question. He did not call me, I'll poshèl. - Not having time to finish, George realized that only made matters worse.

- Then - slowly she hissed Zuzubin - you left open portal without supervision, enabling the child to use it on their own and go into space? You know how it is serèzno?

- I am very, very sorry. - Eric looked abashed. - I had no idea that the satellite will fly in this area ...

- You showed unacceptable carelessness - cut Zuzubin. - This picture was sent to me Dr. Jiang from the Chinese branch of the Brotherhood of scientific research for the benefit of mankind. He wondered how the Chinese satellite was able to get a snapshot - a real shot with the date and time - two astronauts on the moon, if the last manned spacecraft have been there in the nineteen hundred and seventy-second year?

- But then, it appears vsè not so bad? - Hopefully George asked. - If they did not see the portal, then the Cosmos is not declassified, and they decide that this photo - just a mistake.

- Just a bug ?! - I hoisted Zuzubin. - If someone thought up by a supercomputer to walk on the moon and caught him there, do you think this is just a mistake, do not worry?

- Do not yell at George! - Eric began to rebound. Taking off the table one of his many cups he drank cold tea - it seems that it gave him strength. - Yes, I admit that we walked on the moon with the help of the cosmos, because I'm working on a theory and I needed a piece of lunar soil to test the hypothesis. But this vsè! There is no longer talk about.

- Nothing like this! - Zuzubin flushed. - It's very even have to talk about chèm. So far this photograph kept in strict confidence - thanks to Dr. Jiang - but if proizoydèt leaked, it would be a disaster for all of us! You know perfectly well that the cosmos can be an invaluable tool of scientific inquiry only as long as its existence is kept secret. You know what can happen if a nèm know the whole world. You entrusted with the honor of being the custodian of the greatest computer in the world, and you're ... you're ...

George seemed that Professor Zuzubin would burst with rage. But he pulled himself together and continued more calmly:

- And most importantly, vsè it happens in such a difficult time for the Brotherhood ..!

Brotherhood of scientific research for the benefit of mankind consisted of the best and most worthy uchénnyh united for the sake of science was used exclusively for the benefit of mankind, and not to harm him. Not only Eric, but Annie and George were members of the Brotherhood. George vowed uchénogo shortly before he was to save from Eric chèrnoy hole.

- ... You must have seen a demonstration today! And you can not fail to understand that the secret antagonists of the Large Hadron Collider - Zuzubin diligently uttered these words - now just gaining momentum.

And what he is trying so hard, George thought. Thanks to direct - TOBACCO. It imechko them perfectly.

- They grew bolder, - continued Zuzubin. - Today they ventured to appear in a public place - before such was not. They know that in the world of science is vsém vsè great suspicion, and it pridaèt them confidence. And if because of your irresponsibility become aware that we have a secret supercomputer, people will be interested in what eschè we hide from them? Perhaps, they say, the collider is indeed very dangerous. Do you realize what would happen if we banned experiments? Our scientific career pridèt end. Science itself pridèt end!



Eric seemed on the verge of tears. Never eschè George never seen him so miserable.

- What should I do? - Eric asked.

- We called an extraordinary council of the Brotherhood - Zuzubin said, consulting the silver watch, which he izvlèk from his waistcoat pocket. - You immediately go there together with the Cosmos. It will examine all the teams made supercomputer, while he was on twoèm care, and decide whether they were justified.

George and Eric silently gasped. Brotherhood uchènyh scan Cosmos Magazine and finds out that recently it has been used to move the pigs!

- You pridètsya explain their actions - continued Zuzubin.

- If you get ... - I murmured Eric, vsè eschè thinking about Freddie.

- And then the Brotherhood will decide whether you have the right to remain the custodian and trustee of the Cosmos. Transport I have caused.

Eric turned pale:

- You want to say that I have taken away the Cosmos?

- They will not do! - Shouted George. - It's not fair!

- Let's see - Zuzubin said. - You go, Eric. The car drive up to your house.

- And where are going to take me?

- To where do you spend your main experiment.

- I'm going with you, - said George. - I'm also a member of the Brotherhood and have the right to ...

- Eschè what was missing! - Thundered Zuzubin. - You ostaèshsya here. This is not a toy.

- Professor Zuzubin rights - quietly said Eric. - This does not concern you, George.

- But where are you going? - George insisted. - And when vernètes? Where will this meeting?

Eric sighed.

- In the Large Hadron Collider - just as quietly, he said. - Where we are waiting for all the answers.

Vtroèm they silently left the room and headed for the exit. However, looking back on the porch, George saw through the glass door that Zuzubin not idèt behind them and down the stairs leading to the basement.

- Eric - George asked as uchèny opened bicycle lock - and that in the basement of this building?

- In the basement? - Eric asked absently. - I'm not going down there with since he was a student.

- But what's that? - I would not leave George.

- Yes dump rubbish, I suppose. Old computers and vsè is. I do not know! - Eric shook his head. - Sorry, George, I have no time for that. Seek his bike and went home.

Chapter Nine

At home they were met by Eric beaming Annie.

- Dad, Vincent said that you were great! You are a real star!

The festive mood did not last long. Susan took one look at Eric and George to realize that something has happened. She stole Eric's office and closed the door, but through the thin walls of the children vsè still heard every word.

- I do not understand. How are you now going to Switzerland? After the semester has just begun. How are your students? And how do we, Eric? You promised we'd be together to prepare for our wedding anniversary! We long ago vsè planned. Can you at least once in my life to bring me?

- What happened? - Annie whispered.

- When we were on the moon, the Chinese satellite and made us zasèk Photo - said George, too shèpotom. - The Chinese have sent a picture that one professor, quite ancient, and he got very angry, and now your dad's in trouble. He pridètsya go to the Large Hadron Collider, right now, and explain how it happened, and there they will decide whether he can be left at the Cosmos.



- They can take away from us Space ?! - Annie whispered in horror.

- Susan, - heard from the side of the wall - I'm sorry, please. It's my fault.

- You promised, - said Susan. - You promised me that you will no longer turn our life into bedlam. Annie and George did not want to listen, but every word, as luck would have sounded very otchètlivo.

- If I do not go, I will select exactly Cosmos - proiznès Eric.

- Space! - Susan mimicked. - How did he make me sick! I do not want to hear about nèm more! Some trouble for this computer.

- It is not, - timidly said Eric.

Annie ran out of the kitchen and rushed into my father's office.

- Stop! I can not stand it! - She cried, wringing her hands, as if on a stage. - Do not quarrel! Stop immediately!



George stood forlornly in the middle of the kitchen. For the first time since that day, he met with the neighbors, he desperately wanted to be not at home, but at home, with their family parents. Let sestrènki yell, let mom prepares their weird vegetable muffins - and Eric, Annie and Susan even understand each other without it.

- Annie, calm down, - said Susan. - You have nothing to do with chèm. This only applies to us with the Pope.

- They will be taken away from us the Cosmos, is not it? - Annie asked Eric, who, according to his view, was
at this moment somewhere else - probably traveled through the universe.

- What? - Eric winced, as if waking up.

- So you did not hear anything ... - obrechènno said Susan. - I'm talking to you, and you in this time of thinking about science. - Voice eè suddenly became empty and in exhausted.

- I ... well ... - Erik clearly had nothing to say.

- So let it be taken away from you! - Blurred Susan. - Maybe without that damned computer, we would once again become a normal semèy!

- Mama! - Annie horrified. - You what ?! You do not think so!

- Very even think! If the Brotherhood uchènyh not destroy the ill-fated car, I'll kill myself eè!

After these words in the house was very uncomfortable. Eric, stomping loudly, went upstairs to pack; Annie had come with him, to go advising what to say to the Brotherhood.

- Annie! I'll take care of itself! - Donèssya to George's voice Erica, unusually loud. - Mind your business svoè!

George was still standing in the kitchen did not move, as if glued. He heard Annie ran down the stairs and broke into Eric's office and slammed the door. In the house reverberated loud sobs.

Susan gently knocked on the office door.

- Annie ...

- Get out! - Annie screamed. - Hate you! All you hate!

Susan returned to the kitchen - pale, stretched out face.

- Excuse me, please, George, - she said wearily. - I'm very awkward.

- Nothing, - said George.

But vsè was a very "something". George had never heard adults swearing so, and his heart was bad.

- You're probably better now to go home - Susan said softly.

On the threshold of the kitchen there was Eric.

- Here, take it. - He gave George a cage with a hamster Busik. - Eschè And here it is, in the memory. - He took off his backpack from his shoulder and a small voice said: - In case of a sudden, while I'm gone, they decide to confiscate all my cosmic things.

That looks out of a tightly packed backpack, looked like a duvet, had once been white. But George knew exactly what it was: a spacesuit!

- Are you sure? - George asked, throwing a backpack on his shoulder and comfortably intercepting cell.



Minivan was not a normal hamster. Strictly speaking, he was not at all hamster. He was the only one in the world supernanokompyuterom. Created by Dr. Lynn, a former colleague Eric, this Busik was almost as powerful as the Cosmos.

Anyhow, in theory. Because - and this was a problem - practically Eric had no idea how to manage it. Nanocomputers had the appearance of normal furry animal. Control Panel, it did not have, at the command he did not react. Without its creator, Dr. Lynn, Busik was completely useless. Eric had hoped to merge it into the net with the Cosmos, but this plan failed. Busik peacefully lived in a spacious cage, brushed mustache slept so running in the wheel - not the most decent way of life for a computer, which occupies the second place in the world by intelligence ... But as long as Dr. Lynn vernètsya from some far-Institute of Physics, Eric could not do anything with Busik. Is it to protect it - and keep secret.

In addition to Dr. Lynn only Eric and the children knew about Boucicaut. And it means, George suddenly realized that no one in the Brotherhood are not even aware of the existence of the second supercomputer. They only know about the cosmos.

- Bye, George, - said Eric. - Good luck!

- How's Annie? - George asked. The sobs had ceased.

- I'll tell her to write you a message, - promised Susan. - When we're privèdem myself up.

George came out of the neighbor's kitchen into the garden and climbed through the hole in the fence. The home of a friendly light in the darkness familiar dim light. Environmentally friendly solar power generator, assembled from scrap materials dad, gave not a very strong current, and the battery quickly sat down.

George proshèl into the kitchen, where his mother, Daisy, whipped vegetable purées for babies. From the house smells he warmed his heart. My mother turned to him and smiled.

- You already prishèl? I mean, you vsè well? - She asked, looking at the backpack and a cage with a hamster.

His throat was stuck George com. He nodded.

- I'm so glad - affectionately said Daisy. - I understand you are now hard at home ...



The twins were sleeping right there in the kitchen, in reed baskets; tèmnye very long eyelashes cast shadows on the pale pink schèki.

- When they are a little older, - mother hugged George - will become easier. And quieter.

One of the girls - George vsè eschè bad distinguish them - published in a dream a quiet chuckle, like a crystal bell rang zvèzdnaya or a speck of dust fell to the ground.

- When they grow up, you simply will not believe what they once had. I can not imagine that we ever lived without them.

Terence - dad - also went into the kitchen and stood in the door proème, looking at his wife, son and daughters. Before George suddenly realized: for mom and dad never said a word, he holds the neighbors much more time than at home - and he felt that parents loved eschè stronger.

- Well, what do you prishèl, George - my father said. - We missed you. Let me help. - He took a cage with a hamster and began to look at the second most powerful supercomputer in the world, which, like the twins, slept peacefully. - Who is it?

- It Busik, - said George. - Can I have it remain?

Parents smiled.

- Of course you can! - Happy mom. - This handsome. And less porosènka way.

- I'll take it to you, - my father said.



George climbed the stairs to his room and stretched out luxuriously on the bed, do not forget to leave the curtains schèlochku - in case you suddenly prosnètsya night, but the sky just fly to a meteor ...

Chapter Ten

In the stillness of the night before home Erik stopped long chèrnaya brilliant machine. Out of the car came out shofèr and rang the doorbell. Eric, very pale, was standing in the hallway, clutching a briefcase with the Cosmos. On the threshold he turned. Susan and Annie rushed up to him and hugged.

- Well, I must go. - Eric's eyes burned with a white face, like two dying stars.

- Good luck - quietly said Susan. - And I ask you, Eric, be careful. Please! There because there are bad people, and they do not like.

- Come on, vsè be tiptop! - Eric tried to speak cheerfully. Now, when he left Susan and Annie and had forgotten him angry. - I'll be back in a couple of days, and together we posmeèmsya on this story. It's just a stupid misunderstanding; I will explain how it happened, and vsè immediately settled. You are bored and do not have time, I'll be home. Maybe even to the anniversary.

- So far, Dad! - Lower lip trembling Annie.

- Professor, we should, - urged the driver. - Vsè painted by the minute. Get in the car, sir.

Eric left the house and climbed into the car sparkling. The driver closed the door gently behind him. Stèkla windows were zatemnènnye, so that neither Annie nor Susan saw Eric's cheek, sitting alone on a luxurious leather seat with a computer on his knees, slid tear.



The car, humming a powerful engine, sped through the evening city. In silence they drove to the airport. It was a small private airfield, send and receive just a couple samolètov day. The driver said something to the guard, the gates opened and the car rolled on lètnoe field.

On the field, in the bright light of the full moon waiting for a small silver samolèt. The car drove straight to the ramp. Climbing aboard, Eric found out that he - the only passenger.

A minute later the cabin raznèssya pilot's voice:

- Good evening, Professor Bellis. We are honored to welcome you on board our aircraft. After about half an hour we land at an airfield near the Large Hadron Collider. Kindly fasten your seat belt.



Samolètik, picking up speed, slid on vzlètnoy band, easily lifted off the ground and fixing his nose up at the sky, ponès Eric meet fate - and perhaps towards the collapse of his scientific career.

Expansion of the universe

Although George fell asleep as soon as his head touched the pillow, he slept long. In just a few seconds - so it seemed to him - he abruptly sat up in bed, covered in a cold sweat. George had a bad dream, torn and confused. On dalèkoy planet over which shone zelènoe sun, people chèrnom chasing Freddy in the bush orange grass and cried: "Down with the villainous pig" George wanted to stop them, wanted to cry, to leave Freddie alone, but from the throat struggled just scared wheeze .



While George sitting on the bed, trying to catch his breath, he was struck by a terrible thought. If Eric vernetsya without the Cosmos, he, George, never know, which is now home to Freddie! Eric did not tell him where he went boar, because he did not know it, and only going to find out. If the cosmos is lost to them forever, you and Freddie also lost. What if the computer sent him to the most distant regions of the universe? Then Freddie vsè carried away farther and farther away from him. So George would never see each other, and to blame only himself in this. He, and he alone had to take care of Freddy!

The dream vanished. George became unbearably sorry for Freddy, and along with himself. Maybe from a glass of milk with cupcake him feel better? He slipped out of bed and tiptoed breathlessly walked down the stairs. Not only had enough to wake the babies - parents just do not be happy with this.



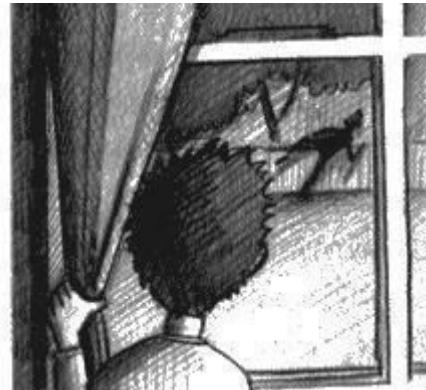
In the middle of the ladder, George suddenly heard sounds. They came from below, from where no light was on, and, in theory, there was not a soul. George froze. To continue the way it was terrible, but he did not want to go back, fearing an unexpected noise to attract attention. He pressed his back against the wall and waited. When he had already decided that he vsè heard, the sounds were heard again. These were the steps, quiet but distinct; someone snuck downstairs as he was. Outside, the full moon was shining, è

silver light streamed through a first floor window. From where George stood prigvozhdènny fear to the wall, he was perfectly visible long shadow that slipped past the stairs and disappeared in the direction of the kitchen.



Barely audible creak the door leading to the garden, and like a cat cautious steps departed away.

Quietly, trying not to make a single sound, George returned to the bedroom and pressed to the window. In the moonlight, he saw tèmnaya shadow darted to the far end of the garden, jumped over the fence and disappeared, as if melted. His head was spinning George, heartbeat echoed in his ears. He rushed to the parent's bedroom and began to shake the pope's shoulder.



- Hrrgrr! - Prohrapel parent and rolled over.

- Dad! - Loud shèpotom called George. - Wake up, wake up the same!

- Grrrmf! - Terence turned and spoke in a dream. - Disable the bomb! Save the whales! Do not eat meat!

George again, shook him by the shoulder.

- Prohibit the whales! I do not have a bomb! Save the meat! - Terence muttered. Daisy softly snoring beside him, with his head under the pillow.

Finally Terence awake.

- George? What? Girls? Again want to eat?

- Dad, the house was someone! I saw how he ran over the fence!

Terence groaned and swung his legs out of bed.

- What is there to steal? - He grumbled. - I wish I could see what he was naydèt ...

He vsè still went down, and when he returned, his face was serèznoe though vsè eschè and very sleepy.

- The back door was open - he told George. - I eè locked. But maybe it's just a cat ran? Okay, George, go to bed until the baby did not wake up.

No sooner had he said as he heard a whimper - first from a cradle, then from the second.

- Well. Waited - summed Terence. - Go to your son. Good night.

The next day at school, George eyes closing and his head drooped to the desk. Dad decided not to declare to the police about the incident the night - because the house nothing is missing, and in general he was sure that just an animal - probably a cat - wandered into the kitchen in search of food.

George did not argue with the Pope, but he had a different opinion: the steps that he had heard during the night, though, and almost silent, for cats were too heavy - if it is, of course, was not a leopard. Attempts to solve the puzzle completely exhausted George, and he yawned loudly.

- We will not interfere? - Politely inquired history teacher.

- No, sir, - said George.

- Then would you be kind enough to open the textbook on page thirty-four?

George dug up in a textbook and backpack nashèl desired page. He had completely forgotten in the turmoil of yesterday's events on homework and did not even open the book.



But it turns out, someone had eè open up to him. At the thirty-chetvèrtoy page appeared a folded piece of paper. On top of an old-fashioned, chètkim and very familiar hand was withdrawn it, George, the name.

With a sinking heart he opened the note and prochèl:

George!

The forces of evil in the universe are not asleep. Our friend E. in danger. We need to talk to you. In no case do not try to contact me. I'll find you.

Yours Faithfully, Dr. L.

George on the back ran a chill. Backpack the night before he gave up on a table in the living room. This means that the shadow that he noticed and steps are heard, belonged to none other as Dr. Lynn, a longtime enemy of Eric.

"But why would he come to me ?! Why does not Eric? "- In a panic thought George - and immediately realized. Because Eric was not at home! He at that time had already left, taking with them the Cosmos. A Busik, supernanokompyuter that Lynn must have hoped to find Eric House, was actually George - in his room on the second floor, where Lynn did not dare to climb. It must be Lynn learned that Eric had left and decided to visit George. Secretly, stealthily, at night! So, he really wanted to tell something important. We need to find and Lynn know in chèm business. But can we trust him?

Annie would probably have said, "Of course not, you're it!" After all, because they have twice Lynn got into trouble in the depths of the universe. But in the end it turned out that Lynn, although he was called Zlin, not such a bad person. Yes, he lured them to the satellite dalèkoy planet - but he himself saved them. And when they returned to Earth, Lynn promised never again to take up the old. He said he wants to again become a friend of Eric and this uchènym, tèmnye throw things and get out of the shadows into the light.

According to a note in the history books, Lynn knows how to help Eric. But how to find him, that Lynn?

"That's where I was hiding, I'll be mad uchènym?" - Napryazhènno mused to himself, George. At least, he thought to himself, - but, as it turned out, he wondered aloud.

- I do not know where to hide crazy uchèneye, - said softly teacher. - But if I were George Grinbi, I would probably have looked now thirty-four page and try to answer the question written on the blackboard.



The class giggled.

- Excuse me, sir, - said George.

The remaining half an hour he struggled to think about the battle of Hastings, and not about the evil forces acting in the universe. But the efforts were in vain. In the brain, it has, like a scarlet letter on the Cosmos screen flashed a single thought:

ERIC IN DANGER!

Chapter Eleven

After school, instead of going straight home, George began to travel around the city by bike. Of course, the chance to meet Lynn on the street was extremely small, but George did not know what to do eschè. He remembered Foksbridzha card, which showed them the Cosmos, and the ill-fated basement, which held a meeting of a secret society. It is necessary to find out more about this TOBACCO! George a drop of no doubt that the note has a Lynn attitude towards people in chèrnom.

Is Lynn Was a protest? Or did he, in chèrnom robe and mask, tried to ask about George Vincent?

George nalèg pedal. He knew the city well and remember where the secret cellar located on the map. It was Eric's college - that is, the same college in which Eric and Lynn were once students Zuzubina. And he Zuzubin, and Lynn and Erik - they all came from the same college.

Zuzubin, Eric thought, oh, this Zuzubin. As it is, he manages to be everywhere and nowhere at the same time?

Tyazhèlye college gates were locked and bolted, but was cut a small door through which is usually included and the students went to the thick wooden doors. George put it in the door, but the path was blocked by the gatekeeper.

- I need to pass a note to Professor Bellis - George lied, did not think of anything better.



- On the table over there leave, - muttered the stern guardian. He had just finished mow the lawn before college - bright zelènye grass stood straight, one to one, - brushed with petals of daisies border flower beds, carefully cobbled podmèl track and polished brass door handles. The last thing he wanted to make this perfect order has been violated somehow disheveled boy. - College closed!

The porter looked at askance by George, his mustache bristled belligerently. George had to go home with nothing. Houses, a quick bite, he ran to the neighbors, but there was only Susan, on itself is not similar. Usually it's his, George's mother, tired and exhausted, dressed in what at first drop neè out of the closet. Today, Mom and Annie was wearing something like eyebrows shifted anxiously in front of the alarm.

- Annie is not at home, - she said. - Went on karate. With Vincent. He seems chèrny belt.

Of course, George thought. Who would doubt that.



- Sign not inviting, - said Susan, - because I've been down stray: We planned on Sunday a big festival, and I need time to prepare vsè. And eschè here, look: the window was broken. As it turned out, it is not clear. Around fragments.

George èknulo heart.

- When did it happen? - he asked. - At night?

He did not tell Susan that night at his home visited uninvited guest - a kind at neè already been flurried.

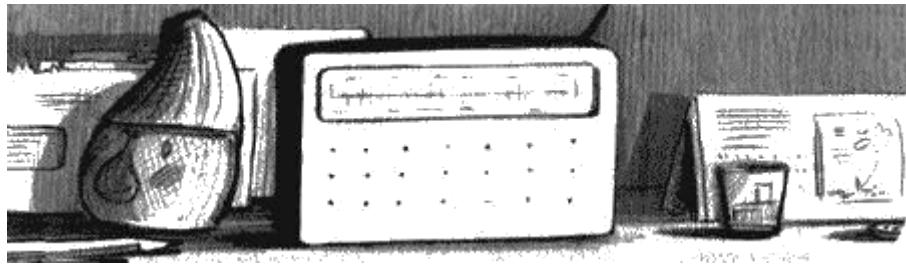
- Looks like it. We have not heard anything. And nothing was missing from the house. - It seemed that she was about to cry.

- And soon Eric vernètsya? - I asked George to divert eè.

- Eric said it was their trial is scheduled for tomorrow night. He hopes that vsè soon found out the next day and in the morning he was flying home. I am also sure that vsè be fine. And now I'll pick Annie, and we will go with her to visit my sister, with nochèvkoy. Sorry, George, I'm really no time! Till!

With that, she closed the door. George heard the key turn in the lock, and then schèlknula valve. He sighed and poplèlsya home - there was nothing left.

He voshèl in the kitchen at the very moment when Dad turned on the radio news.



"Can a tiny puzyrèk of the Large Hadron Collider to absorb our universe? - Came the cheerful voice of the announcer. - That is the question which is now on everyone's lips! "

- George, you heard anything about this? - Terence said.

- Tm-sh! - George pleaded. - Please, Dad, do not bother!

"The group of opponents of science, calling themselves the" secret antagonists of the Large Hadron Collider ", published today a sensational statement: a new experiment at the LHC poses a threat to the survival of mankind! In an open letter to the inhabitants of the universe secret antagonists argue that this experiment - a dangerous folly, because in the course of his can stand out a tiny amount of the so-called true vacuum.

According to our source from the group secret antagonists our existence in the universe depends on the false vacuum, which can be destroyed as a result of experiments with high-energy, which will soon have to start at the collider. Secret antagonists estimated that puzyrèk true vacuum just eight hours is able to smash to pieces the entire solar system! Contact Professor Eric Bellis, leader of the experiments at the LHC, we could not, however, just a minute ago, his colleagues and staff made the statement: "Do not be afraid of the progress of science! The collider is perfectly safe! "And now, following the news of the hour ..."

vacuums

Terence turned off the radio.

- It's true? - He asked grimly. - It is true that Erikovy experiences life-threatening?

- Of course not! - George said. - Eric wants to help humanity, not destroy it.

- Then why is he talking about?

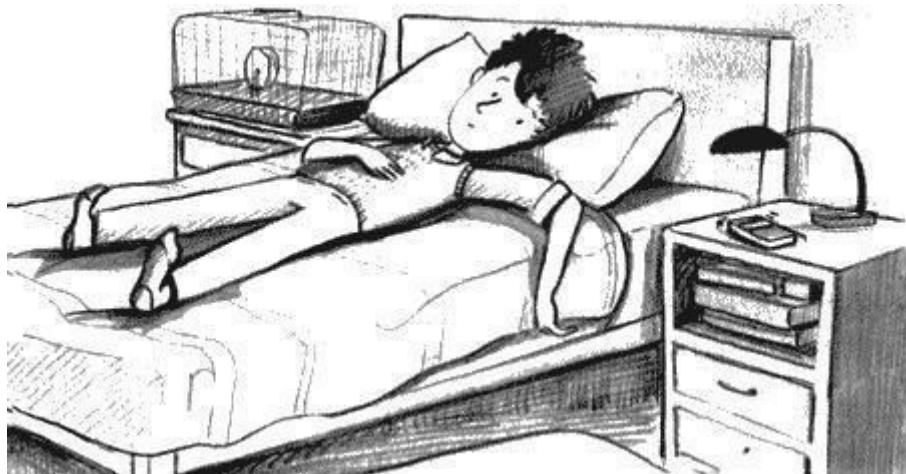
- How do I know? Someone decided to stop him to make discoveries, that invented all this rubbish about the true vacuum. But I will find out who is writing and why! I have to help Eric! ..



- Lessons to do - that's what you've got - my father said sternly. - And stay away from Eric and his family. Temporarily. You understand me well, George? If all of this there is a reasonable explanation, we need to hear it from the Erika. In the meantime, you must promise me not to climb
B these cases.

- I promise - George said, and crossed his fingers behind his back. He could not bear to lie to their parents, but there was no way.

In the morning on Saturday, when George, already fully dressed, lying on top of the bed and laid by pondering a plan of action, his phone rang. When he pereshèl in high school, the parents finally bought him a cell.



- Annie!

Never eschè George was not happy to hear the voice of eè. On the eve of the evening, he called her and bombarded messaging, but no reply came.

- Did you hear what the Pope said about the news? - She asked.

- Uh-huh, - said George restraint. Likely, it's awful, he thought, when your dad is a celebrity. - He called you?

- How! - Annie snorted. - Do not call or write. If only the word! But the entire Internet is buzzing: Eric Bellis - a dangerous madman, it is necessary to forbid his experiments until he has destroyed the entire universe. Mom said that at seven thirty in the evening he will have this same meeting of the Brotherhood, and then, she hopes he vernètsya home. That's all I know.

- I received a strange note - George admitted. - From Lynn.

- From Lynn? - Annie cried. - And are you silent? What is he writing?

- What your dad is in danger. And the forces of evil in the universe are not asleep.

- Too eschè discovery! That's what we know without him. Why did not he say, what do we do? Do you even talked to him?

- And how to talk to him? Do you think he left a phone number? Lynn svoèm repertoire: note almost on parchment, bukovki such vintage. You'd think he was writing with a quill pen. And dipping it into the blood.

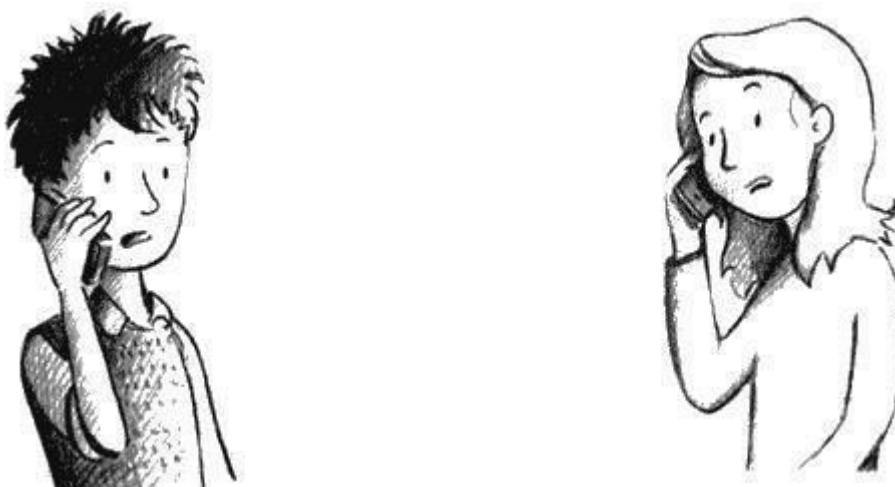
- Explore Zlin - sadly said Annie.

- I have tried to include Boucicaut, - said George.

- Happened?

- Nope. - George glanced at the cage with Busik. Blue eyes nanohomyachka absolutely nothing to express. he watches Usually worn on the wheel as a zavedènnny, but now peacefully nozzles. - I even phoned Emmett last night, and he tried to turn it on remotely, but nothing came of it. Okay, maybe later.

Emmett was their American friend with Annie and part computer wizard.



- Then - soup with a cat - sadly said Annie. - Or rather, with a hamster. Even if our crazy kibermanstra did not work out, then there is no chance.

- Something important vsè Emmett did say - obnadèzhil eè George. - He thinks Busik not just a day of running in a wheel. He cools your CPU when something is said.

- So Busik vklyuchèn, we just can not make it work ?! How insulting! Why did not he wants to help us?

Reply George did not have time because of the cell suddenly rang unbearably shrill squeak.

- Who's there? Your sestrènki? - Annie asked.

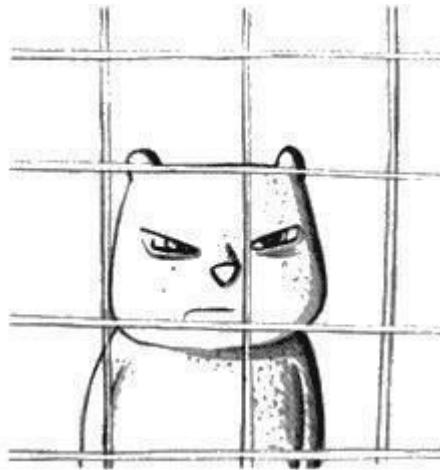
- No. It seems that - slowly proiznès George - is Busik.

Busik stood on his hind legs, front Sutch in the air and his head thrown back. Then he again issued a heart-rending cry - not even believe that such a small creature could make such deafening sounds - bowed his head, turned and stared at George with their hamster eyes, that of the blue suddenly became bright zhèltymi.

- What have you got there? - Annie insisted.

- In my opinion, Boucicaut fit.

But here Busik opened his mouth.



- George - he rasped a voice that was more like the creaking of a rusty nail on the glass. - George.

- Who said that?! - Annie donèssya cry from the tube.

- Busik ... - George hair at the crown stood on end. - Busik said.

As far as he, George, was known Busik never proiznès a single word. In contrast to the Cosmos, he was silent supercomputer. At least until this moment.

But the voice that spoke Busik, was neither an animal, or even a computer; it was a human voice. Human Prichèm, which George and Annie knew very well.

- It's Lynn! - Annie said. - Busik voice says Lynn.

- George - proiznès Busik again, this time more otchètlivo - you've got to help me.

- What should I do? - George asked in a panic at Annie.

- Find out what he wants - she ordered. - Do not hang too ears. Remember how many nasty things he did to us.

- How can I help you? - George asked, realizing with horror that vedèt conversation with electronic hamster.

- You've got to meet me! - Eyes Boucicaut broke zhèltym ognèm. - Find me in the universe! We need to talk.

- Is that you, Dr. Lynn?

- Who eschè - Zlin grumpy voice growled hamster.

- When you and I last saw each other - he reminded George - you would leave us without oxygen on the moon, at a distance of forty-one light-years from Earth. And before you tricked Erik in chèrnyu hole.

- And now I have changed - just Busik said, - and I want to help you.

- Why should I believe you?

- You do not have anything. But if you do not naydesh me and do not listen, Eric never vernètsya home.

George froze. Fearing for Eric, he at the same time imagined Freddy forever Lost knows where ...

- So tell me now! - Dropping the phone, he grabbed the cage in both hands. - What's up with Eric?

- Eric in mortal danger ... Only you, George, you can save it. Only you. Busik privedèt you to me. I do not have much time. Go immediately. Goodbye, George. See you in space.

- Hey! - George shouted at the hamster. - Lynn! Get back!

But Boucicaut zhèltye eyes again turned blue, and George realized that the conversation was over.

- What did he say? - Annie's voice came from the phone.

At this point, hamster started all his little body, and out rolled a tiny ball.

George picked up the phone again. His hand shook.

- What do I have to meet him. In space.
- But where, where?
- He did not say. No where or how to get there.
- Try to find out from Boucicaut! - I told Annie.

George took the hamster out of the cage and carefully felt on all sides - suddenly somewhere vsè there is a secret key, which they had not noticed. But nanocomputer only looked at him with the same empty and meaningless gaze as before.

- Wait, I'm coming! - Annie said.
- Do not. Once.

George returned Boucicaut in a cage and took out a ball that had fallen from a hamster. It was a ball of paper. George unrolled it. On the long strip it was written by a series of numbers, but in the end

- The capital letter X.



- Again ... Again, the message is similar to the coordinates ... - said George, remembering the letter once received from Eric Lynn. In that letter, as this strip of paper, was a series of numbers - the coordinates of the alleged dalékoy planet where Eric was offered to go. Just really did not have any planet: insidious lure Eric Lynn directly into the mouth of a supermassive chèrnaya hole. - Maybe here it shows the position where I have to meet with him?

- But how do you go popadèsh? - Annie asked. - And how do we know it's safe? Suddenly it again chèrnaya hole?

- Then we'll talk. - Holding the phone between ear and shoulder, he jumped out of bed and reached into the cupboard for a spacesuit that Eric gave him two days ago, on the memory of their space adventures.

Busik stirred, blue eyes began to change color. It is already understood George, meant that the computer is turned on and ready to act.

- I go out, - firmly said Annie. - I'm on the bike I will come very quickly. Wait for me!

- I'm sorry, Annie. I have no time.

Busik stretched column; Now his eyes blazed scarlet ognèm. Of these, up to the middle of the room stretched ray of two and began to rotate, forming a glowing circle. Circle spun and spun, just Busikovo wheel.

- George! - Swept from the tube. - Please do not! - George had already climbed into the suit. - Do not go into space without me!

- I have no choice! - George shouted, before putting on a helmet, would otherwise have to speak through a microphone. - It is necessary to know that he wants us to tell Lynn. So far, Annie! ..

George threw the phone on the bed. Painted Busik expanded the circle of light in his eyes, turning into silvery tunnel, stretching into the distance. George put on his helmet and took a deep breath of oxygen cylinder. The headphones came the voice of Lynn.

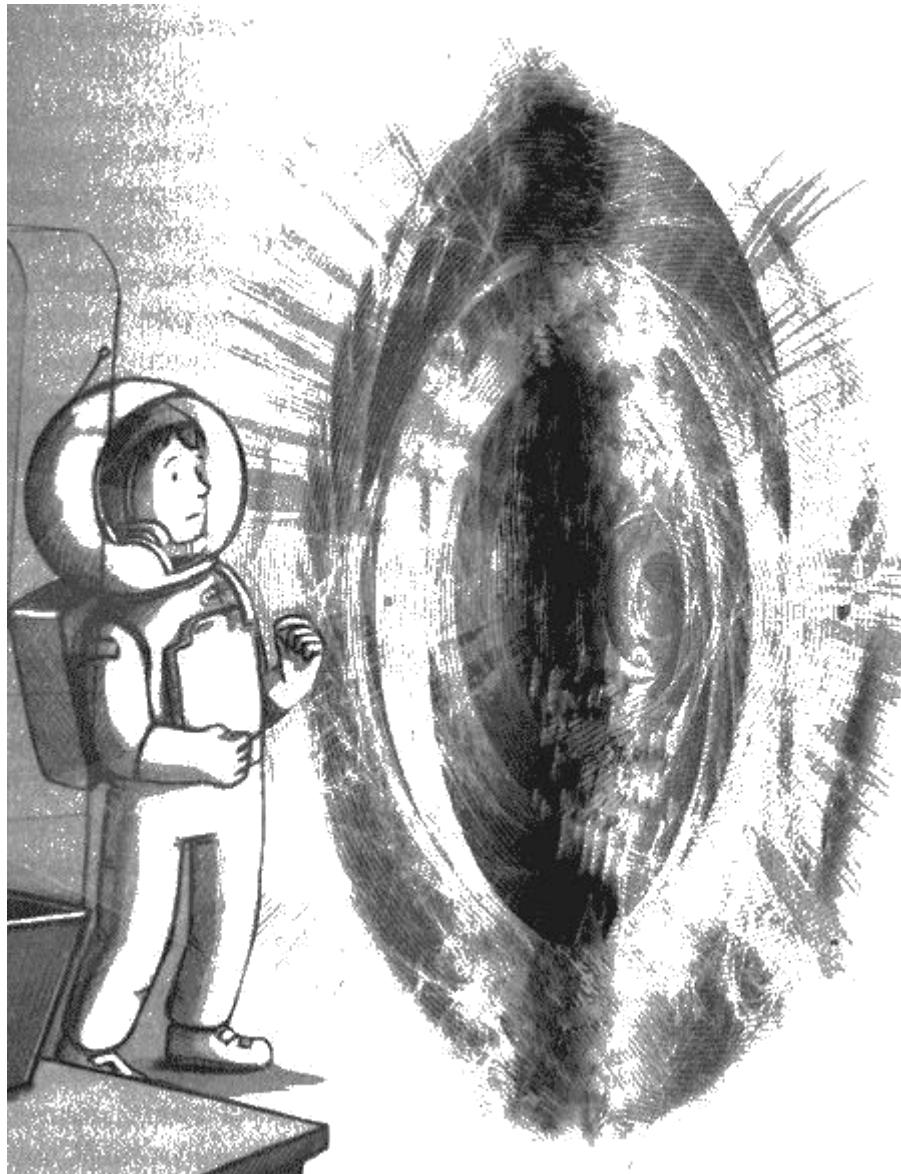
- George - he rasped, - go into the tunnel.

- Where are you? - George said cheerfully, as if he was not scared.

But it was scary - as never before in my life. Fear gripped his hands and feet, and his heart was beating so that every clap of thunder echoed in my head, and George felt that he was about to burst eardrums.

- Here, at the other end of the tunnel, - said Lynn. - Vperèd, George. I'm waiting for you.

All previous journey through the universe George made via the portal, which opened for him the Cosmos, and through this portal are always vsè be seen. Now it was the shimmering silver tunnel in front of him, which is also curved, not allowing to see where he vedèt.



What is it? Parallel universe? Another time? What if the tunnel is bent due to the curvature of space-time and leads to God knows where, far away from the Earth's gravitational field? What zhdèt it, George, at the end of the tunnel?

There was exactly one way to find out.

- If you want to save Eric, - he came with headphones shèpot Lynn - you must pass this way. Forward, George. Tunnel privedèt you to me.

- George! - I heard from the phone, thrown on the bed. Thanks to the external microphone built into the helmet, George heard sounds from outside. - I hear that tells you Lynn! Do not go there! Do not listen to him!

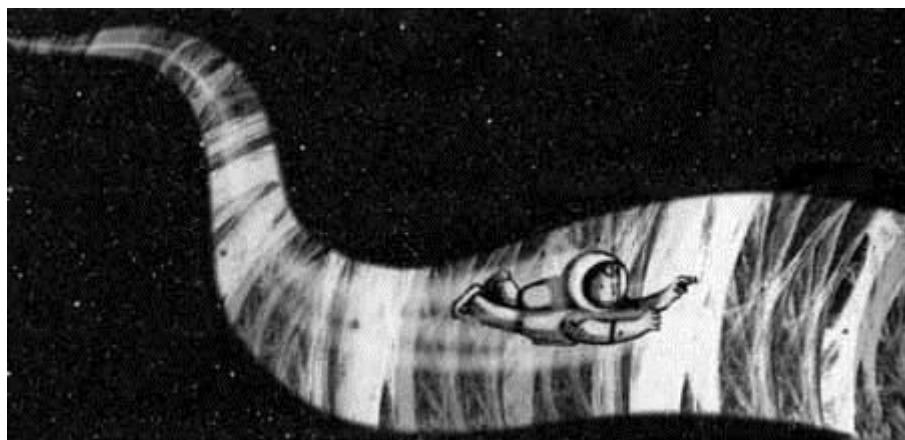
George hesitated - but then came the phone is one more voice:

- George, you hear me, man! Do not do this! Annie told me about this and about Lynn Portal. You can not go there alone, it's dangerous!

What about the mentally boiled George. Wow! What makes this house Vincent Annina tèti? It turns out, he had heard their entire conversation with Annie? He knows about Lynn, about the portal, about the cosmos? He knows all the secrets that they have with Annie vowed not to extradite anyone? And now this great karateka and skateboarder and èè new best friend will tell him, George, what to do and what not to do?

Anger and resentment George forgot about fear. So, Vincent thinks that he, George, can not cope? I think he has the guts to rescue Eric - teacher, friend and Annin dad?

- You know me eschè Vincent - he whispered. - Eric, I'm going! I'll save you, even if I'm all alone ... - He raised his voice: - Farewell, earthlings! I'm going in the space provided.



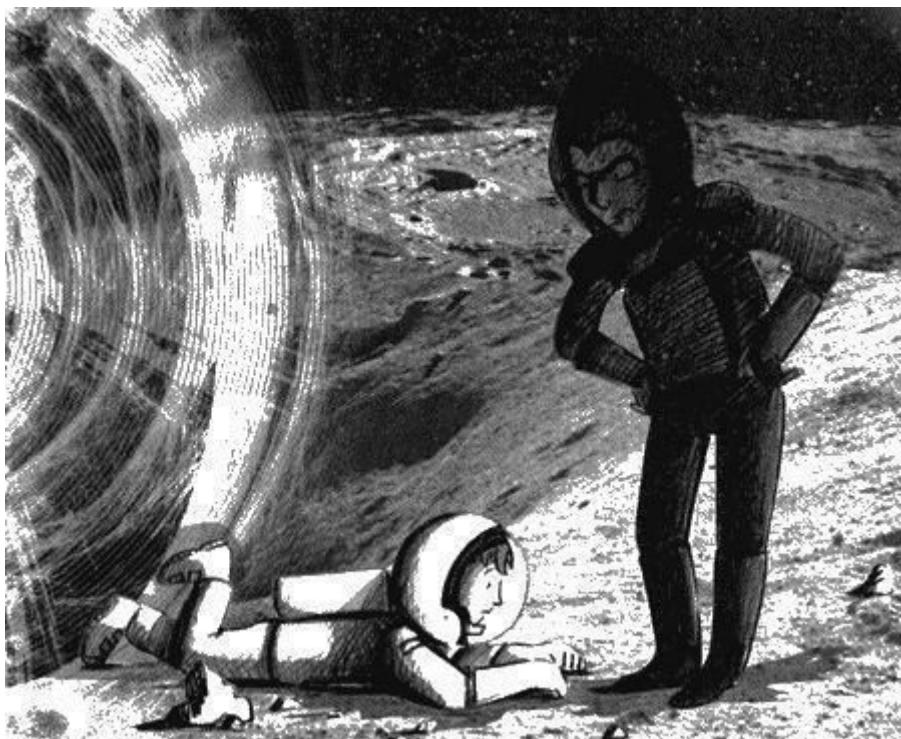
And George stepped into the circle of light created Busik who instantly dragged him into the tunnel. Throwing hand For the first Ye with grave d like diving headfirst with a water slide at a water park, George flew along a winding silvery tunnel - from his own room in the dark - raced at incredible speed through the dazzling light on the blurry spot meeting with former arch-enemy. The helmet he heard headphones - or imagined? - Echo the desperate Annino "no-oo!". But it was too late. They are already separated light years.

The space-time and relativity

Chapter Twelve

George flew from the opposite end of the tunnel, by inertia continued to slide on his stomach on the bare flat rock. In the eyes still vsè blurred due to the blinding light spots, swirl in silver tunnel; Then the eyes of sparks; Then he looked up and saw thousands and thousands of sparks - it was zvèzdy, burning brightly in the sky chèrnom.

And right in front of him he saw something eschè: hefty chèrny shoes. And is one more. George rolled onto his back. Above him loomed the figure chèrnom suit and helmet with chèrnym glass covering the face. But George did not have to see the person, and so he had no doubt: this is Dr. Lynn crazy uchèny whose ambitions have failed once again escaped to the expanses of the universe.



Over his head was Lynn chèrnoe boundless sky, which merged outlines chèrnogo helmet. Around George himself saw only the gray stone surface pitted with huge craters.

- You can get up, - said Lynn dryly. - I chose an asteroid with enough weight, so do not fly away.

When George and Annie rode on a comet - it was the first trip of George on the universe - they had to drive spikes into eè, comets, icy surface and bind themselves to these spikes straps to (both Annie precaution taken with itself), as the comet attraction was too weak. But comets are composed mainly of dust and ice zamèrzshego gas, and this asteroid was composed of much more durable material, and the size was much larger comet, so its gravity is firmly held by George.

- Where are we? - George said, rising to his feet. He staggered, but survived.

- Do not see anything familiar? - Lynn asked. - Nowhere accidentally hangs so, you know, pretty zelèno-pale blue planet, which is the only zhdèt you to eè saved?



But George did not see anything around, except of stars. The tunnel is completely disappeared, and now have George could not get out of this stony desert home to Earth.

- Do not you see? That's right. Although you are in their home galaxy would not recognize anything. But now you're not in the home galaxy, and much more. So far you eschè it was not.

- We're in another universe? - George asked. - And it was the space-time tunnel - "wormhole", huh?

- No, - said Lynn. - This is a portal, but I have it perfected. He made more modern. Door, window - it vsè beznadèzhno date, do not you think? Eric was always so conservative! Strange to say, his theory turned upside down all our ideas about the universe, but when it comes to the design of the portal, it is a model berèt their front door .. We are with you, George, in another galaxy - in Andromeda!.

Andromeda Galaxy

- In another galaxy ... - in awe George repeated.

- Yeah, in the next - he confirmed Lynn, took him by the shoulders. - Across the Universe - vsè like in the neighboring house. You do not notice anything special?

- Zvèzdy how zvèzdy ... - George said slowly, looking around. - And an asteroid asteroid. We probably turn around the star. That is, we are not in the solar, and in some other zvèzdnoy system. But this is not seen much difference from our own Milky Way.

- It's true - agreed Lynn. - And it's amazing, is not it? On closer inspection, there are no two identical stones, especially two identical planets of stars or galaxies. In some areas of space there is nothing but clouds of gas so tèmnoy matter, as in others - please: zvèzdy, asteroids, planets - the greatest diversity! However, the same look: here we are, two and a half million light-years from Earth, and vsè that surrounds us seems not so unfamiliar. This asteroid could well be in our solar system, and there are zvèzdy - in our Milky Way. The variety here

It manifested in the same way as in our galaxy. How do you think, George, what does it mean? Reply - I'll tell you why called you here.

- This means - proiznès George, remembering lecture Eric - that vsè and all formed identically from the same material and by the same rules, however, the beginning time occurred tiny deviations, and because of this vsè slightly different from the rest.

Uniformity space

- Well done! Nice to see that at least one of my former students knowingly pants sit in the classroom!

- Why have you brought me here? - Asked George, emboldened. - What you've done again?

- I was not too pleased with your tone, young man - proiznès Lynn sarcastically, as in the days when George was a teacher.

- And I was not too happy when talking hamsters throw me into space! - I did not remain in debt to George.

- Of course, of course, I understand - quickly agreed to Lynn. - It is unpleasant when vsè runsomersault. But I do not nashèl other way to contact you.

- What are you talking about? - George quipped. - You may think this is not the night you got into my house and put it in a textbook note.

- Well, I, I. - Lynn was obviously nervous, and it was suspicious. He did not look like a former arrogant Zlin, who worked chèrnye case, not knowing doubts. - And how I was eschè twoè attract attention? Eric, I did not find at home - I had to run to you and leave a message.

- But if this is so important, why do not you come openly, in broad daylight, like a normal person?

- Yes, I can not! - Annoyance Lynn said. - I can not go anywhere or do anything because I have under the hood. Was stuck to his ears. On the last night, when I managed to get out and look for you and to Eric, they hang on my tail. True, they do not know that I was with you, but I know that somewhere I was, and eyes despise me. So I could not communicate with you and especially with Eric earthly ways. Only in space, and you can talk quietly. This is our only chance to stop them.

- Who - they? - George asked. - Who is behind you watching?

- TOBACCO - Lynn said. - They are everywhere, everywhere! - He looked around at the sides, as if the invisible enemy has chosen to an asteroid. - Invisible tèmnaya force surrounding us.

- I think you're describing tèmnuyu matter - said George. - Which are invisible, and is twenty-three percent of the known universe.

- George - ardently proiznès Lynn - you have no idea how you're right! These people - tèmnaya matter of humanity. We do not see them, but we know about them by the impact they have on the surrounding universe.

At once, he spoke from the heart, thought George, - unless, of course, admit that Lynn has a soul.

- People in chèrnom who wanted to break into a lecture by Eric - it was them?

- Yes, but it was only a small part. They are much, much more. This colossal razvetvlènnaya network. I was there on a protest, but I was not able to get close to you. I tried to call you through that boy, but failed.

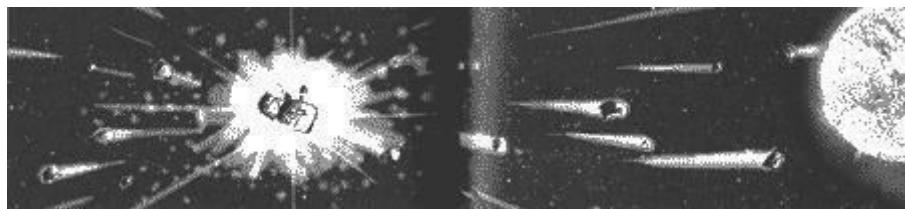
- I knew it! - George said. - I knew it was you. But he could not figure out why you need me ... can not understand why it does TOBACCO. What is wrong if Eric would open just a theory? Is it so dangerous - to understand why the universe began?

- This is for you and me, George, opening theory of everything would be a huge step vperèd, and for them is a terrible, devastating blow.

- Due to the true vacuum? - George asked.

- No, - Lynn waved his hand. - Leaders of the tobacco does not believe in any puzyrèk of the Large Hadron Collider, which allegedly razorvèt universe into small pieces. They invented it, to intimidate all, so that more people come into their organization grew to a network. And they are afraid of is actually quite different.

- What?



The asteroid on which they stood, moved along its orbit around a very bright young stars

- Billions of years younger than our sun. Suddenly, right in front of George's two stone fragments, each with a couple of hundred meters, crashed into one another. The impact was like a nuclear explosion; a thick cloud of dust beginning to spread out in all directions.

This young zvèzdnaya system has been a very turbulent place: around the central star was worn many such debris. Over time there will form the world and attracted to all the debris left after such collisions; yet is there chaos, and it is very, very dangerous place. On the other hand, I thought George, Lynn is now both will give anything -

и any place in the universe seem safer planet Earth ...

- Guide tobacco convinced that Eric experiments eventually lead to very different results - Lynn said. - They think that science, having a theory of everything, it naydèt

a variety of applications. For example, uchèneye will create a new source of clean, low-cost and renewable energy.

- But who does not want that? - George said.

- I was able to get into their top-secret files relating to membership in the organization, - said Lynn - so that I am one of the very few who knows the true leaders of tobacco. First of all the owners of the major corporations who benefit from that, we still enjoyed uglèm, oil, gas, nuclear energy, rather than looking for new sources of renewable energy. They are afraid, as if the experiments at the Large Hadron Collider in one day is not suggested to mankind the way to deshèvoy and clean energy.

- Ugh! - George grimaced. - These are the scoundrels that pollute the oceans and poison the atmosphere gases that cause the greenhouse effect?

He thought of his parents - fighters for the salvation of the planet Earth. They're just good, good people who care about the future of the planet. Is there any chance they have in dealing with such powerful enemies?

- But it's not vsè - Lynn continued the time. - In TOBACCO eschè is a group of people who are afraid that, when there is a theory that unites four basic interactions in the world to stop the war. Theory of Everything will understand that all of us - a whole, representatives of one of the human race, and then we, instead of fighting, nachnèm together to solve the problems of our planet. Stop the struggle for natural resources, rich countries will help the poor ...

- And these people that do not want wars, is not it? - George quite confused.

- No, - said Lynn briefly. - They get mad profits from the arms trade, so that it is beneficial for people to kill each other. War - their business, endless war - their ideal.

- Wow ... And who eschè included in this ... TOBACCO?

- Eschè - any astrologers who suspect that people learn the truth about the structure of the universe, will lose interest in horoscopes and stop paying for fortunetelling and predictions. One TV preacher - he is afraid that no one else would run to him for salvation. There are people who have come into TOBACCO simply out of fear of science and èè progress. And even a few uchènyh.

- Uchènyh? - George was potryasèn.

- Well, I, for example, - modestly Lynn said. - I entered there to spy on them - only I'm not a real member of the tobacco. Hearing about the secret anti-scientific organizations, I decided to find out èè plans and joined the neè. I was given the nickname of a clandestine Isaac in honor of Sir Isaac Newton, one of the greatest uchènyh. To insinuate their confidence, I lied, that we with Eric still sworn enemies. None of tobacco does not know that we had made it up.

- And Eric knows that you entered in tobacco? - George asked.

- No, - Lynn said. - I wanted to tell him about their plans, but he knew that if he tried to contact him directly, he will be in greater danger eschè!

- And the rest uchèneye tobacco - they are who?

- That is the question more difficult, - said Lynn. - We are not allowed to get acquainted with each other. Everyone - svoè separate job, so our paths never crossed.

- And what is your job?

- I was instructed, - not without pride, said Lynn - to create an explosive device - extremely powerful and extremely intelligent. They wanted me to make a bomb, the explosion of which can not be prevented. After all, how to construct an ordinary bomb: pererezhesh provodochki necessary - and it is not vzorvètsya. A TOBACCO wanted to get a bomb that can not be cleaned, even if a snack wire or know the code. They said - added hastily Lynn - that is just a sample for experimental purposes.



- But you eè did not, right? - George asked. - I mean - you do not give into the hands of these enemies of true science, bomb?

- And what is eschè? - Genuinely astonished Lynn. - How could I do a thing that does not work ?!

- Yes, easily! If the bomb does not work, then do not vzorvètsya nothing. No bomb - no problem.

- But I uchèny - whined Lynn. - The fact that I'm creating, always works. I have vsè do it right, otherwise I would not be uchènym .. - he paused in confusion.

- Tell me about the bomb - George felt that his patience is about to burst.

- Of course! - Lynn brightened. - It is perfection! Vzorvèt vsè anything! In terms of - General vsè.

- I already knew. And now you can read more?

- Oh, I'm sorry! So, I developed a bomb with eight switches. To bring them into a state of readiness, you need to dial the code on the numeric keypad. If you click all eight switches sozdaètsya superposition of eight states. If we let go of all eight, then automatically starts reverse otschët, followed by an explosion.

- And chèm main trick? - George asked.

- Since this is a quantum-mechanical bomb - Lynn said casually, as if not going to brag about - it sozdaèt quantum superposition of different combinations within the detonator. This means that anyone who tries to defuse the bomb by cutting one of the wires or schèlknuv one of the switches, just vzorvèt themselves and everyone else. That's the thing: they wanted to get the bomb, which can not be reversed, if the tobacco zavedètsya traitor.

- I do not understand - George frowned.

- The bomb is charged in such a way that none of the switches can not disable eè; This quantum superposition of eight different possible switches.

Detonator "decides" which switch to use, before someone nazhmèt one of them, hoping to prevent an explosion, and the scheme will check if the switch is correct. At this moment, the wave function collapses and will randomly select one of the eight switches. Even if you press all eight at the same time, a bomb with a high degree of probability vzorvètsya immediately. That is what it did, it still vsè vzorvètsya - that is what I am getting at.

- Well, why did you make it? - George said grimly.

- Then, to show them what I'm smart - as Lynn said grimly. - I did not think that they are really going to give effect to this damn thing. They said it was just an experiment.

- And where is it, this is your quantum mechanical neobezvrezhivaemaya bomb?

- I do not know! - Lynn blurted. - That's the trouble. She disappeared!

- What do you mean gone?

- Èè taken. Taken away in an unknown direction. And judging by what I have read, when hacked their computers, they still intend vsè eè use. Where's Eric?

- He flew on the Large Hadron Collider - George said, slowly realizing the horror of what is happening. - At the meeting of the Brotherhood of scientific research for the benefit of mankind. There invited all the members of the Brotherhood.

- Here! - Cried Lynn. - That's where they will blow up the bomb! They want to destroy the collider and Eric - but not him alone, and all the best of modern physics!

- But ... but ... - George gasped - but how did they know about the Brotherhood meeting ?!

- I have long suspected - hurriedly said Lynn - that the Brotherhood has a spy, a secret agent of tobacco. Someone uchènyh, entered the tobacco vydaèt mystery of the Brotherhood.

- And this is, of course, are not you? - Poisonous George asked.

- Of course not! - Lynn frowned. - I'm not even a member of the Brotherhood. Isklyuchèn many years ago, without the right of return. So it's someone else. And that someone is really dangerous.

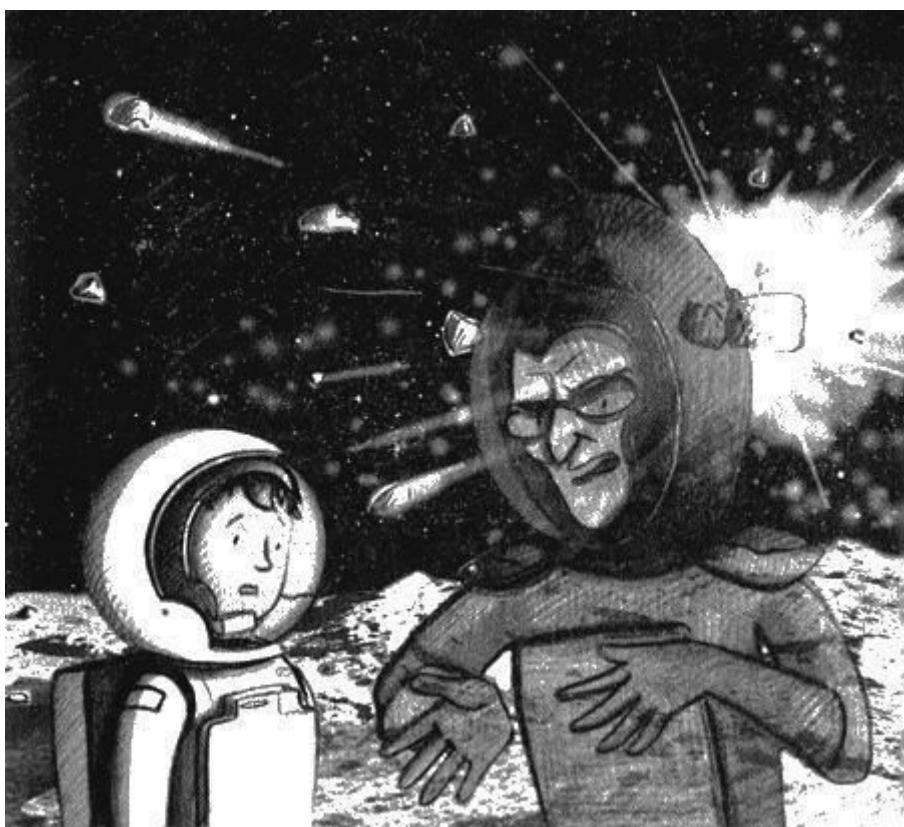
- But then suddenly, you decided to help Eric? - George asked with suspicion.

Lynn sighed again.

- I know, George, you do not think too highly of me. But please believe me. More than anything, I love science. I can not bear to stand by and watch as all sorts of idiots out of greed or out of superstition destroy what was created for centuries. I joined the tobacco, to stop them. That's why I'm here!

particle collisions

George dizzy. Vrèt Lynn or telling the truth? He asks to believe him, but in fact it has twice lured Eric in fatal trap ...



Meanwhile, with Lynn began to happen something strange: he seemed blurred, melting, dissolving into blackness Andromeda.

- George - the headphones sounded full alarm voice Lynn - we have less time than I expected.

- What is being done to you ?!

- It's not the real me. - Lynn said is now very fast. George did not see his outline - only zvèzdnogo triangles of light, reflected in the gleaming helmet and boots. - This is my virtual avatar. I created it to see you - it was not any other way. Not finding any Erika or the cosmos, or minivan, I entered to your house and hid there unnoticed router to use it to manage Busik. So here I was able to send your avatar and you open the portal.

- That would have been sent to your avatar Collider! - George shouted. - Him, not me!

- Will not work! - Lynn's voice was distorted, moving away. - The second time I did not get away from them!

- But what about the bomb? - George shouted in despair.

- There is a way! I'm not an idiot! I provèl monitoring and observation affects the object! Busik gave you the code ...

- But how do I use it? How to defuse the bomb ?!

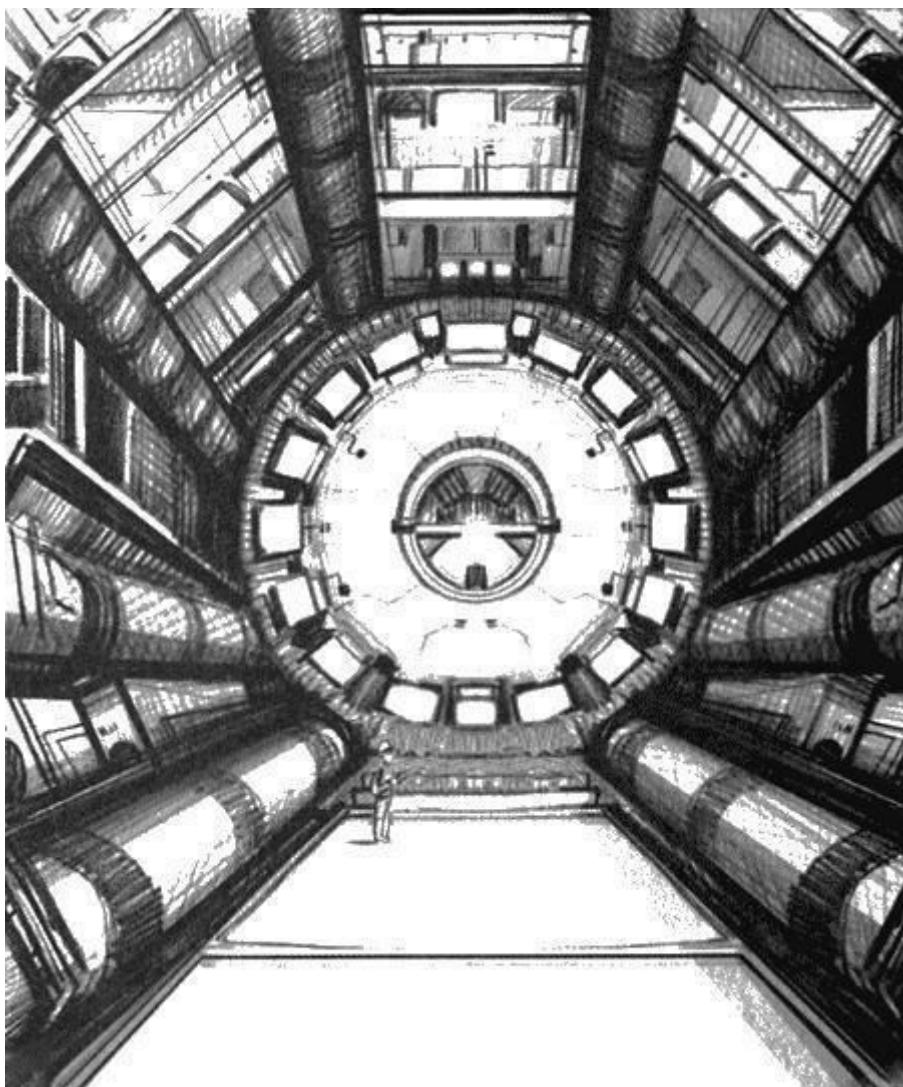
In response came the barely audible "George ..." - and vsè quiet. In the universe reigned complete, absolute silence. Where just standing Lynn reopened silver tunnel and pulled George into light funnel. Whirling and tumbling at an incredible speed, George raced through the universe away on quintillions kilometers from Andromeda and approaching their galaxy - the Milky Way, consisting of ordinary matter and of the mysterious tèmnaya matter that surrounds us, but which we can not see, nor hear, nor touch. "Here it is, tèmnaya side of the universe - thought George, flying through the tunnel. - Here they are, the forces of darkness. "



Tèmnaya side of the universe

Chapter Thirteen

Eric was standing in front of screens of surveillance cameras in the control center of the Large Hadron Collider and looked at ATLAS - one of the collider detectors, the most extensive in the history of science; the people who created this edifice, seemed to èè background ants. However, the entrance to the tunnel, where the accelerator is located, and in the huge artificial caves, which are located in the rest of the ATLAS detector, was now zapreschèn and doors - closed. No one can not enter into this part of the underground complex during collider operation.



According to the official schedule, before the start of the experiment - the grand, inviting government officials, who will click on the red button - left eschè few weeks. In the meantime, carried out "dress rehearsal" to uchènye could check whether they vsè taken into account, and, if necessary, to correct anything before nachnètsya experiment really. However vsè went so smoothly that the trial run proved to be indistinguishable from the ground. Proton beams have swept through the tunnel in the opposite direction at a speed of more than eleven thousand revolutions per second, making a hundred million collisions per second, and the detector reads the data of these collisions.

The Large Hadron Collider

Vsè going so well, Eric, in theory, would have to dance for joy. However, when you're all alone, it is difficult to enjoy. Prior to the general meeting of the Brotherhood Eric remained under suspicion: with him politely bowed and passed it by. Colleagues and friends sympathized with him, but restrained.

This isolation from the scientific community, of course, saddened Eric, but was eschè something worse: it could separate from work. The upcoming series of experiments has been the most ambitious in the history of science; all we are waiting to get answers to basic questions of physics. Eric realized with frightening clarity: if today's meeting all opolchatsya against him and expelled from the Brotherhood, he pridètsya immediately leave the territory of the collider, and he will not witness the most important moment for science - the most important after the Big Bang. But that did not yet vsè: maybe he will not even see the results of experiments! Until then, until it again do not recognize trust worthy, it will remain a lone suspect in the back of science. Probably, and Lynn then, many years ago, just felt like an outcast and oskorblènnym - prichèm he, Eric,

And then he zabibikal pager.

"Meeting at 19:30. Underground launch center, "- prochèl Eric, and his heart began to beat very quickly. Finally, decide his fate.

Eric has long toiled in anticipation. Members uchènyh Brotherhood had to get on the collider longer than anticipated. And Eric was alone, even Cosmos could not accompany him. The computer was confiscated at the same moment, as Eric stepped off the plane to land in Switzerland. At the airport he was waiting for Dr. Jiang, the same uchèny from China, which saw them with George on the moon. On the night sky poured rain jet.

- I'm very awkward, Eric, - said Jiang, looking away in embarrassment - but you give me pridètsya Cosmos immediately.

- And what will happen to him? - Eric asked.

- His zhdèt conversation with Grid - Jiang said. - It will scan all the actions of the Cosmos for a time while he was in your care.

Grid - not just a computer and a giant computer network, which analyzes data from the Large Hadron Collider. Eric immediately thought of Freddy. Yes, he thought, one can imagine what he would say about the grid moving pigs from the farm to the expanse. And about their George walks on the moon. Not to mention the numerous journeys through the universe in the company of children!

With all the power grid in neè it had little in common with the Cosmos. Cosmos has properties that the Grid has been completely stripped: the ability to empathize. That is what allowed him to exercise creative initiative that made him the smartest computer in the world. Grid did not know how to break the established her own strict rules, did not know how to conduct intuitive communication between disparate bits of information. Eric had no doubt that in the intellectual competition clever Cosmos would easily jump on this unwieldy edifice. It was painful to think about what the test will have an unpleasant wretch Cosmos.

Wandering up and vperèd management center, Eric looked at his watch. Prior to the meeting, which will decide his fate, had very little time. Familiar life collapsed as

fast that he did not yet have time to recover - and vsè due to a single image, depicting them with George on the moon? Is because of this cost hastily convene vsè Brotherhood?

Past uchène walked with a straight face, carefully turning away so as not to meet with Eric glance.

- Tell me, please - called him Eric - and Professor Zuzubin here?

Maybe he could convince his old boss and mentor, scientific look at this story through the eyes of others? Maybe Zuzubin Brotherhood persuade Eric to forgive if he would honestly never more so to do? ..



- Zuzubin? - I asked uchène on the go. - He's gone.

- Gone? - Eric marveled. - But it's all the same, he called! Why he left, if it is so important meeting for him?

However uchène was already far away, and Eric was again left alone with his perplexity.

Something's wrong here. Something in vsèm there is deeply wrong. The meeting convened in a hurry as if grasping for the first available occasion. Zuzubin that vsè is started, for some reason has disappeared.

A Space chained to a grid, which checks it - a file-by-file. It does not happen all of a sudden realized Eric. It should not be. Looking for something to do.

Eric looked at his cell phone and saw chèrny screen. Even here, in the control center, Grid blocked external signals; You can only use the internal paging system or a telephone network collider. And in any case, to whom he could now call? The only one who will believe him immediately and unconditionally - is George, but not enough to implicate eschè rebènka this story!

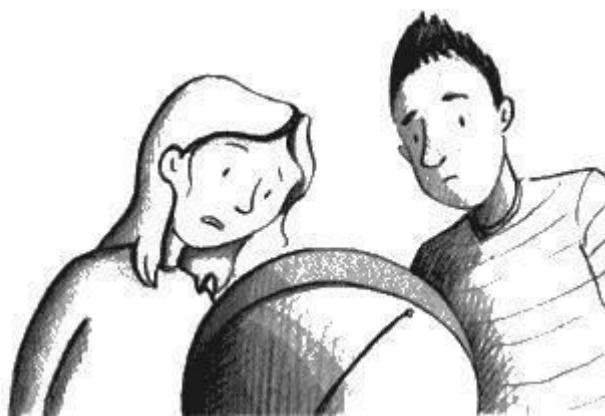
Eric sighed. You can even turn off the phone - even if the battery is not discharged. He eschè walked back and forth a few minutes, until he felt that the more so can not. Colleagues shunned and cast sidelong glances, no one was interested in his opinion, he is torn in the walls of the four positions, like a tiger in a cage - no, it's not so poydèt. First you need to calm down. Bring thoughts.

And it needs to go for a walk.

Chapter Fourteen

George flew from silver tunnel, landed on his stomach and drove his room from end to end and stopped, panting. So he lay there, until I realized - as well as on an asteroid - that he was not alone. In his field of vision were two pairs of feet in sneakers. George rolled onto his back. In the window of the helmet blurred two faces, staring down at him. One person, with bright blue eyes anxious, was framed by blond locks; the second, on which protruded chèrnye hair frozen astonishment.

- George! - The owner of blond hair - it was low - grabbed his shoulders and began to shake. - You're back! Well, how could you - alone, without me!



"Who are these people?" - Unsuccessfully tried to understand George. It seems that he had seen them before, but when and where - he could not remember. Maybe in a dream? His eyes flashed light spot, and head tossing multi-colored ball, from which he painfully tried to snatch the strings of thoughts - but they escaped and swam again in the color fog, not allowing George to understand what was happening to him.

One of the two that was higher, grabbed George by the hand - more precisely, with the gloves - and put it on the feet. But could not resist - like melted bones, muscles turned to jelly ...

- Stop! - Awesome grabbed him under the arms, to prevent settling on the floor. In the eyes still flashed silver flashes. - Where did you come? And what was that?

Defocused circle the room look, George had noticed that the portal closed and Busik sits motionless. Only these two things meant something to him, something about chèm signaled his confusion. High meanwhile pulled George toward the bed and put on neè directly in the suit. Due to the oxygen tank lying was terrible uncomfortable. Hands unbuttoned and removed his helmet, carefully otèrli perspiring face George area covers ...

- Water! - Commanded a small figure. - Bring him a drink.

High darted to the door, and a few moments later returned with a glass in his hand.

- Drink, - he said to George, and he poured into his mouth a few drops of water.

Little Meanwhile rasstègival on George kosmonavtskie shoes.

- George, it's me, Annie! Vincent, yeah Help me!

They both jumped at tyazhelye shoes - Annie left for Vincent for the right - and dèrnuli struggling. Boots suddenly slipped easily and Annie Vincent were on the floor, each with a shoe in her hand. But this did not dampen their ardor. They immediately jumped up and rushed over to George, who became visibly worse vsè. He turned pale, then schèki covered with bright pink spots, eyes rolled.

- What about him? - Vincent panicked.



Annie jerked George, sat up in bed and unhooked the oxygen tank.

- Rasstègivay suit! - She ordered.

Vincent obediently unbuttoned his suit and freed the hands of George out of the sleeves.

- Privstan-ka! - He raised George and pulled off his suit, under which turned out to be a shirt, knitted sleeveless shirt and jeans.

George hung in his arms like a rag doll. Vincent put him back on the bed and carefully wiped his face matched with floor shirt.

- Give me the suit, rather! - Annie shouted.

Vincent threw tyazhelye space suit over the bed, and Annie began frantically rummaging in his pockets.

- But where, where? .. - She muttered.

- Listen, it looks bad - recalled Vincent. - Maybe call a doctor?

- And what do we tell him? "You know, a friend of ours just returned from space, and it was not good? So sometimes it happens, it is not known who created "when you pass through the portal of the curve? - Annie's voice rose to a shout.

George in the corner of his mouth came a greenish foam and crawled under the chin.

- Help me! - Annie pleaded. - I can not find a means of first aid. It is somewhere here, in one of the pockets.

Vincent reached for the other side of the suit and began to probe the pockets.

- It is? - He took from his pocket a plastic sleeve with a bottle of bright red inscription "Remote First Aid" and prochél aloud the text on the label: - "On his return from space travel you feel unwell?

You sick? Seeing double? Do not listen to the muscles? Fall hair? "- Vincent anxiously glanced at George, but all the hair that seems to be so far have been in place.



- Well, let the same here! - Annie hurried him.

- You're it ever took? - Vincent asked incredulously, still holding a bottle of hand.

- No, - reluctantly admitted Annie. - There was no need. But Dad always said that you need to accept it, if you are in space seasick.

Vincent threw her bottle. George started to beat trembling. Annie, wasted no time brought medication to his lips, had already begun to turn blue, and poured it into the mouth of a few drops of amber.

- For the sake of all the planets and of stars - she pleaded - even if it will help him!

She added a few drops of eschè.

- It's not too much? - Cautiously I asked Vincent.

- Is it too - said Annie - the whole bottle - a single dose. So my father said.

Before she could finish, George's lips turned pink again. The person also acquired a normal color, breathing evened out, eyelashes trembling - George was clearly trying to open his eyes. Remote First Aid properly done svoè business.

- George! - Annie cried and cried.

Vincent reached out and embraced, consoling.

At that moment, George opened his eyes.

- What is eschè for ... - he mumbled, his eyes closed again.

Annie Vincent recoiled from each other and rushed to the head of the bed on both sides.

- You are alive! George, darling! - And she kissed George loudly in schèku.



George was pounding in his temples.

- Annie? - He asked hesitantly. - It's you?

- And who eschè! I, of course. And Vincent - she hastened to add. - We'll save! You flew in a suit from some eerie tunnel, and you have started an attack.

- Fit, I? - George with every second to get better. He sat up in bed and looked around his room.

- What Eschè - enthusiastically confirmed Vincent. - Do you drool zelènye mouth and ran his eyes were crazy, like a zombie.

George sat back down on the pillow. Eschè Never had he felt so strange. He struggled to remember what had happened, but the sight of hard surfaced the same picture that he saw emerging from oblivion: Annie embraces Vincent.

- George! - Annie said. - How could you - alone, without us!

- "We"?

- Without me and Vincent, blockhead! - Making sure that George is better, Annie was again a. - If you had deigned to have to wait, we would fly together. We immediately rushed here as soon ceased to hear your voice on the phone.

- How did you get into the house? - George did not yet quite oklemalsya. His brain did not want to remember
o space travel and clinging to what George saw around.

As if in answer to his question, the bottom donèssya furious baby crying.

- It's your sister, - explained Annie. - And we just came from. Your mom let us. George, flinching as if stung, jumped up and got back into bed.

- She knows about the portal ?! - He asked in horror.

- What are you - judiciously said Annie. - Daisy is a baby, and they scream. She certainly did not hear anything.

- You have not had a drink. - Vincent George shoved the glass.

George took a sip ... and almost spat vsè back:

- What it is?!

- Oh, sorry, - said Vincent. - It was a cup Toothbrush schètok. He just caught me the first arm.

- Enough! - Annie snapped. - Come on, George, remember! Where you suffered? And for what? At the head of George as if something schèlnulo - and cleared up in a jiffy. He remembered vsè.

- Saints supersymmetric string ... - he muttered. It was a favorite saying Emmett, their computer genius. George looked from Annie Vincent and back, not daring to begin. - Vincent, I can trust you?

- Yeah pridètsya - he patted him on the shoulder, Annie, - after all, that Vincent saw. In addition, he helped me rescue you. George, do not wait. What was there?

George hesitated no more than a second. Nothing can be done, it is not to fine feelings. Let him, George, not happy with this karate, but karate around here, and he somehow already know vsè.

George took a deep breath and laid out:

- I saw Lynn.

- It turns out, he was waiting for you there - concluded Annie.

- This is a terrible type that you searched for, is not it? - Vincent instinctively reached for a glass for schètok and drank a big gulp.

- Aha, - said George. - He met me on the asteroid in the Andromeda Galaxy. Annie jumped.

- Wow! Andromeda's nebula! It happens in my life so far! - The voice betrayed a èè envy.

- Consider yourself lucky - George grimaced. - Boucicaut This portal would not proshèl tested for safety, believe me.

- Yes, you have Vidocq was not a fountain - voskhischènno said Vincent. - What did you just vsè it survived? You're a toughie, brother.

- Uh-uh ... thank you, - said George.



The knock on the door, and peered into the room mom George:

- I'll bring cupcakes. Because broccoli and spinach.

- Thank you! - Annie quickly took the neè from the hands of the tray and remains in the doorway, blocking a room while Daisy was out on the stairs - bottom donèssya once indignant cry of one of the babies. - Vkusnoty-conductive! - Annie shouted after him.

Eternally hungry Vincent jubilant cry lashed out at the feast. But as soon as he bit into the first piece, joy written on his face, replaced by astonishment.

- PIF is it? - He said with his mouth full.

Annie kicked him until he managed to blurt out something about the culinary delights of Daisy. They have something with George were plenty to chuckle about this, but Vincent, Annie suddenly realized, should not make fun of my mom George.

- Yes, I just wanted to say that this is an energy food! We have something similar to give the fights! Now I understand why George so hardy.

- What time is it now? - George asked.

Vincent looked at his watch.

- Seventeen zero six.

- Time is not too much. Wait a minute, and in Switzerland the time?

- Eighteen zero six.

- Then we do not have the time. We must act now. - George spoke with pulemètnoy speed. - Annie, you said that the meeting of the Brotherhood is now in the nineteen thirties, but Lynn said that tobacco has a bomb, not just a bomb, and quantum mechanical, and I'm sure they have programmed еè so that it exploded when nachnètsya meeting, and then the collider and all who are there, shoot up into the air and throw science back several centuries - perhaps right into the Middle Ages.

- Quantum-mechanical bomb? - Repeated pale Annie. View from neè was almost the same as George a few minutes ago. - What it is?

- What is it, I already know, - said George - but just do not know how to do, so it does not explode. We need to take with this. - He showed her a paper strip with numbers, the one that fell out of the minivan. - I'm not sure, but maybe this is the code that will help us neutralize еè.

Or part of the code.



- A Lynn vrèt? - Annie asked suspiciously.

- Maybe vrèt. But I feel that this time it is for us. And for Eric. Lynn wants these psychos in chèrnom - well, those in the wine cellar, where we first wanted to settle Freddie - that they should not have blown up the collider, and all those who had gathered there.

- He can not be trusted! - Vincent intervened. - It is the number of times you hang noodles on the ears?

Annie nervously twirling in his hand phone. She had tried to call the Pope, but there was no connection. Even it was not possible to send a message.

- Pridètsya risk, - said George. - Because if you do not do anything at all, then tonight, just in time for the meeting, the collider could explode.

- But how do we get there popadèm? - Annie snapped. - We do not have time! For this you need a portal,
a Cosmos something we do not.

- You can call up a portal to another computer, - said George ubezhdènno. He finally nashèl missing link, which unsuccessfully tried to find since the night when visited the Faculty of Mathematics. - And I know where the other computer.

- Where? - Annie asked in confusion. - I thought, Space - the only supercomputer in the world ... except Boucicaut, which is better not to have affairs.

- Correctly. With Busik we will not have anything to do - first of all, we do not know how, and secondly, the portal he did not fit anywhere! But I thought once we know how to handle the new cosmos, then cope with the old!

- With the old? What eschè for the old cosmos? - Annie looked at him blankly.

- Do you remember your dad's lecture? - Brain George worked now with the speed of light. - There was this old guy, Professor Zuzubin. This he told Eric to urgently rush to Switzerland for an extraordinary meeting of the Brotherhood uchènyh and convened this meeting it too!

- So what? - Interrupted Annie. - What's wrong with that?

- And then - continued George, - that when we went out of the building - well, from the Faculty of Mathematics, where there was a lecture - it is for us not poshèl. I do not went outside. He went down the stairs to the basement.

- Yes, if there chèm vsè it?

- You know, your dad told me that when he was a student at Foksbridzhe old Cosmos - the first supercomputer - was in the basement of the Faculty of Mathematics? Well, now, going into the street after the lecture, I turned around and saw through the glass door as Zuzubin down to the basement. And eschè nèm on that evening were zhèltye points - a hair's breadth the kind that appeared on Eric when he climbed out of the hole chèrnoy. This means that someone is hanging on the universe and throws things anywhere

...

- ... And for this we need a supercomputer! - Annie picked up, catching his thought. - So you think ... do you think that old Space and is now sticking out in the basement? And Zuzubin uses it? ..

- But your dad was five hundred thousand years ago, a student - Vincent intervened. - One computer is probably dismantled for scrap.

- And they want us to think, - said George. - To all of us were convinced that the old cosmos does not work. But if it works and if it is able to send Zuzubina chèrnym holes, what he should send us Collider? Then we will have time to defuse the bomb.

- But why Zuzubin keeps the computer in secret? - Annie asked.

- I do not know, - said George gloomily. - But it seems that we are about to find out. If popadèm now on the faculty of mathematics. Zuzubin something now at the collider, so we do not hurt anybody to get acquainted with the old cosmos.



George and Annie rushed down the stairs, taking two steps; Vincent nèssya them.

- That's what I do not understand, - he said, jumping on his skateboard. - Mathematics something to do with chèm? Well it's all sorts of figures, plus or minus two and two and a vsè. How does this relate to travel through the universe? Who gave it all this math? Which of neè use?

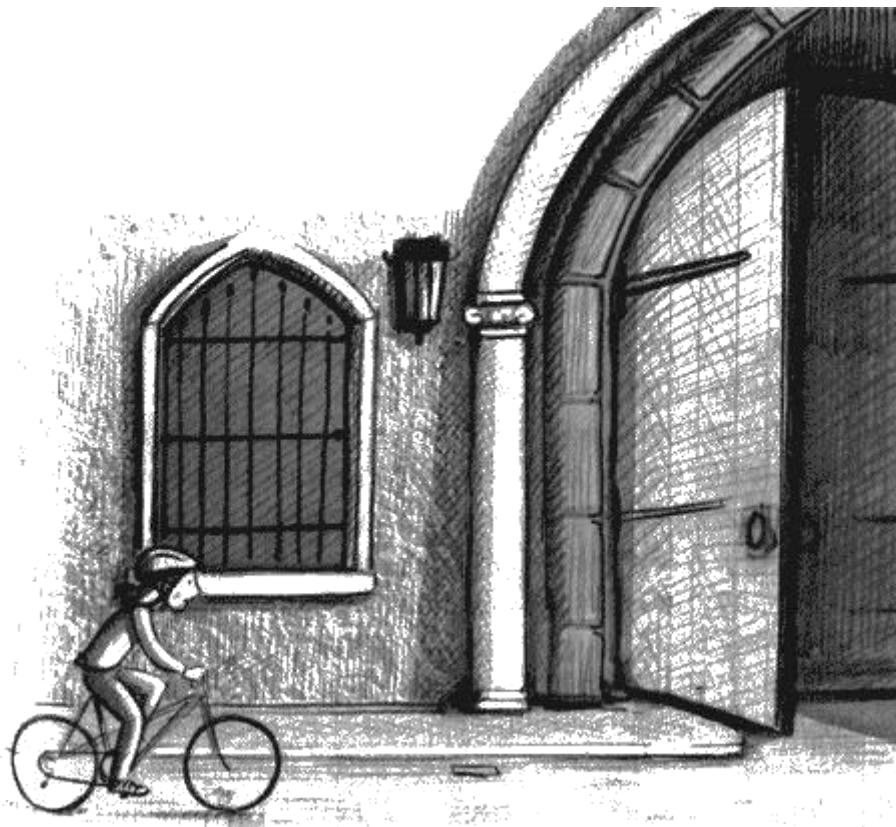
Are there many benefits of Mathematics at unlocking secrets of the universe?

Chapter Fifteen

George and Annie, furiously pedaling, raced past the citadels fokbridzhskih knowledge. Vincent did not depart, deftly writing on svoèm skateboard intricate shapes.



The ancient town was full of beautiful buildings, where over the centuries uchënye men pored over the explanation of the world wonders. The world, however, are rarely listened to them.



Some colleges are more like medieval fortresses, and the reasons were serèznye. Sometimes uchènym had to lock the gate in front of a crowd razyarènnoy, whose anger was caused by one or another of the new theory. It could be, for example, the theory of universal gravitation. Or heliocentric theory states that the Earth revolves around the Sun and not vice versa. Evolution theory. Big Bang. DNA double helix. The probability of the existence of life on other planets. college walls were thick, the windows - narrow; vsè it was intended to protect the temples of science from the outside, often hostile world.

At the Faculty of Mathematics children bicycles leaned to chèrnoy fences and raced up the stairs to the front door. At this time, no one blocked their way, glass doors twisted in the wind, and the trio ended up in the lobby. There was not a soul - they were met by a familiar smell of chalk and old rags. Somewhere in the distance rattled the spoon in a tea cup.

- Do not cause the elevator! - Annie hissed, seeing that Vincent reaches for the button. - He thunders! Go down the stairs.

His invaluable skateboard Vincent parked under the message board. Having read a couple of them - "doubly periodic monopole: trèhmernaya integrable system" and "Early Universe: transitional state" - he knew only that he did not understand anything.

All three went on tiptoe to the basement: the first George went down, followed by Annie Vincent shèl closing.

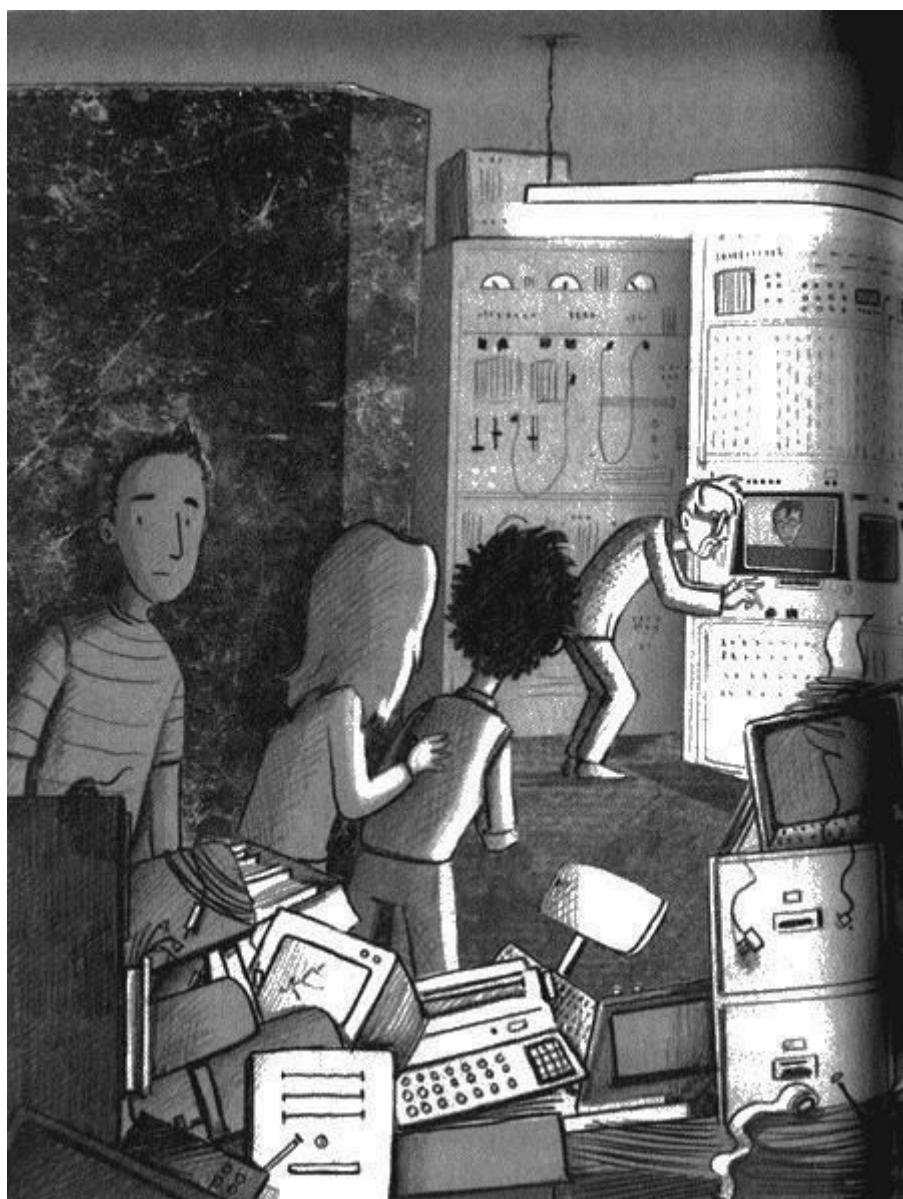
In the basement of the burned dim light. The spacious room appeared clogged with junk - outdated fax machines, copiers, non-working computers, lame chairs, broken tables and mountains of punched cards. The children made their way through the rubble under dimensional whirring computer, which is not yet in sight. It soon became clear that

basement they are not alone. Amid the buzz otchètlivo voice came - surely man:

- Again ?! Yes, as you can! You will obey or not, stupid piece of iron?

They crept eschè advanced a few steps into the depths of the cellar (Vincent still held back), and finally saw the owner grumpy voice. It was an old man in a tweed suit, trying to achieve something huge from the computer. Computer occupied an entire wall

- Antediluvian monster, composed of a plurality of compartments, similar to an old cupboard doors. In the center of the monitor located where the old man seems to have watched some movies. However, the image occupies only the upper part of the screen, while the lower part was the running line - zelènye letters on chèrnom background.



- This is Professor Zuzubin - George whispered in his ear Annie. - But he's got to be at the collider! He said it would be a general meeting of the Brotherhood of scientific research for the benefit of mankind, and he is also a member of the Brotherhood.

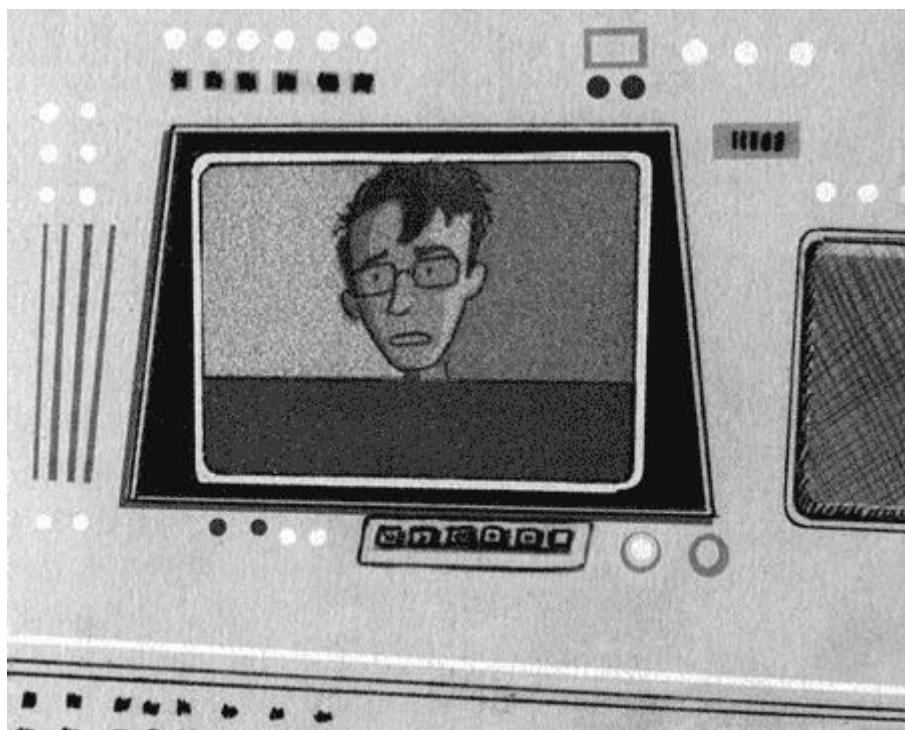
- What is he doing? - Annie asked, too, and also shèpotom ear.

With bated breath, they looked like Zuzubin unwinds picture back and zelènye letters run in the opposite direction. Then he pressed the button "Play" and the movie started first. Flashed a few frames, and appeared on the screen Zuzubin, only much younger, standing in front of a full audience on the background of old-fashioned overhead projector.

- This is the room where your father gave a lecture! - George whispered. - Why Zuzubin lecture in Foksbridzhe?

- He used to work here - Annie muttered, almost without moving his lips. - He taught mathematics, as now the pope.

- Maybe he wants to get back the job? - George muttered. What he saw, he did not like. - Look! You see, there is a student raises his hand and vstaèt? It's Eric!



On the screen there was a close-up young man with a shock of ferrous hair, sitting in a crooked glasses and with a big friendly smile.

- Dad! - Annie gasped, and her eyes filled with tears eè. - Daddy! Was he so young? And what he got? This question is at the same moment said the old cosmos.

- So, Professor Zuzubin - mechanical voice proiznès it instead of Eric, who has just moved his lips on the screen - I have demonstrated that your theory is in error! - Eric and Eric was in his youth: according to the disarming smile, he expected the professor Zuzubin be pleased to hear.

Indeed, Zuzubin on the screen was also smiling, but the smile that seemed to be glued.

Eric went on the old mechanical voice of the Cosmos:

- I have shown that the proposed model of the universe you violate weak energy condition. Zuzubina nostrils flared in anger on the screen.
- Bellis - rasped the old Cosmos - your hypotheses about the so-called Big Bang curious, but completely unprovable.
- I do not agree, - said the young Eric. - Recently open microwave background radiation provides direct evidence for the Big Bang model. Besides, I tvèrdo sure that one day we can put a big experiment, proving mathematical theory, which my colleagues and I - Eric obvèl hand students sitting next to c him - we developed here in Foksbridzhe.

Singularity

This Zuzubin pressing the "Pause", and the picture froze. Razdrazhènno He pounded on the control button. On the screen appeared a thin brush and Zuzubin with the mouse, it is connected to the old cosmos, and began to carry it across the screen. Brush thrashed back and forth, but the image remained the same.

- Damn you! - Cursed man. - And it does not work. Do not worry, try different ...

He removed all the text from the screen and quickly banging on the keyboard by entering a new one:

"Nothing like this. Properties zuzona are crucial for understanding the connection between the four fundamental interactions and the emergence of matter. My prediction is that any experiment with the energy level, which you propose to end the deadly explosion unimaginable force, which will serve as proof of the validity of my theories about the nature of elementary particles and the dynamics of the universe. "

But before Zuzubin print this new text, the cursor began to wash his own, replacing the previous one.

- This is not a movie - George whispered. - This past. He made his Cosmos return to the past, when he taught at Foksbridzhe. And he wants to change the past. He seems set to Space program, which tries to correct what he had said and done. Something like "Photoshop".

- But why? - Mouthed asked Annie.

- And so it happened that he seemed vsè predicted in advance! He tries to get Cosmos change the past, so that his theory seemed correct, but your dad's theory - wrong. He wants to portray vsè as if he had long predicted that the collider vzorvètsya.

Zuzubin was so pogloschèn his occupation, that have not heard a rustle nor shèpota. But when mobile phone George played the theme from "Zvèzdnyh wars", not to hear it was not possible - the melody, reflected from the stone walls swept around the basement.

George lightning dropped the phone on the floor and threw his leg back to Vincent. He picked up the phone, rejected the challenge and turned off the sound.

But it was too late. Zuzubin noticed them. He looked furious - and then broke into a smile when he saw two pairs of eyes that stared at him from behind a pile of iron, harbored an old computer from the outside world.



- Oh, George! - He grinned. - And the baby Annie. Glad to see you! Come on, Annie, do not be afraid. I'm wearing your arms when you were very eschè crumbs.

George and Annie had no choice, and they came out from behind a mountain of scrap metal. Vincent stayed in place, hiding behind the old furniture. Zuzubin did not notice, and Vincent decided not to reveal himself to come to the aid of Annie and George, if they fall into pereplèt. He did not understand almost nothing of what the old saying uchèny, but one thing was clear to him: a man who planned to change the past, to rehabilitate themselves and to denigrate the other - it is not the one who can be trusted.



- Annie! - I continued to coo Zuzubin. - How you've grown! Quite a big girl. And what a good girl! But why do you have such a preoccupied look, kids? How can I help you? Let's lay out. Trust old professor!

George pinched Annie, bring her to open her mouth, but it was too late.

- Professor Zuzubin ... - she said in a trembling voice.

Zuzubin stealthily put his hand behind his back and turned off the monitor of the old cosmos.

- ... We need to get on the Large Hadron Collider - Annie continued. - There's dad, we have to save it. You've got an old space ... please, hurry, send us Collider, urgently, we should have time to defuse the bomb.

- A bomb? On the Big Collider? Your dad is in trouble? - Zuzubin pretended very worried. - It can not be, I do not believe! Is Eric threatens ... - He stopped in mid-sentence, watching suspiciously as George whispers something in the ear of Annie, and, having heard, vozmuschènno exclaimed: - Why is it "not a word more"? Eric - my beloved disciple, my pride, my biggest success in my life. And if he was in trouble, a great honor to come to his aid to me. - And Zuzubin bowed.

Annie turned to George.

- We have no way out, - she said in a voice full slèz. - More nobody asked us.

- So, you want to get to the collider - softly proiznès Zuzubin. - Of course I'll help you. Second - and you are there.

He vvèl on the keyboard a few commands, and his hand hovered over one of the doors leading somewhere inside the huge computer.

- When I opened the door - he purred Zuzubin - Space takes you to the place where you should be, just as intended. You, Annie, now command the parade. You will solve all problems, and vsè will be good again.

Annie beamed. Finally, she had the main role. She vsè correct, all spasèt. No dad, not for my mother, not George - it.

- Yes, - she said emphatically. - I do vsè you need. Send me Collider!

- Alas, moè child, one you can not go there. - Zuzubin shook his head sympathetically. - Your little friend has to keep you company. You will go together, you and George. Space will not be able to transfer you there alone.

- Annie - George eè pulled his shirt. - Do not listen to him! This is nonsense some, this can not be!

- I do not care! - Annie cried. - Professor Zuzubin, please open space and send us - she glared at George angry look - on the collider.

- A space suits? - Obrechènno George asked. - We do not have space suits!

- Why do you need the suits? - Sang Zuzubin. - You really do not go into space? A only in another country. Hop - and you are already there. Voydète portal - he took the door handle - and almost instantly find yourself in the place of destination. This I guarantee. I am a member of the Brotherhood of scientific research for the benefit of mankind, I swear Oath uchènogo that it's true.

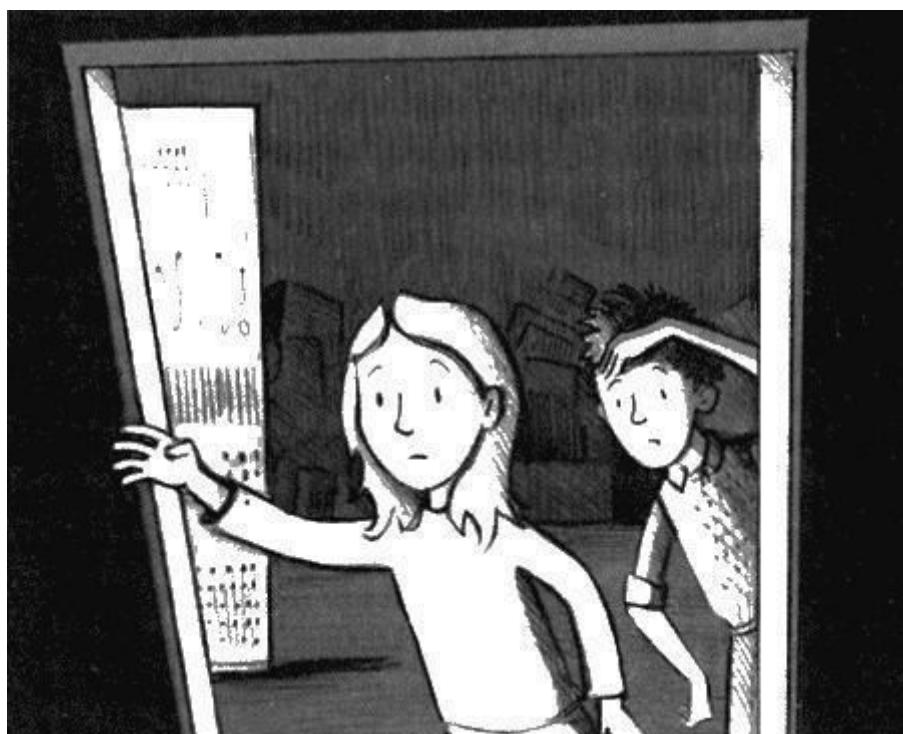
- I heard? - Annie said. - He took an oath. You too eè give, me and dad, and all his friends uchèneye. He did not disappoint.

- In this there is no doubt - with a sense of proiznès Zuzubin. - Listen to me, Annie. Vsè now in your hands. You voydèsh portal. You vsè correct. You all spasèsh ... - He spoke in a strange voice, as if hypnotizing Annie. She blinked several times, and his head swayed helplessly eè.

George looked at the clock. In Foksbridzhe six in the evening, then in Switzerland for seven. You're half an hour before the explosion, which not only prervèt great science experiment, but unesèt life of the world's best uchènyh - and Eric including ...

Zuzubin, noting that George also panics and loses too will, Annie winked and opened the door. After it was complete, pitch dark.

- I beg! - Eagerly invited Zuzubin. - Come on, kids. Zuzubin will take care of you. You'll be intact, unharmed ... intact, unharmed ... lovely, nice kids ...



Annie, like a sleepwalker, stepped in the door chèrny proèm - and disappeared.

George could not let go of one eè. He had no idea where she would be, but even if by some miracle Annie really transpired in the collider, it will not vsè could defuse the quantum-mechanical bomb - because code George, not at neè.

To what does not look like George had time to think, the world's first supercomputer to the current Space - small, silver, talkative. Vsè like hulking cruise ship instead of the usual brisk katerke ...

And George after Annie rushed headlong into the darkness, into a strange portal, toward the unknown.

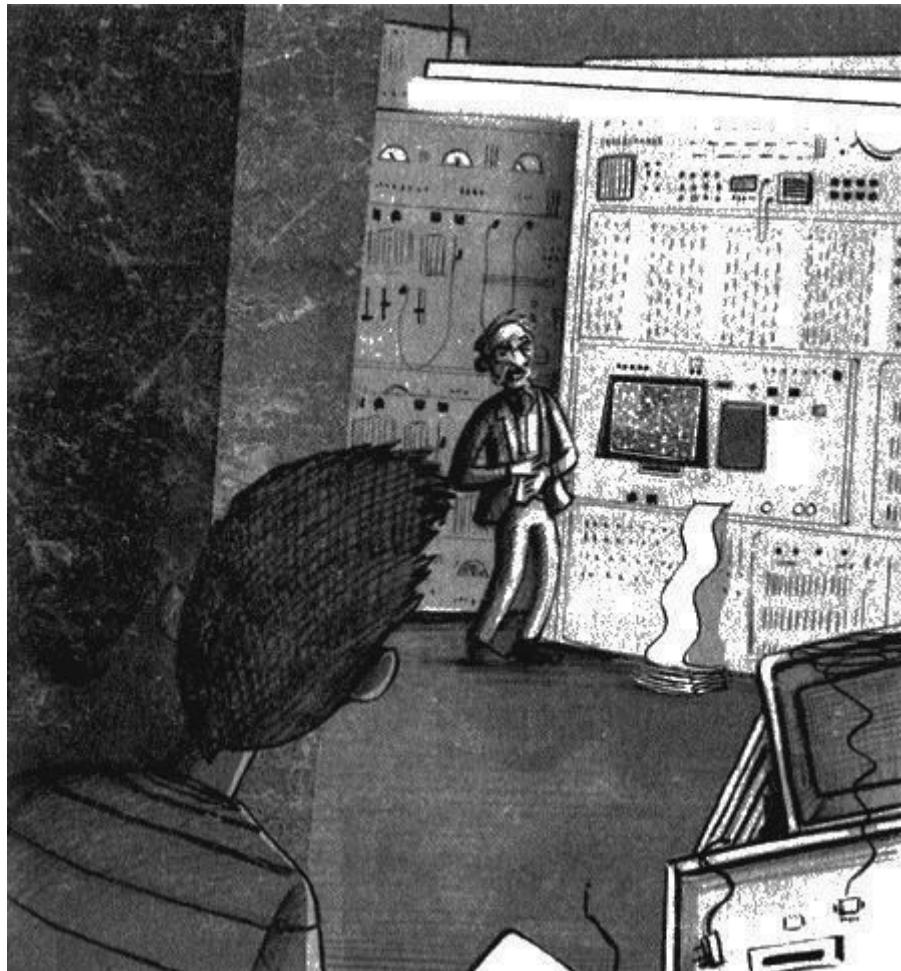
Chapter Sixteen

From his vantage point among the heaps of ramshackle furniture Vincent little heard, but seen vsè. He saw a sinister grin Zuzubina seen as struggling with an Annie and how flushed with anger, George. He could see that George is trying to dissuade eè - and knew it was useless.

Once Zuzubin opened a portal, which is hoped Annie privedèt them straight to Collider, Eric, Vincent realized that the moment had arrived. But before you apply svoè martial art, it is, as always, proiznès himself karate credo:

"I leave with empty hands. I have no weapons. But if I pridètsya protect themselves, their principles or honor, if it is a matter of life or death, the weapon will be karate - my empty hands. "

But when he looked up, Annie and George have already disappeared, and only the old man, Zuzubin, roared with laughter in front of a huge computer with the screen off. He laughed and laughed until he wrinkled cheeks slèzy not poured, and he began to wipe them ironed crisp white handkerchief. Otsmeyavshis, he again turned on the monitor, but this time the image on nèm was quite different.



Leaning out of the corner, Vincent saw the room on the screen, on which two tiny figures moved. He stalked closer, trying to walk a cat silently - and then Zuzubin picked up an old-fashioned microphone and said:

- George and Annie ...

Crossing the threshold, Annie and George were in full, gloomy darkness. Behind them zaschèlnulas door portal. After a few moments, suddenly broke the light - and the children froze, mouths open in amazement.

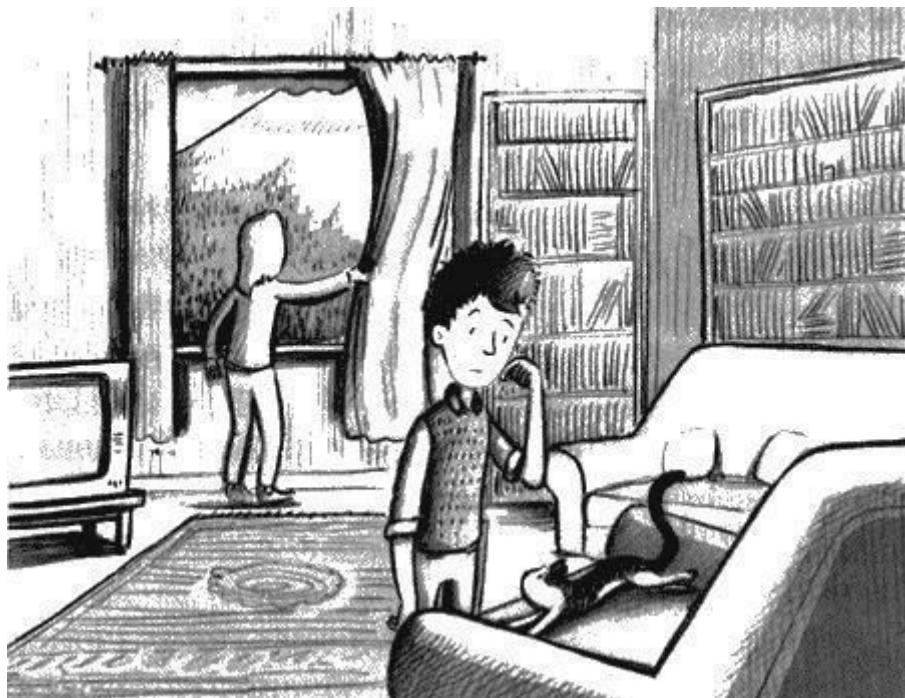
Where not only threw them before the portal, painted the cosmos! They have been in remote parts of the universe where the attraction is not like in the world, and you either jump up a ball, flying in the atmosphere of another planet, or, conversely, can not break away from the surface. Once they were on the edge of Lake chèrnogo methane, another time - near the volcano, from which crept slowly viscous lava. They saw in the sky just two of the sun and watched the explosion chèrnoy hole. But in a place like this, they did not yet fall.

In fact, it was just a room. The most common room as a room. It was hard to say why it was so scary.

The room was square, the ceiling height of the ordinary, comfortable-looking sofa, TV, a pair of cozy armchairs pèstry mat on the floor and shelves with hundreds of volumes, neatly arranged in alphabetical order.

In one of the chairs humming stretched chèrno-white cat.

The curtains were closed, but Annie ran to the window and otdèrnula them. Outside the window were the mountains that are covered with snow caps; on the slopes that lower, darkened pine trees in the blue sky above the tops of the mountains were going chèrnye clouds.



- Where are we? - Annie asked.

- I do not know, - said George, looking around. - But this is clearly not the Large Hadron Collider.

Something in this room was not - so not something that both chills running down your skin.

- Maybe it's the Alps behind the window? - Annie asked hopefully. - It is necessary to open the door - suddenly Collider somewhere very close?

Both turned and looked at the door through which entered the room. The door was already closed.

- No, I suppose we neè through back Foksbridzh popadèm - George said. - Just to get out to the outside, need another door ...

At this moment in the ancient TV suddenly crackled and ran across the screen chèrno-white stripes that cover the already nechètkoe image. Finally interference disappeared, the image has become sharpness.

- George and Annie, - rasped the voice of the TV.

This voice can not be confused with any other. On the TV screen to be treated professor Zuzubin. Only he did not realize that behind him looms over Vincent, ready to strike.



- Zuzubin! - Annie screamed.

And then in the head at George as if the fog lifted. Vsè fell into place - and the voices in the cellar, and zhèltye glasses, and what was said about Eric on the radio, and the secret machinations of the old space in the basement ...

- It was you! - George said, referring to the TV. - Did you run hither the universe and throwing things in chèrnye hole! You come up with all this nonsense about the true vacuum, hoping to frighten ordinary people, so they rushed to join the tobacco. That you are the secret agent who vydaèt tobacco mystery of the Brotherhood! It is you started to gather in one place the best physicists of the day, and blow them to stay single! Do you want to change the past

- That everyone thought like your theory, about which no one does not remember, supposedly predicted the explosion in the Large Hadron Collider!

- And, gleefully concluded Zuzubin - vsè it I got! Eschè a few minutes - and your Collider smashed to pieces. That's when the world will know that me and my theory too soon dropped off. All are convinced that from the beginning I vsè correctly predicted, and no one will grab my hand - something other physicists will not go! So I won!

- Nothing like this! - George shouted at the TV. - You cheated! This defeat, not victory, besides the most shameful!

Annie, edging out George screamed directly into the screen:

- Where are we? You promised to take us to Collider unharmed! You swore!

- Oh, no, sweetheart, - chuckled Zuzubin. - If you listen carefully and do not make hasty conclusions, I have heard what I said and not what you wanted to hear. I said that you arrive safe and sound at their destination. And I promise fulfilled svoë. And it would be for a place, I did not specify.

Annie rushed to the door.

- Stop! - George shouted. - Annie, do not open the door! We do not know what's behind it.

- That's it - grinned Zuzubin. - You, my young friends, are trapped in the back Shrèdingera. You even do not have to entice - have run like a lamb.

- What does it mean? - Annie retired to the background.

- That is ... - George issued a heavy sigh. - This means that we know where we are, but when open the door. We can be anywhere, anywhere at all, but as long as the door is closed, we will not know exactly where we are.

- That's it, that's it - happily nodded Zuzubin. - As long as the door closed ostaëtsya, the number of your locations indefinitely. We are pleased to introduce you to some of the possibilities.

View outside the window gave way to something dazzling, raskalènnoe-hot, reeking only slightly yellowish. Annie and George fell back, closing his eyes.

- It is likely - said Zuzubin - that you are in the center of the planet Earth, in tvèrdoy, the crystalline portion èè core. In this case, you are sitting in the middle, most of the iron ball diameter of two thousand six hundred kilometers, such as hot as the surface of the sun. The pressure there in three and a half million times greater than the pressure on the surface. Do you want to open the door - welcome! I am only interested in one thing: you burn or you flatten in lepëshku? What proizoydët before, I wonder?



George stood in front of the window, unable to utter a word.

- Lost for words? - Asked Zuzubin. - Then we continue our lesson geology. Around the inner core is the outer, liquid, molten iron - also, I assure you, preuyutnoe place - and around it, in turn, is the mantle. It is composed of rocks, and there and then bubbling molten lava. Even if you somehow miraculously proberètes from the inner core to the outer, you have the blood boils in the veins, because it is incredibly hot. But this is not vsè. The Earth has eschè and bark, and you would have done in the course of her long and forty kilometers to reach the planet's surface. But not necessarily so grub: you can dig only twelve kilometers - and find yourself at the bottom of the ocean. - He clapped his hands. - Come on, kids, let's see what you then proizoydèt!

At Annie suddenly gave way under his feet, and she sat down directly to the cat. He yelled indignantly, wriggled out from under the neè, took the same position on the couch and began to wash, throwing Annie a withering look.



The picture changed again through the window. This time there was deep depression, where no sunlight penetrates. However, it was still light in the room, so that the children could see the curved reefs and chèrnogo trickle of smoke rising from the rift in the ocean floor.

- Assume - gloated Zuzubin - you come to the bottom of the Pacific Ocean. Here, hidden from human eyes, flourish strange prehistoric life forms. They are able to feed on minerals spewing from hot springs, which beat out of the ground!

Huge, long, George, worm thud on the window and udivlènnym squelch peeled himself off the glass.

- Oh, what a shame, she did not see you! - Exclaimed Zuzubin. - Vsè because neè no eyes. This giant Pogonophora - though it honey? I bet you would not have refused to go for a swim with her race. It is quite friendly. However, it does not matter. Vsè still alive you would have cooked in some water from a hydrothermal source. Well, that is if the first did not drown ...

Annie beat trembling. George sat down and put his arm around the shoulders eè.

- Do not look back any more! He deliberately intimidates us. And we do not give in to it!

However, he could not take his eyes off the creature, chè deathly pale body wriggled through the window ...



- Again unhappy? Well, you can not please everyone. - Zuzubin clicked his tongue, and the view outside the window changed again. At this time in front of them as the eye could see, stretched the endless ice field. - It looks like you do not like the heat. Let's try a different way. Did you nepodalèku from the South Pole in the middle of the Antarctic winter.

Through the window hit the wind, the glass rattled. Through the blizzard children spotted penguins: they stood, head bowed, hiding from the frenzied gusts of icy wind.



- You see, kids, - Zuzubin continued, obviously enjoying their astonishment - options that await you on the other side of the door, truly without number. Maybe you are reduced to the quantum size and learn the hard way what being a quark!

- No, - said George. - It will not. Because it is impossible.

- What are you? - Feigned astonishment Zuzubin. - Do you think that you can not get stuck inside the proton forever eschè three quarks, gluons and myriad pairs of quarks and antiquarks? The likelihood that you weed out, is extremely small, I assure you, my child moè. No one ever did not yet seen a quark hadron outside, dear boy, and no one will ever see you if you ...

- Enough - resolutely George interrupted. - It vsè vranè and true.

- Did you check - kindly offered Zuzubin. - Experiment - an integral and vital part of science, so looking forward to the results of your efforts to prove me wrong.

The quantum world

- Enough! - Annie screamed. - We need to get out of here!

- But who detains you, you are my darlings? - Smiled broadly Zuzubin. - You are free to leave the room at any moment. Just something and works that open the door.

- But what ... - Annie sank back on the sofa. - Because then we maybe umrèm ...

- Maybe - readily agreed Zuzubin. - It may not be...

- So, - she said George slowly - we're stuck in this room forever? Permanently?

- But there is something to read - reassured them Zuzubin. - Look at the shelves of books that should be read to every educated person. For the first time will suffice. A refrigerated naydète than eat.



Annie jumped up and ran to the fridge, hoping to discover if there is a way out of this trap. But a box of oatmeal has been in the refrigerator, five bars of chocolate but milk bottle with the inscription "For a cat."

- Flakes and chocolate? And it vsè? - Annie protested.

- Perfect diet also very nutritious, - coldly retorted Zuzubin. - I would ask you about your culinary preferences, but there was no time - you do so in a hurry.

And then it dawned on George:

- It's your room. You zhivète in it, when you want to escape from all. Just disappear - and appear here.

- Yes, - admitted Zuzubin. - It is good and comfortable. An ideal place for reflection. No dèrgaet not distracting.

- So, there is a solution - George accusatory pointed at the screen. - Once you can go from here to Foksbridzh, then we can. And when you get out of this room, you know exactly where to find yourself! No "maybe" and "perhaps"! I bet you get from neè and

Collider, and generally wherever you want! This room - your storage terminal. Thanks to it you suddenly disappear from one place and just as suddenly appears in another.

- Of course, - Zuzubin said. - I also have a remote control. With it, I can carry out observation, which makes the portal to select opredelènnoe destination. So, when I open the door, I find myself where I want, and not just anywhere.

- Remote controller! - Shouted George. - Annie, we need to find the TV remote.

- Look, look, - hemmed Zuzubin. - Look no nadorvites.

He waved some object, and George throat was dry with terror when he learned in this subject the remote control.

- So, you just locked us so we sat there and waited for my dad vzorvètsya? - Very quiet, empty voice asked Annie.

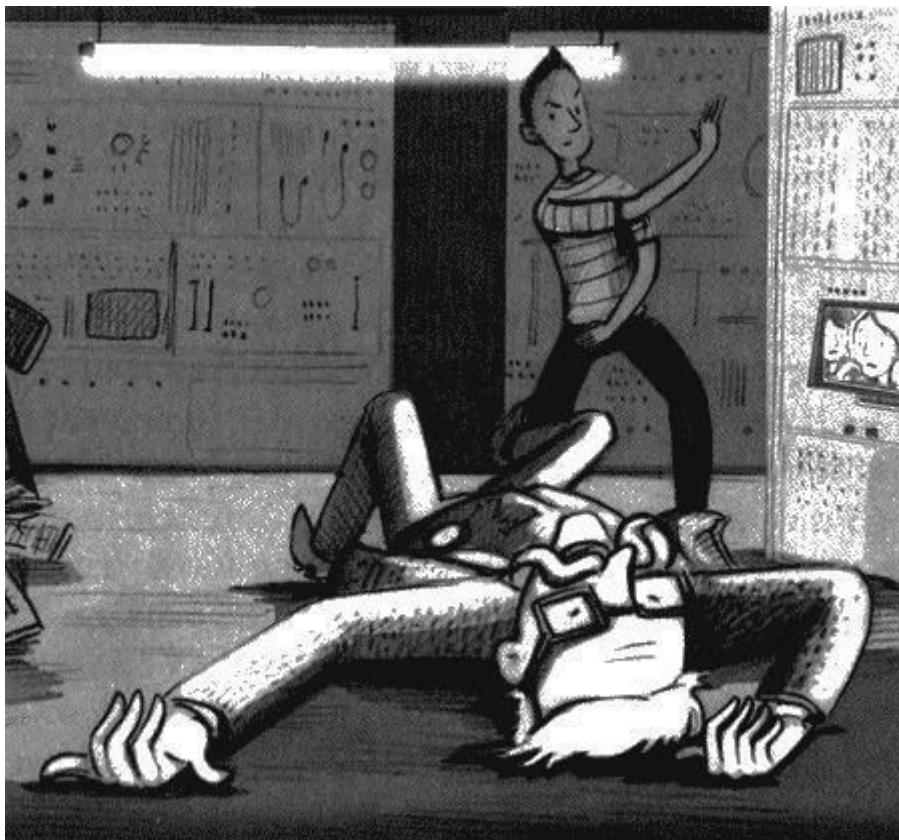
- Yeah, - quietly confirmed Zuzubin. - Would you like to see? I can show on TV. I for our dear guests do not mind.

- No-oo! - Annie cried so shrill and desperate, Vincent - there in Foksbridzhe - heard the cry and knew it was time to.

Chapter Seventeen

Vincent has long been looming behind the old professor, hoping Zuzubin one way or another will tell him how to rescue Annie and George out of the trap. He had no doubt that will lay the old man with one hand, but what's the use of that? If Zuzubin not explain how to return George and Annie back from the terrible room, he, Vincent, now watched the old computer monitor, they will be in big trouble ... eschè

Vincent looked at the phone, George, picked them up from the floor, I saw on the screen a message of missed calls from home, at the same moment he heard a desperate cry Annie - and decided it will no longer wait. With a battle cry, he leapt into the air, landed behind crazed Zuzubina and knocked him to the ground by a single blow, perfectly accurate and rapid to stealth. Zuzubin, had begun to turn around udivlènno collapsed threw himself. His head was thumping on the floor, his eyes rolled back.



On the screen he saw Vincent totally stunned faces of George and Annie.

- Vincent! - Annie covered screen kisses.

George pulled eè ago.

- Vincent! - He exclaimed. - It was cool! Unbelievable!

- Vincent! - Once again rushed to the screen Annie. - You are the best! You are hero!

George again pushed eè.

- Vince, but how do we get out of here?

- Call my dad! - Annie cried. - Tell him about the bomb at the collider!

Vincent picked up a mobile phone, George, Eric nashèl room - but the mechanical voice told him that the person is not available, and offered to call back later.

- Remote controller! - George yelled. - Vince, take Zuzubina in control!

Vincent looked at Zuzubina, motionless lying on the floor - spread arms, drooping mustache - bent, pulled from his fingers and remote podnès the screen.

- This, or something?

- Yes! - George said. - Well done! Now get us out of here, okay?

- A such as? - Vincent asked hesitantly. - How does this thing work?

- Oh, - obrechènno proiznès George. - I did not think about it ...

- On, a closer look! - Vincent podnès remote close to the screen.

- And what's the point? - George angrily waved. - Look, do not look, nechètkoe image without razberèsh nothing. And most importantly, Vince, the main thing - we must hurry! Time we almost gone!

- Call on the collider! - Annie again intervened. - Tell them that there is a bomb!

- No, - I interrupted eè George. - It is useless, they vsè still he did not believe it. There is only one way. We need to get ourselves and disarm the bomb.

On the other side of the screen Vincent, head bowed, looked remote.

- When I'm home I press the remote's button this here - he said thoughtfully, - the TV is switched from one function to another. We are also about this and do you want? To get out of the back of your trap Shrèbiusa or whatever his name is? It is necessary to switch it to trap the portal. Can I try? - He said hesitantly.

- Come on, try quickly! - I urged him George. - You - our only hope!

Vincent took a deep breath, and with a sinking heart, pressed the button. Nothing happened. He pressed for the second time - and the old Cosmos screen menu appears. Exactly the same menu appears on the TV screen and on the reverse the trap Shrèdingera. Vincent began to read a friend menu items:

- Foksbridzh ... Large Hadron Collider ...

This is probably the place where visited Zuzubin - George spoke quickly - and if we choose the collider, it is likely popadèm in the same place at the collider, where he planted a bomb! On the panel there is an arrow? You can select the line where it says "Large Hadron Collider"?

- I dont know! - Vincent panicked. One thing to skateboarding or Karate, then he did not know fear - but with his own hands to send friends to where they are at risk? - I can not! I can not you at Collider! There is a bomb!

- Vincent, come on! - Annie said, pushing back from the screen, George. - You have to move us to Collider, simply must, otherwise my dad never vernètsya home - so said Lynn! The faster you can do it, the more we will have time to find and defuse the bomb. You zhmèsh the button, we open the door. Go!

Vincent made a heartbreaking sigh arrows drove the cursor to the desired line - the "Large Hadron Collider" - and pressed the button.

At that moment, George threw open the door ...



The last thing I saw on the screen Vincent were friends back, disappearing into the portal.

Vsè if he did not it? Do they get to Collider? And just about whether they need to get there, if there vzorvètsya bomb? He should have sent them back to Foksbridzh ... And if he does not hit the button and brought in some "wormhole"? Suddenly he threw them in the past? Or, in another universe? What then?

Vincent sat on the floor and put his head in his hands. Next to him, without regaining consciousness, wheezing source of all ills - Zuzubin.

"Wormholes" (also known as "wormholes") and time travel

Chapter Eighteen

Leaders of tobacco in his headquarters also did not take their eyes off the television screen, watching the broadcast from a secret center of the launch of the LHC.

Lynn pretended not zhdèt dozhdètsya explosion, otherwise TOBACCO might suspect something.



One of the leaders moved, freeing his place:

- You'll like it! You will see with your own eyes, as Eric Bellis, your sworn enemy, fly in the air with the collider. And think: "This is vsè because of his experiments! So he lied when assured that they are safe! "

- Ha ha, - he forced himself to Lynn. - In is awesome! - He desperately hoped that George after their meeting on the asteroid would be able to somehow miraculously thwart a sinister plan of tobacco.

The meeting was scheduled for nineteen thirty. It was nineteen fifteen, and running the center is gradually filled. This room is in an artificial cave, stuffed with electronics, was the perfect place for meetings. As accelerators and detectors, it is also located in the dungeon, but from his work space separated the two-meter wall thickness.

Start Center has been completely safe and top secret place - at least, so thought the members of the Brotherhood of scientific research for the benefit of mankind, to know without knowing that the hall is installed a hidden camera. They were in a nightmare could not have dreamed that the science enemies eagerly caught every word, every movement.

In the middle of the room stood the Cosmos, a few tarnished after a grueling interview grid. The screen had been unclear and naklonèn at an odd angle, and the rear protruded razlohmachennye wires. The room voshèl some uchèny and began to explore the cosmos,

reproachfully shaking his head at the sight of how severely treated with a small silver supercomputer.

- It Bellis? - Televangelist asked, peering at the screen.

- No, - said Lynn. - Bellis did not yet appear. - He hoped with all my heart that somewhere in another room collider Eric with George now neutralizes the quantum-mechanical bomb.

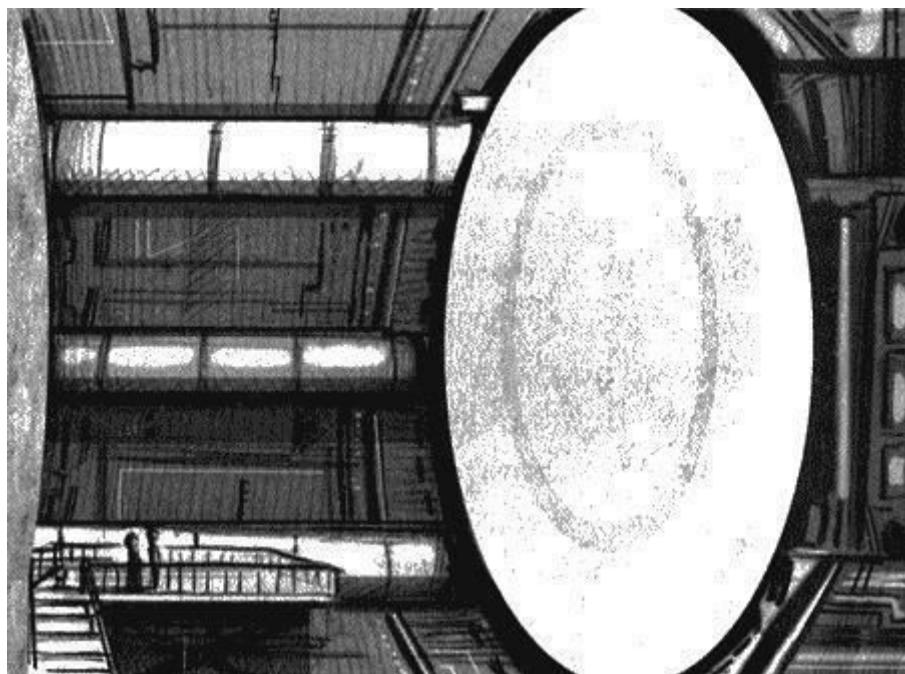
- By seven forty he has to be there! - Ominously said another leader of the tobacco. - At the epicenter of the explosion!

Lynn thought a minute, afraid to breathe. Alas, even in nineteen thirty-door opened, and in the center run briskly voshèl Eric. Walking helped him gather his thoughts, gave strength and confidence, and he strongly shèl meet fate, ready to prove and defend.

On the other side of the wall, George and Annie just shlèpnulis on the metal floor: hurry to get out of the trap Shrèdingera feedback, they accidentally collided in the portal.

- Slessssmenya! - Annie hissed from somewhere out of George.

He had managed to roll onto his side and tried to get up, but his knees buckled. George lie down on the floor, staring at the huge metal disc, which stood in front of them, reminding the plate: the middle of the large circle has been drawn smaller circle. Disc framed ring of blue metal plates, and the side, as if to embrace the hand, stretched vperèd immense gray tubes. This construction surged against children, like a magnificent temple, suppressing one already in their size. At the sight of it immediately wanted to go to shèpot.



George somehow got to his feet. It seemed that he and Annie have landed on a certain platform. Annie was still lying on the floor iron curled.

- How are you? - Eè asked George.

Annie turned to him with her eyes closed for a moment opened them - George had noticed a bright blueness - and again closed her eyes.

- Nothing, - she said. - It feels familiar, as though asleep, and suddenly someone turned on the light. I'm used to it.

George looked around.

- Hey? - He called softly.

Sound disappeared into space, as if the giant machine swallowed it. Before George came the echo of a strange wheezing - pew-pew-pew ... Around it seems, there was not a soul.

George did not notice the tiny motion detectors are immediately registered the appearance of intruders and have set in motion alarm: security camera system have already passed them to image Annie on monitors around the gigantic collider complex. Because of the thick walls, harboring complicated technique, George and Annie heard wailing horns, it means that the locking system is turned on and caused a beam dump: proton beams were instantly thrown out of the pipes of the accelerator and crashed into a seven-meter graphite cylinders, each of which was pomeschén in steel cylinder. The children had no idea that their presence has made so much noise at the collider.

Annie staggered to her feet and quickly-quickly blinked.

- We're on a spaceship? - She whispered, looking around. - This is the engine room?

- Hardly, - George shook his head. - It is normal pull, and we breathe without cylinders. I think we are on Earth. On the Large Hadron Collider. Old Cosmos took us to the right place.

- Phew, lucky - said Annie and quietly moved closer to him - she always did when she was afraid. - Where are we now? Where to find Dad? And how do we obezvre ...

George opened his mouth to answer questions eè, but then Annie, osèkshis in mid-sentence, shrilly screeched.

- What? - George jumped up as if stung and looked around at the sides, but saw no danger.

- I - on foot - something - hairy! - A barely audible whisper, pale with terror Annie.

George looked down. By Annina ankle pressed the cat, the one who was lying on the couch in the room-trapped. George raised his hands.

- It's okay - he said, calming whether Annie, or a cat, but rather both. - It's just zuzubinsky kotyara. Leaked us into the portal.

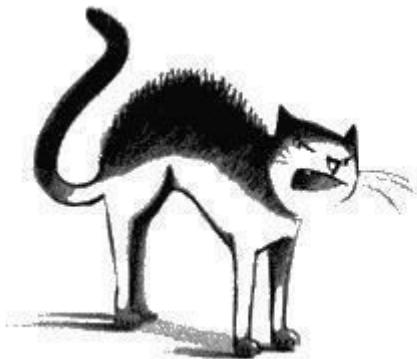
He scratched the cat's ear, he purred and sat comfortably in his arms.

- Are you sure it's safe? - Anxiously asked Annie. - And suddenly it turned into a cat Zuzubin to secretly linked us?

- It is unlikely, - said George, stroking the soft white-chèrno shèrstku. - You see what he is now affectionate? I suppose at least we wanted to escape from that terrible room ... Oh, look! - Under the chin of a cat hung a medal engraved. - What is written there?

Annie took the medal in his hands:

- "The reward to the person who is alive or naydèt mèrtvym". - She turned the medal and read on the back: - "Shrèdi". Perhaps it's the name. Wait a minute, here eschè something there, in small letters: "I have a cat who walks by himself."



Cat suddenly hissed and bit his finger claws in George. He gasped and opened his hands.

- Here you see? - Annie said grimly. - Anything that came out of that damn room, can not be trusted.

Côte gently landed on all fours, hissed again, as if on an invisible enemy, arched his back, so that the hair stood on end, and began furiously scratching claws iron floor. He looked up for a moment, George - mustache quivered with indignation - and turned away again. George sat down in front of him on his haunches.

- What's the matter, Shrèdi? What happened?

- Pretending - Annie snorted. - Another trick.

Shrèdi vperèd took a few steps, came back several times oboshèl around George, again moved vperèd and returned, while throwing vsè George significant looks.

- It seems, he says: "Follow me" - George guessed.

At Annie's eyebrows went up:

- Are you going to follow the cat ?!

- I am, by the way, once thrown into space talking hamster - George recalled. - And then a crazy uchénny who wants to blow up the collider, shoved us into the lovely room. So why not follow the cat? Moreover, it is, in fact, the cat Zuzubina.

- I thought it was a cat Shrèdingera - Annie screwed.

- Never mind! Importantly, this cat physics - so he can know something. For example, he could see in the window as Zuzubin puts a bomb on the collider. - And by the way, - George looked around the silent giant mechanism - if it comes to that, we have no other ideas, no clues where to find the bomb! And where to find your dad, we also have no idea.

Annie looked at her cell phone. He showed no signs of life.

- If this is the Large Hadron Collider - he continued George - but it is like it is because it can not be it - so we are under zemlèy. And this thing, - he pointed to the machine - probably the detector. And nèm pipe in which protons collide.

- We are under zemlèy - repeated Annie. - In the dungeon. As underground.

- Yeah, - said George. - From one trap to another, but this is a thousand times more dangerous than that. But we were not in vain here. Cosmos brought us anywhere, and in the same place at the collider, where Zuzubin visited before. Then a bomb around here!

Shrèdi hissed again and impatiently tapped his paw on the floor. In the eerie silence of the children at the same time suddenly it seemed as if they can hear the ticking time bomb mechanism. Last minutes before the explosion, which prèvèt not only the greatest experiment in the history of mankind, but also a lot of lives ...

- Okay, - Annie decided - for the cat because the cat! Vperèd, Shrèdi, lead us!

Shrèdi smoothed his mustache, gave Annie and George smug grin and gracefully stepping, walked to the edge of the platform. With neè cool down led blue metal staircase. Before the top rung cat turned and looked expectantly at George.

- She wants you to take him in his arms, - translated by Annie.

- Only without the claws, Shrèdi - warned George, he picked up the cat in his arms and moved down. Annie stumping behind. Iron rungs rattled unmercifully.



Once the ladder over, Shrèdi nimbly jumped off the hands gracefully landed and ran vperèd along the curved sides of the ATLAS detector. Children tiptoe followed him.

- Listen, - Annie George pulled his sleeve - and if we do not Shrèdi to bomb vedèt? What then? George abdominal vsè sank.

- I do not know - honestly, he said, trying to sound cheerful. - Then, perhaps, we naydèm your dad, and he certainly would be able to defuse the bomb.

But both know that they are deep under zemlèy, okruzhènnye thick concrete walls, stone and machinery. If the bomb vzorvètsya, they too will die.

Côte vèl them straight to the far end of a huge underground hall, along the shiny side of the detector.

- If a bomb around here, we eè would not naydèm - whispered Annie.

George was ready to believe it. But Shrèdi thought otherwise. He hissed again, claws and grabbed Annie up - very noticeable, even through the thick denim trousers.

- Ouch! - She cried. - What are you doing ?!

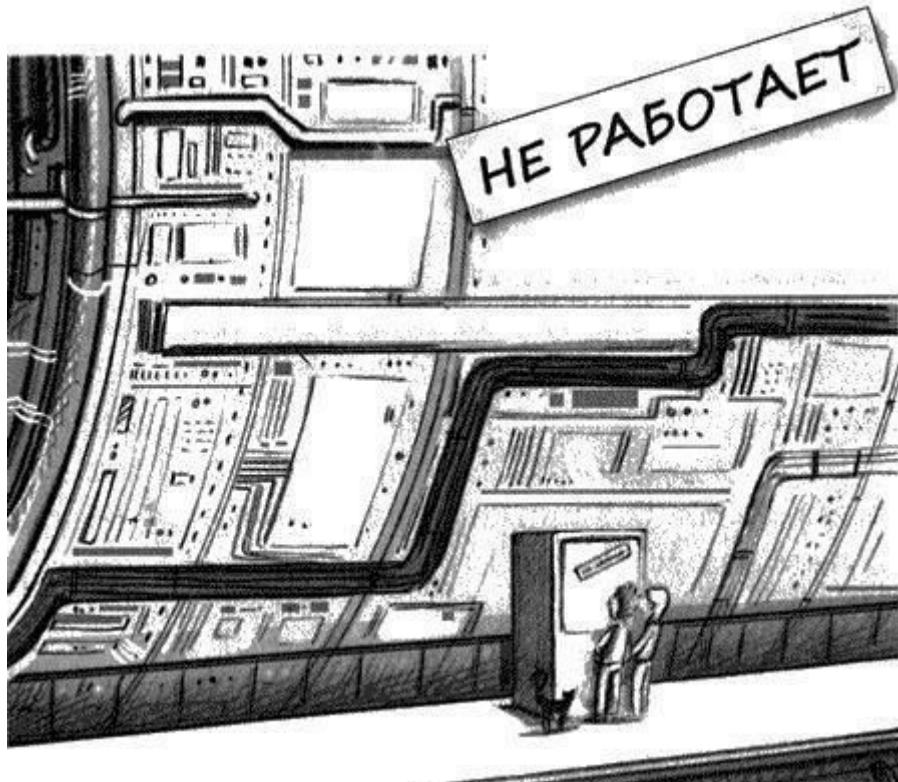
Cat calmly looked both eyes, a long tail and arched towards the machine with drinks - very ordinary machine, which at first did not notice the children against the background of all that unusual that surrounded them.

- Shrèdi! - Annie protested. - We do not want you to buy anything! We have no time for this!

But George stopped in front of a gun and began to examine it closely.

- Annie. Tell me. You do not notice anything strange?

Annie peered more closely. The upper part of the machine has been divided into sections, each image were banks with a drink and the corresponding button. And on top of all this, obliquely, - a handwritten sign "CLOSED".



- All drinks are unknown - said Annie turned to George. - There does not happen! What is eschè for "Quark brew?" A "Sip gluon"? "Neutrino nectar"? And all the lights are lit, although it is written that does not work.

- Eight - grimly said George. - Just eight drinks. But Lynn said that the bomb eight switches.

Annie gasped.

- So the bomb here? In the machine? You just need to choose the right drink - and we eè disabled?

George fished out a slip of paper with a long sequence of digits - the same one so kindly pulling them out of themselves Busik.

- Here! Here is the code that activates the switches, and only then can we make the bomb exploded. Or, conversely, did not explode. And there's this ... quantum superposition: all switches are involved, but only one of them is important to us. And what - we do not know.

- And if we nazhmèm wrong button - Bomb vzorvètsya? - Explained Annie.

- Yes. And in theory, there vsè arranged like this: you will not know which button you need, until you try, and nachnèsh try - would not that ... But Lynn said, it is something thought up to that damned bomb vsè still could disable . He said that provèl observation and got the result.

- If he provèl observation - quickly realized Annie - then wanted to know what the drink should be selected so that this is not a superposition superpozirovala. And probably figured out! He knows which button to defuse the bomb. A code to activate you already have.

- It remains to choose the right drink - summed up George - that's all.

- That's all ... - echoed Annie and stepped closer to the machine, looking at the pictures.

- Do not touch - predosterèg eè George. - All of a sudden there is a booby trap?

- I did not touch. But to choose it is necessary ... Look! - Under the slot for coins Annie noticed the display on which is displayed, how many coins thrown. The display shèl reverse otschèt two-digit numbers: 81, 80, 79 ... - just seconds before the explosion! It is necessary to choose prichèm quickly. That's vzorvètsya! .. And if you push all eight at the same time? Will not help?

- No, - said George. - It's a machine for beverages. Artfully conceived. Indeed, in a normal machine you choose one drink, then you press one button. And in another way it will not work. Hence, we can press a single.



- But what ?!

George, stammering with excitement, began reading the names of beverages:

- «W and the Z," "Quark brew", "Sip gluon", "photon Fountain", "Neutrino nectar", "The energy of the electron," "Hee-Hicks", "Thaon-lemon" ...

"60" - appears.

George looked at Shrèdi:

- Do you have ideas?

Côte sadly shook his head, as if to say "I did vsè that could" curled up on George sneakers and began to lick his mustache.

- Annie, do you?

- One of them has to be "superfluous", he has something different from the rest, - she said. - Probably, especially Lynn provèl in nèm quantum observation to bomb then chose only one of the eight code - one that is necessary ... But what, what?

- Bosons W and Z, - George muttered under his breath. - Quark ... gluons, photons, neutrinos, electrons, the Higgs boson, Thaon ... - And then in his mind flashed like sparks, like on this very machine with drinks. - Eureka! - He yelled. - This is the Higgs boson. He once!

- Are you sure?

Before the explosion was thirty seconds.

- The Higgs boson - George said slowly, - the only particle that does not rotate around its axis. The rest - rotate: in a single photon and the gluon spin and a neutrino, electron and Thaon - half ...

- Hold, George! Please, right now, before its too late!

Fifteen seconds. George reached for the button, but his hand trembled.

What if he was wrong?

What if he nazhmèt the wrong button, and because of him vzorvètsya Large Hadron Collider - and all who nèm is also explode?

Then he remembered how Eric once said: in the quantum theory of all observations are unpredictable (Eric said - "neopredelènnny"). You can only calculate the probability of a particular outcome, and only in certain situations, this probability becomes opredelènnostyu. How Lynn managed to get a bomb to choose "Hee-Hicks"? George looked at Boucicaut piece of paper - and suddenly realized that the last icon on the nèm - letter. «X» in capital letters.

Seconds flew inexorably. Nine, eight, seven, six, five ...

On schète "five" George, I'm sure finally that guessed correctly, hit the beverage button "Hee-Hicks."

The lights on the machine at the same moment went off - only the button "Hee-Hicks" is still shining. "4" Display on the figure stood. In the window next to the button until the text: "ENTER CODE".

George quickly vvèl Busikova digital part of the code, making the machine an instant rush of light and shook. Chetvèrka gone on display, instead of neè there was an inscription: "neutralized."

Children potryasènno looked at this inscription. There's something clanged loudly, and there was a tray with a transparent drink sweating Bank.

- Wow! - George said.

Shrèdi fairly purred. Annie sat down exhausted on the floor. Suddenly there was another sound - if tyazhèlaya door opened, and then he heard the quick steps that are clearly approaching. Finally, due to the angle of a huge machine appeared disheveled Eric - and stopped dead in his tracks when he saw the children.

- Annie! - He yelled. - George! How quark brought you here?

Behind Eric seemed a whole string of anxious uchènyh.

When the alarm is triggered, uchènye immediately realized that in an artificial cave, where the ATLAS detector, it is not clear how two people found themselves short. Squeezed through the crowd to the monitor, Erik, to his horror, he saw that the two are strikingly similar to his daughter Annie and eè best friend George. Turning cold, he, along with other uchènymi watched the two figures down the iron stairs and came out of the field

of surveillance cameras. At this very moment he came to his senses and rushed from the start in the direction of the center of the ATLAS detector.



- Dad! - Annie rushed to his father. - You are alive! Collider vzorvètsya not! Science does not end!

- About chèm is that you? - Eschè more astonished Eric.

- Professor Bellis - joined in the conversation one of uchènyh - enlighten us, please: how the two children appear to have you kind of relationship, were in an isolated underground compartment of the LHC and have set in motion locking system, causing a beam dump ?

- Dr. Jiang ... - Eric said.

- You can finally explain what's going on here? - Under his arm from Dr. Jiang was a small silver Cosmos. Despite the anxiety and the general turmoil, Jiang did not forget to grab a computer - he obviously did not want to leave it unattended.

- Honestly, no, - Eric admitted.



Dr. Jiang frowned, but then George resolutely stepped forward.

- Hi, - he said loudly, addressing all. - Excuse me, please. Vsè the fact that this machine for beverages has quantum mechanical bomb.

- The machine for drinks? - Jiang asked. - But he was a hundred years is broken. No it does not enjoy ... that is ... So that's how it is ... lay explosives in the broken machine ... Clever, do not say anything.

- And if the bomb exploded - he continued George - from the collider would be left a wet spot. We - I mean, we, Annie, because it is one I would never have managed - we know that there are eight switches that can be used to bring into effect the bomb or, conversely, to neutralize it. And on this machine - eight different drinks and eight buttons, so each button - this switch. We had a code - George waved Busikovoy piece of paper - and we know that the inventor of the explosive device secretly proved observation and received information about which of the buttons will turn off the bomb. So we had to just calculate the correct switch, ie a drink. And we decided that it was probably "Hee-Hicks," ie, the Higgs boson, because all the other particles rotate around its axis,

a Higgs boson does not rotate. But, in truth - he looked at Annie - we figured out that our choice is correct, because at the end of this code is written the letter «X». So we chose the Higgs boson, entered the code - and now bomb defused.

- Yeah, - he held out one of uchennyh - now the collider accurately detect the Higgs boson. Prichem in machine drinks.

The remaining uchennyh pereshetyvalis:

- Quantum-mechanical bomb ... a monstrous device ... who just came to mind ...

- But how does it all happen? - Dr. Jiang asked anxiously. - Someone planned to destroy the collider uchènyh destroy, destroy science ... Who? Why? What for?

George and Annie looked at each other. Annie stood up and stepped vperèd.

- It vsè TOBACCO - began to explain it - the secret enemies of the collider. - Uchèneye rolled his eyes and groaned, but Annie continued: - They decided to blow up the Collider now, when you are all gathered here. For all thought, if your experiments are deadly, and never tried to repeat them. Would one fell swoop destroy the best physicists in the world and to intimidate humanity.

- I do not understand one - how they did it - Doctor Jiang said? We collider highest level of security. As they made their way here?

- One of them - a member of the Brotherhood - simply explained George.

- It Zuzubin - sadly said Eric. - That he betrayed us. Why, George? You know?

View Eric was so bitter that George did not want to upset him eschè stronger. However, the question was asked, and he had to answer.

- Well, in short, we believe - we Anni - that Zuzubin wanted to make a big old cosmos a time machine and go back in time. And adjust vsè so that now, because of this, it seemed as if his long-forgotten, mossy theory from the very beginning were true. And your - are incorrect. And if he eschè then predicted that the Large Hadron Collider vzorvètsya.

Eric took off his glasses and began to wipe them out of his pants vybivsheysya hollow shirt.

- Oh, trouble, - he said. - Zuzubin Poor, poor old man ...

- What does "poor"? - George hoisted. - He was going to blow us all, and you will regret it ?!

- Because he soshèl mind, it's obvious. - Sokrushènno Eric shook his head. - That Zuzubin, which I was, would never not do that. He knew that the science does not stop. In science, it is important not who is right and who is wrong, and development progress. We otdaèm work all their strength, knowledge and abilities to the uchènym who will come after us, it had to rely on. Of course, our theory may be wrong, but we know about it and consciously idèm risk. Do something new - to risk. He who is afraid to take the risk, never create anything really worthwhile. Of course, we make mistakes - and how else? That's the whole point. We try, make mistakes, start again, fall, rise again idèm vperèd - vsè and this not only in science but also in life.

- Yes, it is, - has agreed to Dr. Jiang. - The most difficult and interesting part begins not when our forecasts are confirmed, but on the contrary, when they are wrong and we get a completely unexpected information. Then you have to completely change the idea of what we thought we knew.

At this point, Dr. Jiang's pager beeped, followed zachirikali and pagers uchènyh others - like a dungeon flew into a flock of starlings. All instantly read the messages, and the hall resounded with jubilant cries.



- What? - George asked Eric.

Eric hugged him and Annie.

- ATLAS! - he said. - To get the result! And just at the moment when we least expect it. There is new information about the early universe. Now, if I enter eè into space, then ... - Eric suddenly osèksya.

Around it was quiet. All recalled that the question of whether it is possible to leave the Cosmos Eric, was never reshèn.

Dr. Jiang also thoughtfully silent. Finally, he very politely asked to Eric:

- Dear Professor Bellis! I think we have an issue that needs to be clarified before we proceed to the study of these interesting new data. Brotherhood will have to decide whether you will be the sole custodian and guardian of the Cosmos. But before we put it to a vote, I want to ask you: How is it that these kids know so much? How they got the knowledge from the field of quantum physics are sufficient to prevent a terrible catastrophe - a catastrophe that almost pushed the development of science for a few centuries ago?

Eric was going to answer, but it was ahead of George:

- Can I say? We know because so many things that we vsè Eric explains. But he was not just telling - he berèt us along for the journey that we learn for yourself on svoèm experience. He did not just tell us the information - it makes their brains and use this information.

- With the help of the Cosmos? - Said Dr. Jiang.

- Yes, because with it more fun and interesting, - said George. - We learn to obtain knowledge, and then apply them in practice, faced with new, unfamiliar tasks. But I do not just mean it. - George hesitantly looked at Eric and vsè also continued - nothing we did not work - we would not have saved any collider, no people - if not for Dr. Lynn. Joining the tobacco, he risked his life: imagine if they knew that he gave them? He sent out into the Universe your avatar to warn me about the bomb. If not for him, we would have not been able to do. In short, I'm going to ask about chèm: please take it back to the Brotherhood! In my opinion, he deserved.

- Hmm - handed Dr. Jiang. - Really curious. I think I put these questions to the vote. Who is in favor to Cosmos remained Eric Bellis care, please raise your hands.

Rose wood hand.

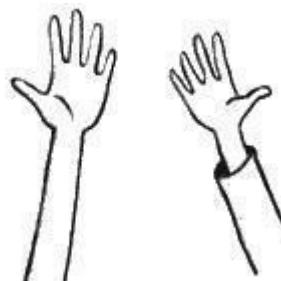
- Who is against?

Not a single hand has not risen.

- Who is in favor again to take Zachary Lynn uchènyh the Brotherhood?

Even though Eric has voted "for" two voices vsè not enough.

- George and Annie, - said Eric fun - if my memory serves me, you, too, members of the Brotherhood. You do not want to vote?



Annie George smiled and raised their hands.

- In this case, - said Dr. Jiang, handing Eric Cosmos - I would like once again to entrust the care of your Space. And we'll find until Dr. Lynn, and even return to the Brotherhood will reward him for what he saved from death ... science

- Thank you, - said Eric, in a burst of gratitude hugged Cosmos. - Thank you, Dr. Jiang. Thank you, colleagues. But the biggest thank you - you, Annie and George.

- And eschè one, - said Jiang on the way to the elevators. - Please, Professor Bellis, no more pigs. Very you please. At least - not involving the supercomputer.

- Of course, of course - Eric hurried to agree. - Next time, I'll take it on the car ... When I find - shèpotom he added, thinking that this will be the first item on his to-do list as soon as validated results of the experiment, simulating the beginning of the universe.

- Speaking of the fauna, - said Dr. Jiang, standing together with Eric and children queue to the elevator - I imagined or I really seen a cat? I do not believe. As the animal to get here?

- So it Shrèdi! - Annie exclaimed. - You know, he's ... - She started to explain, but just stopped and looked around. Shrèdi nowhere to be seen. - Probably I went
B another dimension - she murmured. - If M-theory is correct, they are a dozen, these measurements - choose any.

- Who is Shrèdi? - Said Dr. Jiang.

- It's an imaginary friend Annie - quickly said George. - You know, Dr. Jiang, kids love to invent themselves friends ... Ouch! That push, Annie?

M-theory: 11 measurement!

CHAPTER NINETEEN

After returning from the dungeon to the control center Large Hadron Collider, Uchène immediately rushed to their computers to become familiar with stunning results obtained on the detector. Eric and Dr. Jiang diligently introduced these results into space.



- Simply breathtaking! - He confessed to Eric George and Annie. - You know, with these data show us the cosmos of the universe all the way back, from now until that happened thirteen point seven billion years ago.

- Dad, - Annie timidly tugged at his sleeve - and you can call mom first, to say that vsè you okay? She's out there going crazy.

- Oh, of course! - Eric slapped his forehead and reached for one of the phones lying on the table. -!? Susan hi .. Yes, well .. What vsè .. Annie was gone? Do not missing it, she was there with me! .. As it was in Switzerland? It's a long story. Then explain ... No, George is here, too! .. Yes, have time for the holiday ... No, I have not forgotten that he had promised to bring the cake ...

While Eric was looking painfully answer to the question, as the children were in the Large Hadron Collider, George touched Dr. Jiang's shoulder:

- Dr. Jiang and tobacco? What happens to them now?

Uchène frowned.

- Already declared internationally wanted, - he said. - I very much hope that they would find and arrest. Their actions threaten the lives of many people, and if you are not with Annie ...

- And they went out and brought?

- Wherever they are - they are tracked down, I'm sure.

- It turns out that they do not want to save humanity, right? - George said. - They're just all intimidated people to engage in their organization?

- That's right, George, - said Jiang. - They lied and pretended to covering their own selfish motives imaginary concern for humanity. It is a real evil.

- My parents are not very high opinion of science - George admitted. - They believe that it causes harm to the planet. They themselves try to live so as to protect the planet, and not to harm her.

- Then they are the ones to whom we uchèneye should listen - serèzno said Jiang, and George felt proud of my father and mother. - Their opinions in no case can not be discounted. Earth - our common planet and protect eè we can only together.

Annie during that time managed to take away the phone and call the Pope in Foksbridzh Vincent.

- What-what did you do? - She burst into laughter, covered the phone with his hand and turned to George: - Estimate, Vincent shoved backwards Zuzubina Shrèdingera trap! I saw that Zuzubin is about ochnétsya, opened the door of the portal, and threw it in there!

George snatched neè phone.

- Wow! - Vincent voskhischènno he said. - You are awesome! - Suddenly he was surprised to realize that he was grateful to Vincent, and perhaps - well, mo-o-ozhet be - someday they will become friends in the future.

- Oh, nonsense - laughing, said Vincent. - Here you are - really cool. I just thought it was the most nadèzhnoe place where you can hold him until Eric did not vernètsya. Look, I see on the monitor Zuzubina - he's quite mad! Mosques around the room like a cage. But he did not open the door, I eè locked.

- It is not exactly run away?

- Oh, no, - I intervened Eric, who had heard the conversation. - He will not get anywhere. It will be locked up as pretty as we do not vernèmsya tomorrow Foksbridzh - samolètom like normal people. So do not worry, I'll deal with him. And by the way, George! I'll find Freddy, I promise, and also find a new home for him.

Annie took the phone, George.

- Bye, Vince! - She said cheerfully. - Till tomorrow! And now my father, along with Space suit rewind the universe! We vernèmsya in the very-very beginning and find out how vsè was the Big Bang!

Eric drummed on supercomputer keys; Dr. Jiang, leaning over his shoulder, napryazhènno viewed in the monitor. To better see Annie and George squeezed closer to Eric, surrounded by a small crowd had already gathered. On the screen of the Cosmos running from top to bottom columns of numbers, and in the corner there is the schedule: the thin red line snaked down diagonally.

- This is the diameter of the universe - Eric said, hovering over the red line. - It seeks to k zero for as Cosmos approaches the Big Bang.

George saw how the line suddenly rushed down almost vertically.

- This inflation - a low voice murmured Dr. Jiang, - a period of exponential expansion. So, we have in the first second of the universe.

In the next few minutes, the silence broken only by the steady hum of computers and air conditioners. George could not take his eyes off the thin red line. She almost crawled to the end of the screen, but suddenly froze for a moment and then moved down again, only this time not so cool. George looked and looked. The line stopped again - and again came down. Someone behind George izumlènno gasped. George looked at Eric - he was shining, and his eyes ran up and down the columns of numbers.



- Not what we expected - Eric whispered. - Not at all ...

- What "not"? - Annie asked.

Eric turned to her with a joyful smile:

- That's not what we expected, Annie. This is a completely new physics! It seems that the Big Bang vsè did not ... - He turned to the cosmos and began to quickly print.

Annie looked at George's:

- What was not?

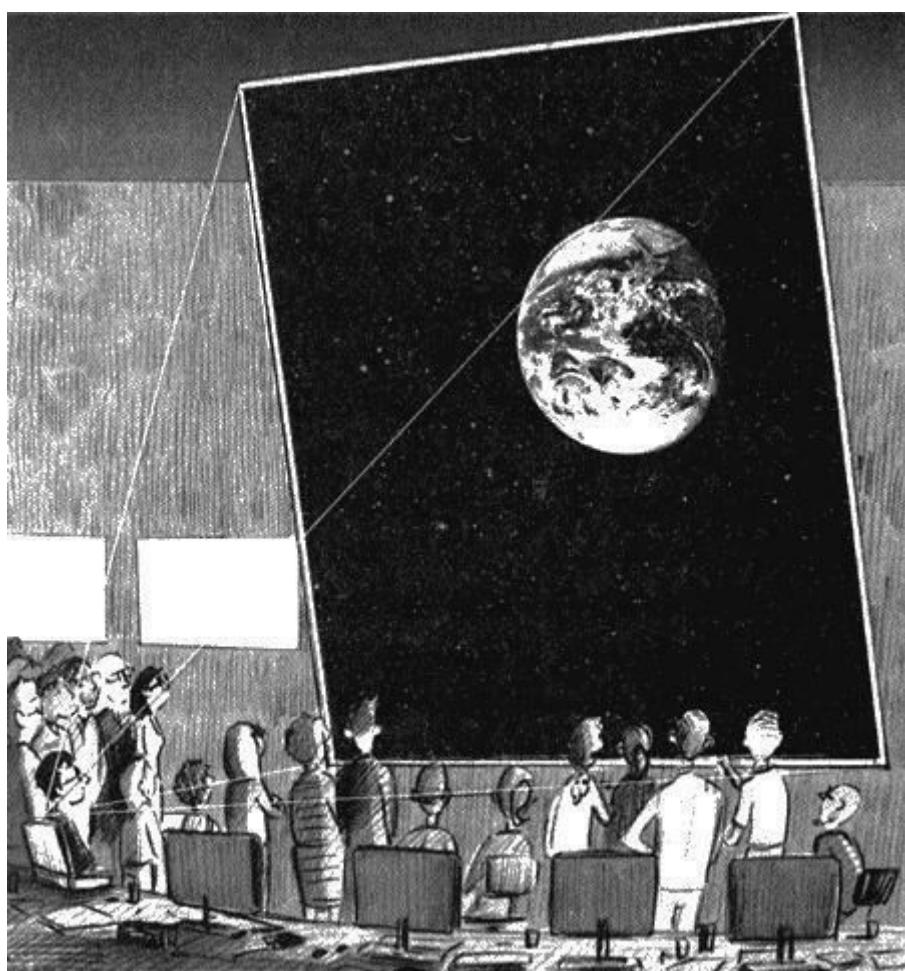
George intently watching schedule. The line still fell, but eè trajectory now becomes vsè horizontally. She was almost crawling along the bottom edge of the screen.

- I think I know ... - he said.

Eric triumphantly leaned back in his chair.

- Now you see for yourself! - He leaned back and pressed vperèd F4.

From Cosmos screen I broke a thin ray of light and painted window, dangling in the air over the heads of all those present. Initially, the window was dark, only in the middle of vaguely looked through something round. But then suddenly the ball quickly obrèl sharpness and appeared zelèno blue planet Earth, orbiting around its axis on the path around its star, the sun.



Space window closer to the Earth could get a better look - with all the familiar outlines eè continents and oceans, deserts and forests, covering the surface of the most beautiful and the most habitable planet. And vsè the surface of the earth seemed changed shape right before their eyes ...

НАШЕ ВРЕМЯ: 13,7 миллиарда лет после Большого взрыва

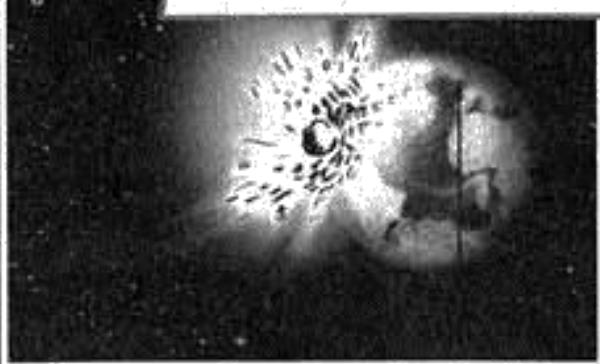


ВРЕМЯ: 200 000 лет назад

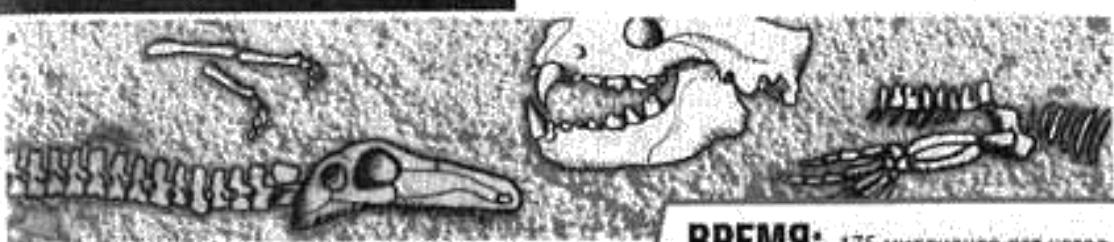


Появляются
современные люди

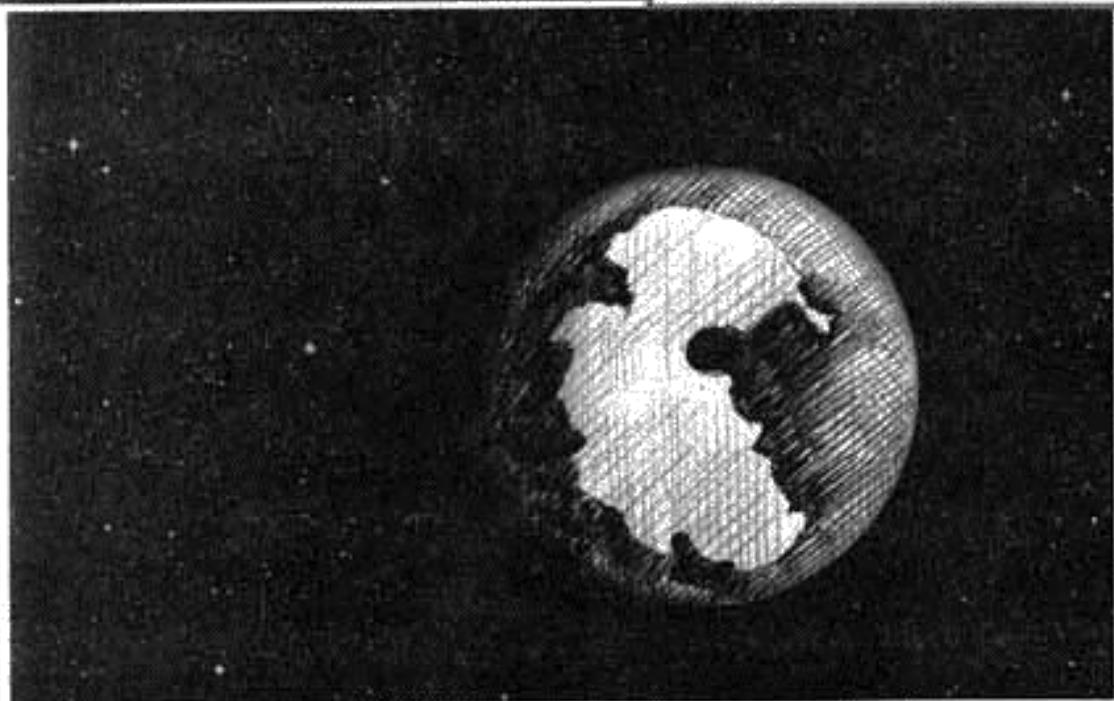
ВРЕМЯ: 65 миллионов лет назад



Заканчивается эра динозавров.



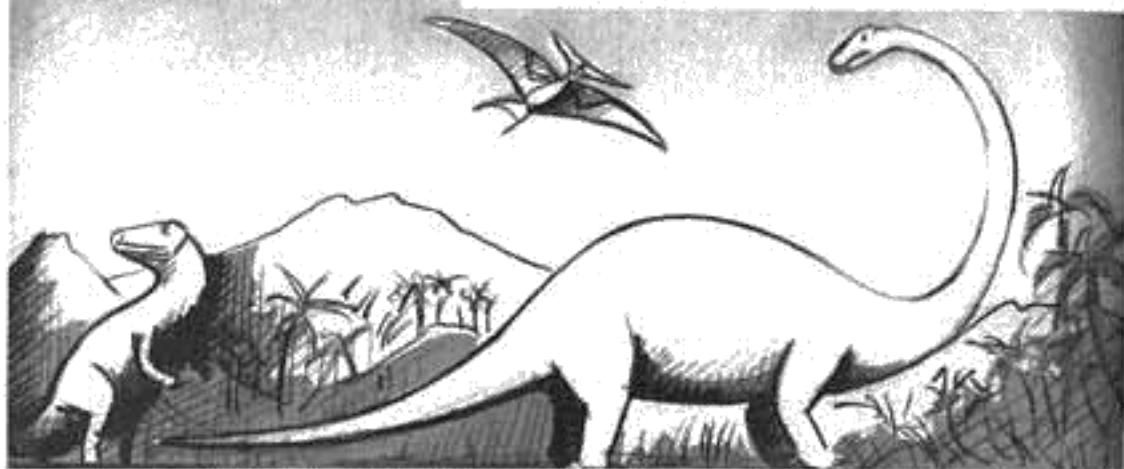
ВРЕМЯ: 175 миллионов лет назад



Пангея – единий суперконтинент – раскалывается,
образуя все материки Земли.

ВРЕМЯ: около 200 миллионов лет назад

На Земле появляются динозавры.



ВРЕМЯ: приблизительно 2 миллиарда лет назад

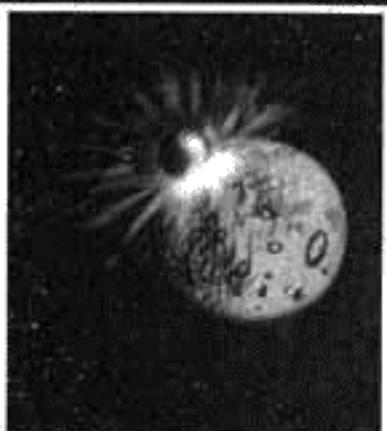
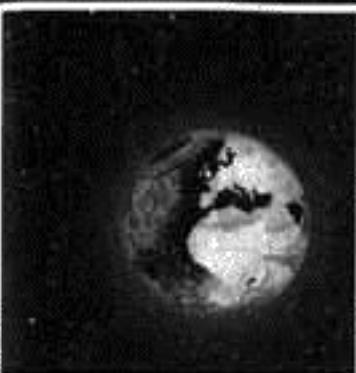
1 миллиард
= 1000 миллионов
= 1 000 000 000

В атмосфере Земли в результате фотосинтеза начинает накапливаться кислород.

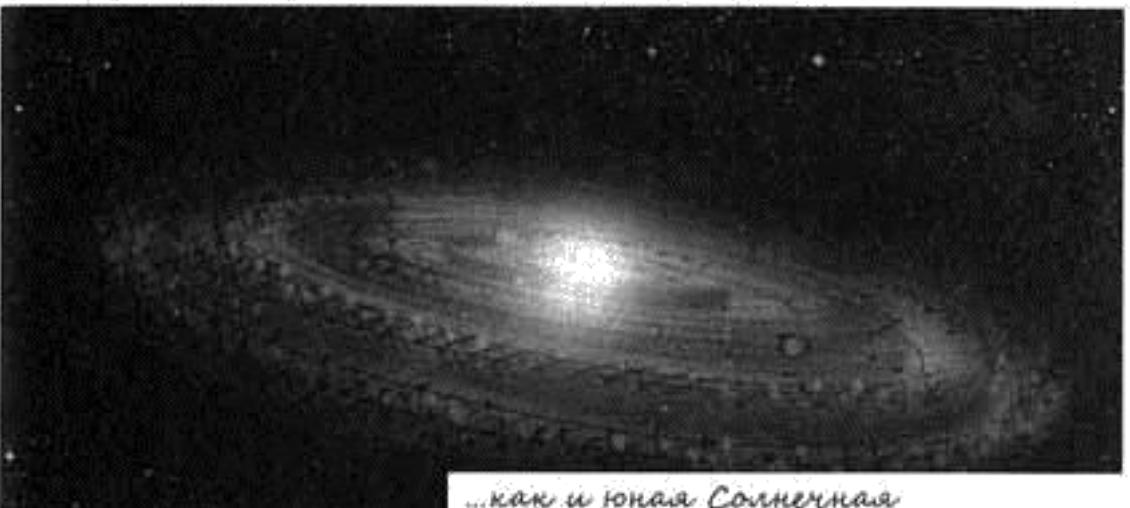
ВРЕМЯ: около 3,5 миллиарда лет назад

На Земле зарождается жизнь.



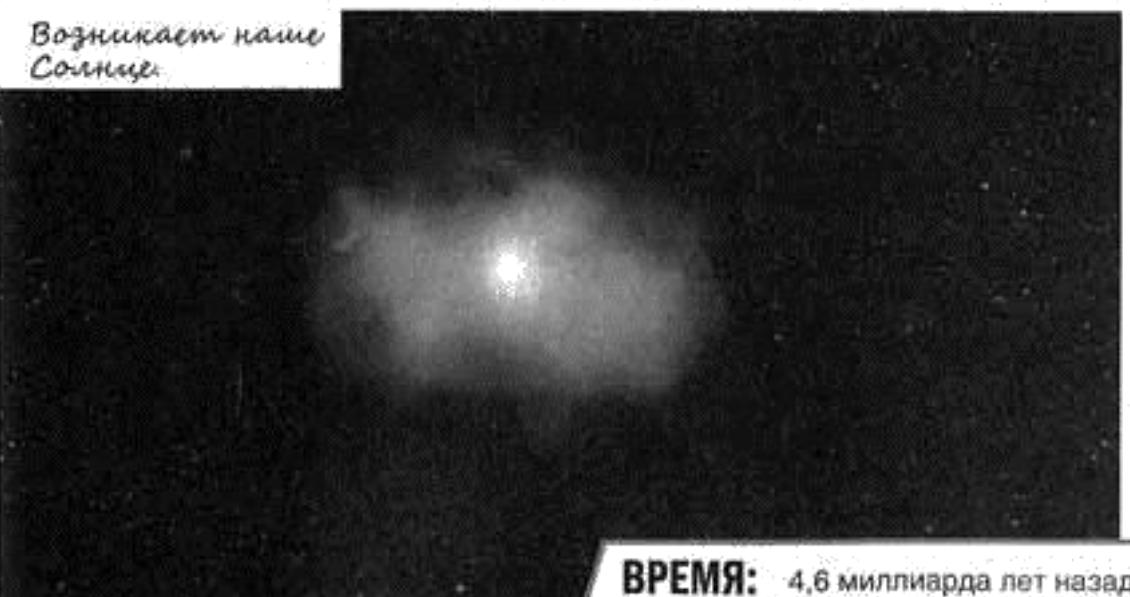


Юная Земля – опасное место...

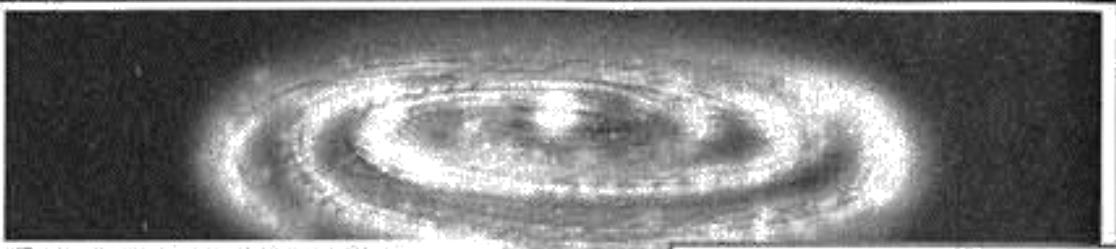


...как и юная Солнечная система, в которой ещё только формируются планеты.

Возникает наше Солнце

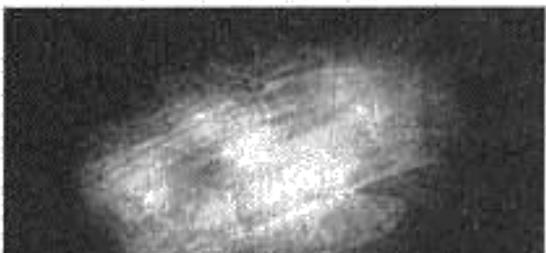


ВРЕМЯ: 4,6 миллиарда лет назад



Прекрасная спиральная галактика – Млечный Путь.

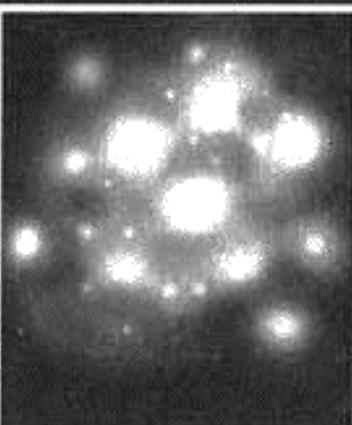
ВРЕМЯ: 13,2 миллиарда лет назад – примерно через 500 миллионов лет после Большого взрыва



Первые звезды, взрываясь, выбрасывают в пространство смеси разных атомов, благодаря чему во Вселенной возникнет новое поколение звезд.



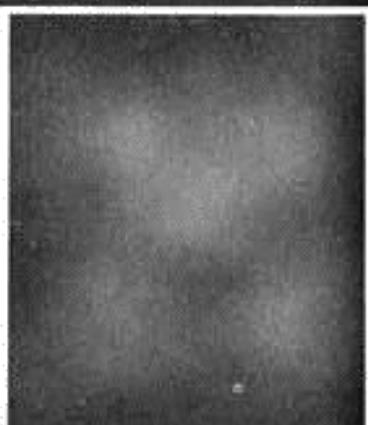
Сгустки газа сжимаются и нагреваются настолько, что начинают излучать ядерную энергию – и становятся первыми звездами.



Под действием гравитации сгустки тёмной материи и газа притягиваются друг к другу.



Космические Тёмные века длиятся несколько сотен миллионов лет.



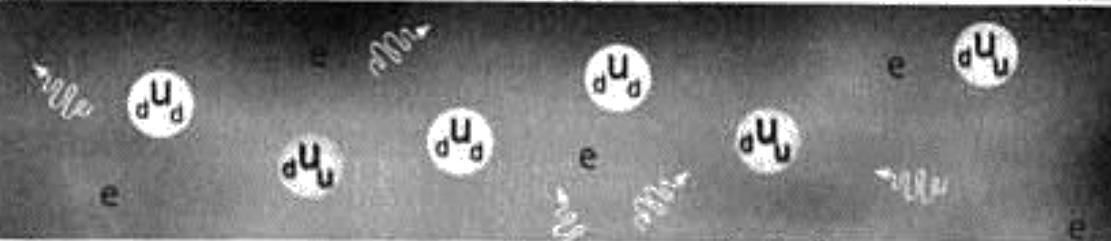
Образуются первые цепочки атомов, туман рассеивается, и по Вселенной беспредметственно распространяется космическое микроволновое фоновое излучение.

ВРЕМЯ: почти на 500 миллионов лет раньше – спустя 380 000 лет после Большого взрыва

ВРЕМЯ: 13,7 миллиарда лет назад – через 3 минуты после Большого взрыва

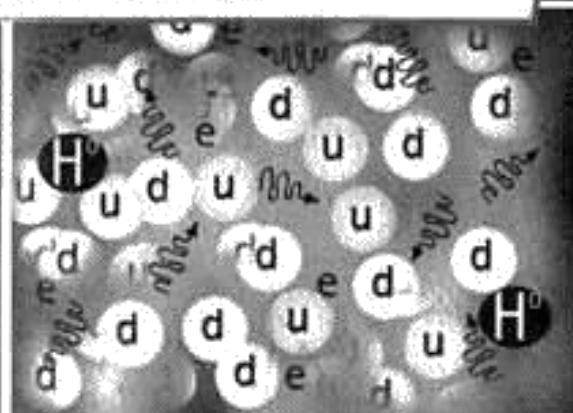
Образуются первые атомные ядра. Вселенную заполняет горячий туман.

ВРЕМЯ: одна микросекунда после Большого взрыва



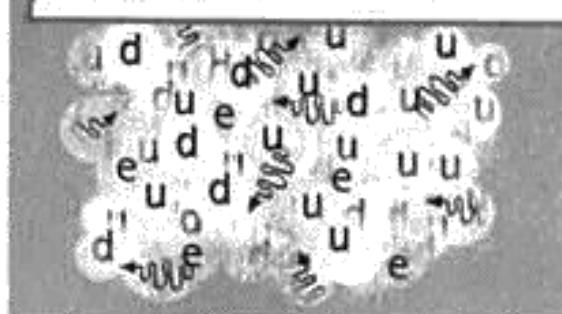
Кварк-глюонная плаズма остывает, отчего становится возможным формирование протонов и нейтронов. Материя и антиматерия взаимно уничтожаются, испуская фотоны (частицы света), не способные далеко проникать сквозь туманообразную плаズму.

ВРЕМЯ: одна миллионная микросекунды после Большого взрыва



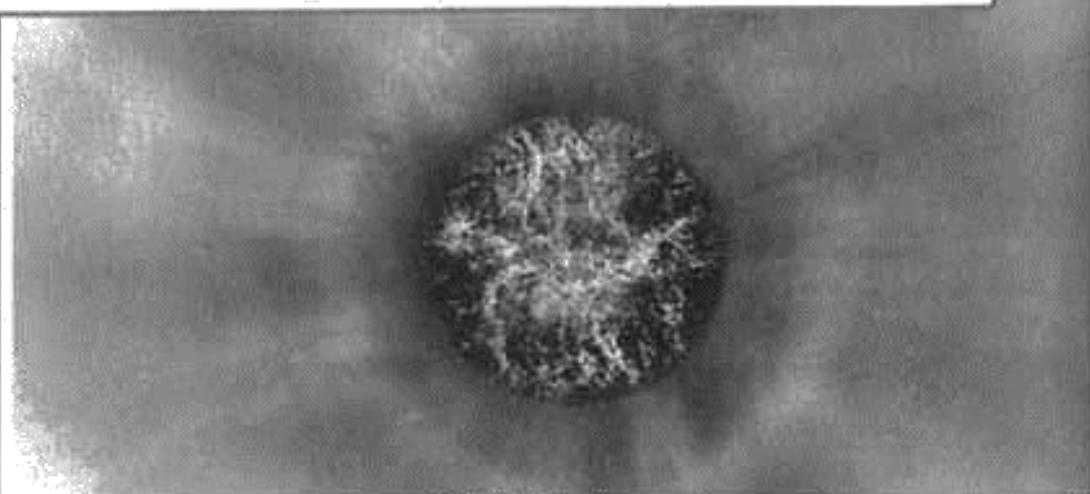
Все частица под воздействием поля Хиггса приобретают массу.

ВРЕМЯ: десять миллиардных миллиардной миллиардной микросекунды после Большого взрыва



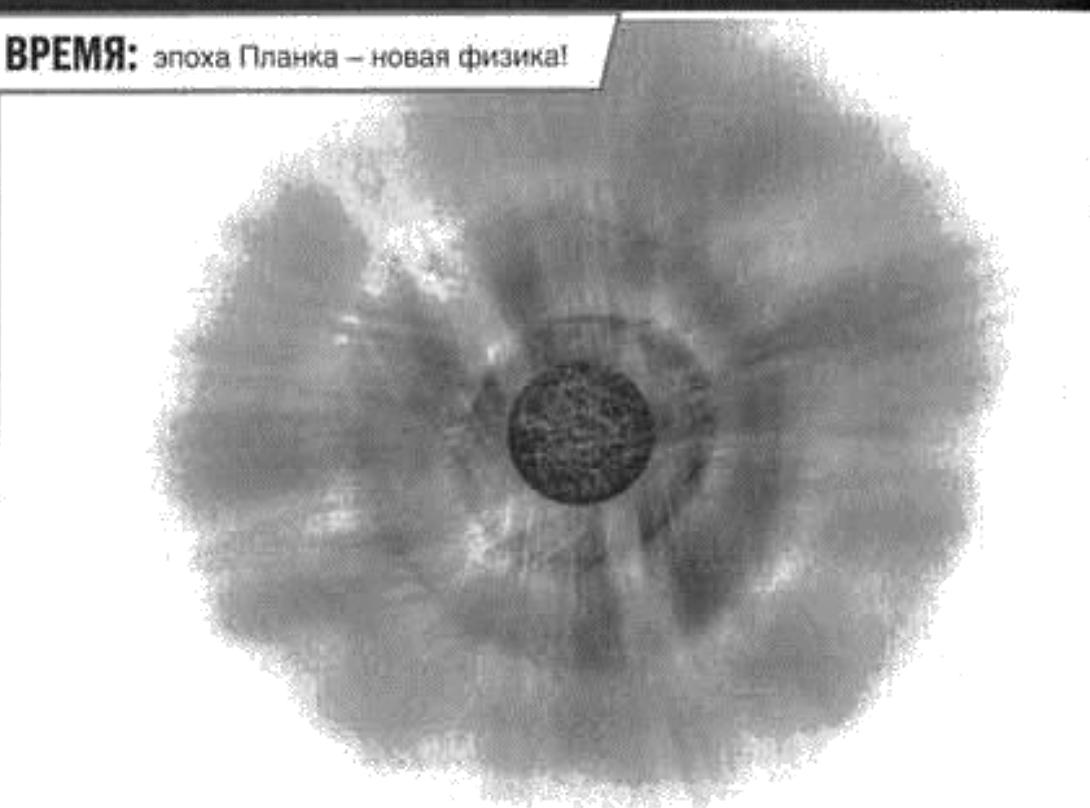
Вселенная только что прекратила расширяться, и высвободилось большое количество энергии. Вселенная заполнена кварк-глюонной плаズмой.

ВРЕМЯ: инфляционная эпоха. Почти момент Большого взрыва...

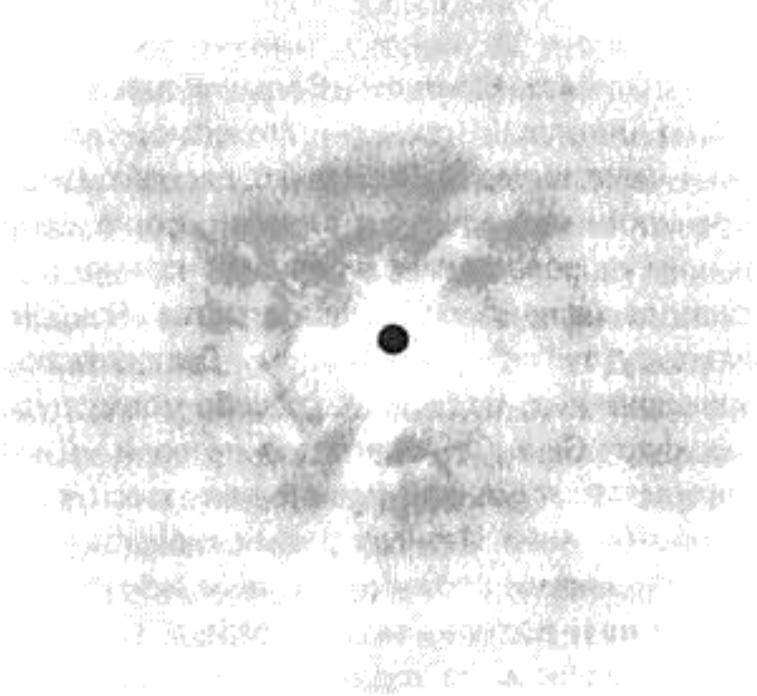


Вселенная очень быстро сжимается, приближаясь к Большому взрыву!

ВРЕМЯ: эпоха Планка – новая физика!



Царство экзотической материи и М-теории.
Еще сжимается, но уже не так быстро.



Именно сейчас должно начаться пространство-время, как мы его понимаем. Но Вселенная, немыслимо маленькая, всё еще существует и все еще сжимается. Может, она никогда и не достигнет сингулярности?..

From the author

Books such as "George and the Big Bang", do not arise out of nowhere. So they came, we need efforts of so many people. Work on a series of George, in particular over the last book, it was for me a great pleasure and a great honor.

I am grateful to the staff of the publishing house "Random House Childrens Books," who accompanied George in all his adventures. Special thanks to my wonderful editor Sue Cook, whereby "George" has evolved from a vague idea to a full and trilogy. Thank you Annie Eaton for the vision and for the fact that diligence è complex scientific concepts become simple and affordable. Thank you and my other friends and colleagues from the publishers, who put so much soul and work in a series of books about George: This is Jessica Clark, Sophie Nelson MeV Behnam, Juliette Clarke, Lauren Buckland, bhavini Dzholapara, Margaret Hope, James Fraser, Claire Lansli.

My sincere appreciation to Claire Paterson Kirsty Gordon, Luke and Julie Janklow Justa from the literary agency "Janklow and Nesbit," thanks to which our George travels not only the universe but also for the planet Earth.

Harry Parsons, as always, is alive and subtly portrayed George, his friends and enemies and skillfully cope with the complex task - to illustrate the history of the universe back, from our days prior vremèn.

Without Stuart Rankin world and I would not have heard about reverse trap Shrèdingera. Tremendous thanks to him for this great invention, as well as an essay about the Big Bang, with the deceptive simplicity of explanation of quantum theory and a variety of strange and mysterious phenomena. I bow Marcus Pessel of the Max Planck Institute for his contribution to the final text.

Once again - my profound gratitude to the outstanding uchènym who volunteered to explain to young readers the essence of their work. Paul Davis, Michael Terner, Kip Thorne - thanks for your brilliant essays!

Thanks Roger Weiss of NASA photos of the wonders of the universe - and all our friends from NASA for permission to use the photo archive.

Thank you to all my friends and colleagues from the University of Arizona, who invited me to teach literature, for a wonderful year and for the opportunity to finish this book.

But the biggest thank you - the readers, who were waiting for the continuation of George adventures! I wish you success space!

Lucy

ILLUSTRATIONS



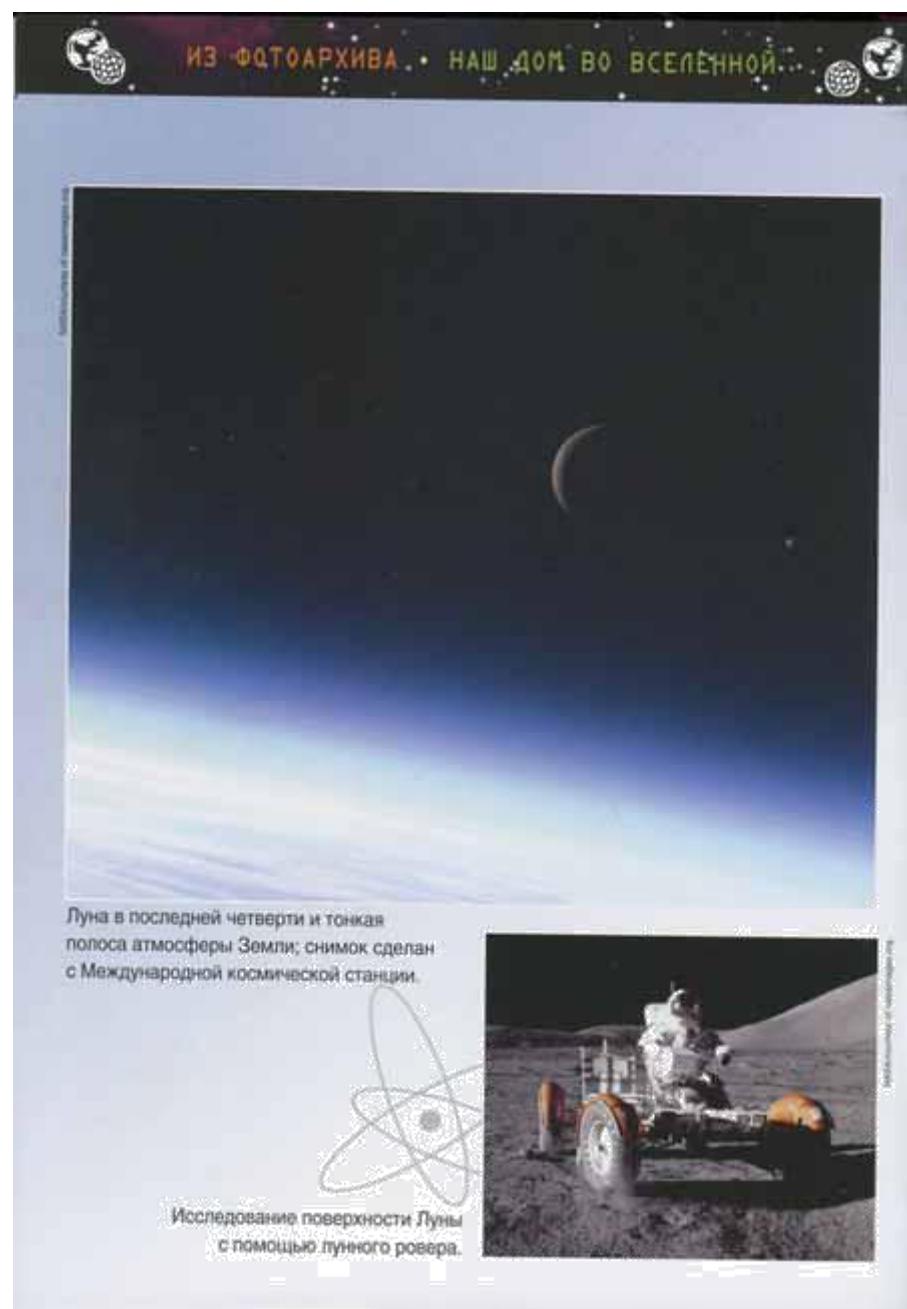
Наша прекрасная Земля и её единственный спутник – Луна.

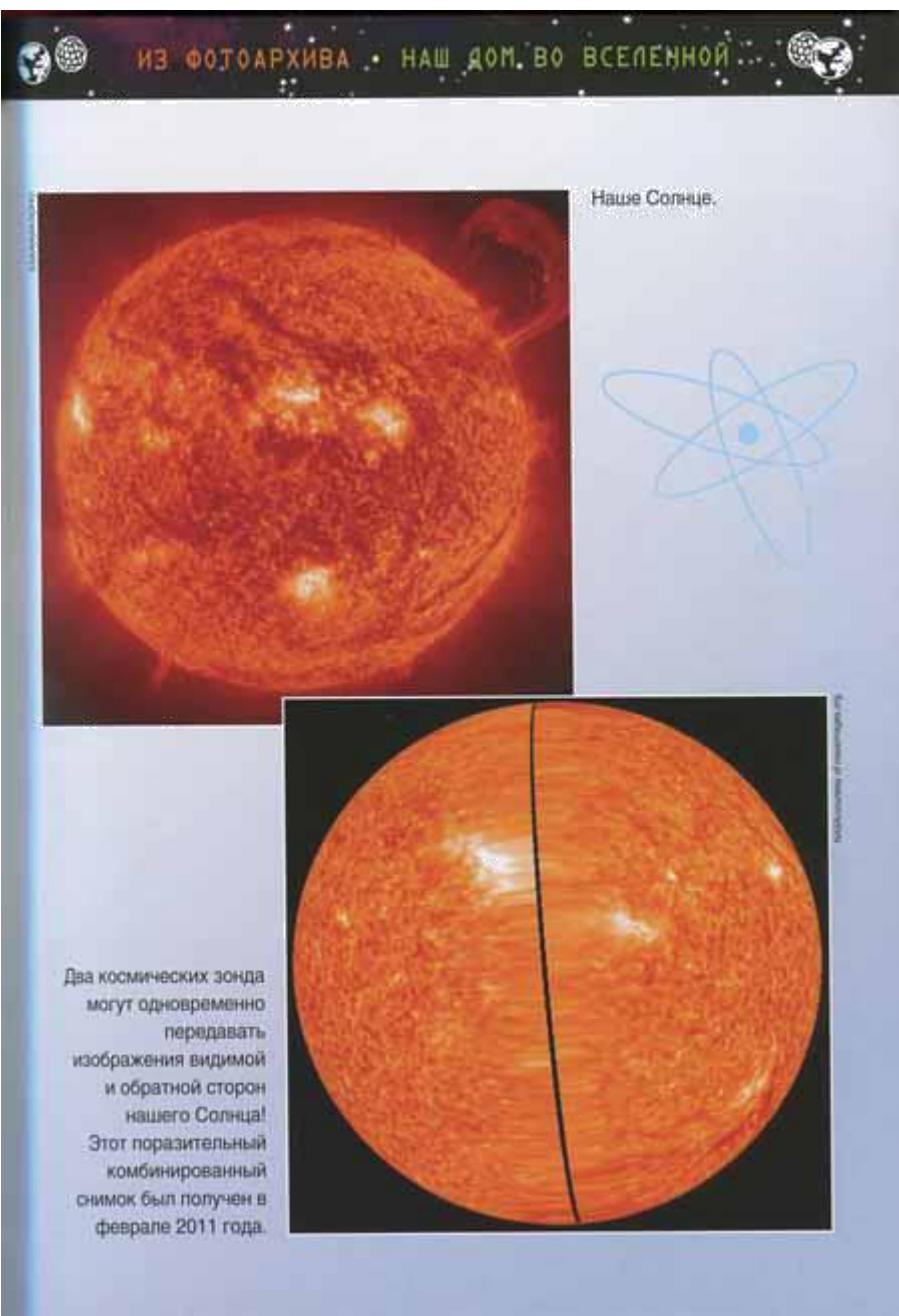


ИЗ ФОТОАРХИВА • НАШ ДОМ ВО ВСЕЛЕННОЙ



За мгновения до старта космического шаттла в небе над ним пролетает метеор, словно напоминая о величии Вселенной, которую мы стремимся исследовать.







ИЗ ФОТОАРХИВА • НАШ ДОМ ВО ВСЕЛЕННОЙ



ГЛЯДЯ НА ЗЕМЛЮ ИЗ КОСМОСА



Горы Симен в Эфиопии, Африка.





Вулкан Коcигуина
в Никарагуа,
Южная Америка.



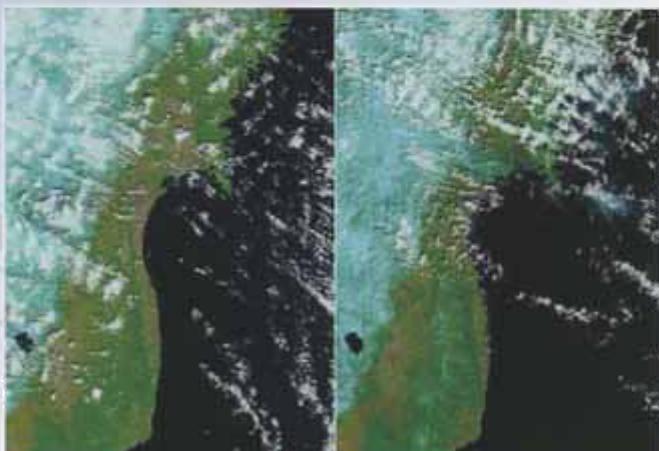
Ураган Даниэлла в августе 2010 г.



ИЗ ФОТОАРХИВА • НАШ ДОМ ВО ВСЕЛЕННОЙ



Национальный парк и заповедник «Великие песчаные дюны» в штате Колорадо, США.



Ужасающие
последствия
циунами
и землетрясения
в Японии в марте
2011 года.

ИЗ ФОТОАРХИВА · НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕЛЕННОЙ



Исследования глубин космоса телескопом «Хаббл» позволяют предположить, что первые звёзды после Большого взрыва озарили небеса, точно фейерверк.



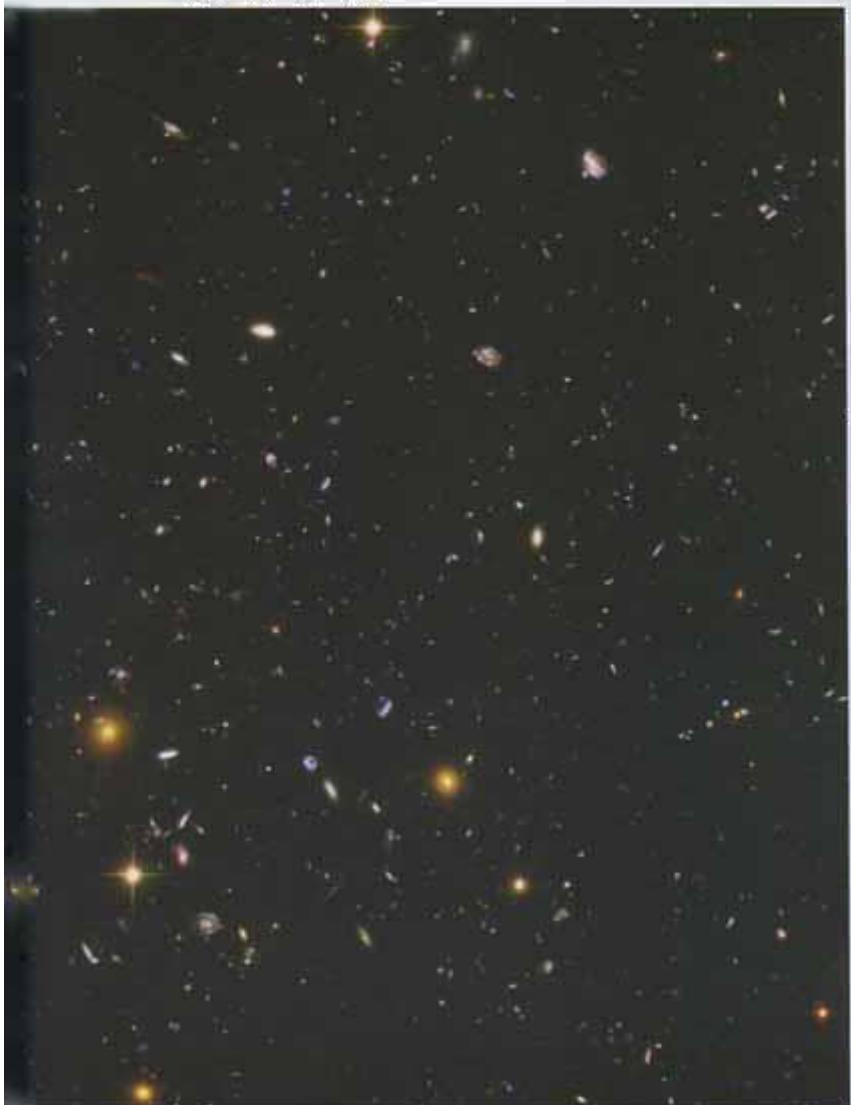
Скопление молодых звёзд NGC 3603 в созвездии Киль, в 20 000 световых лет от нас.

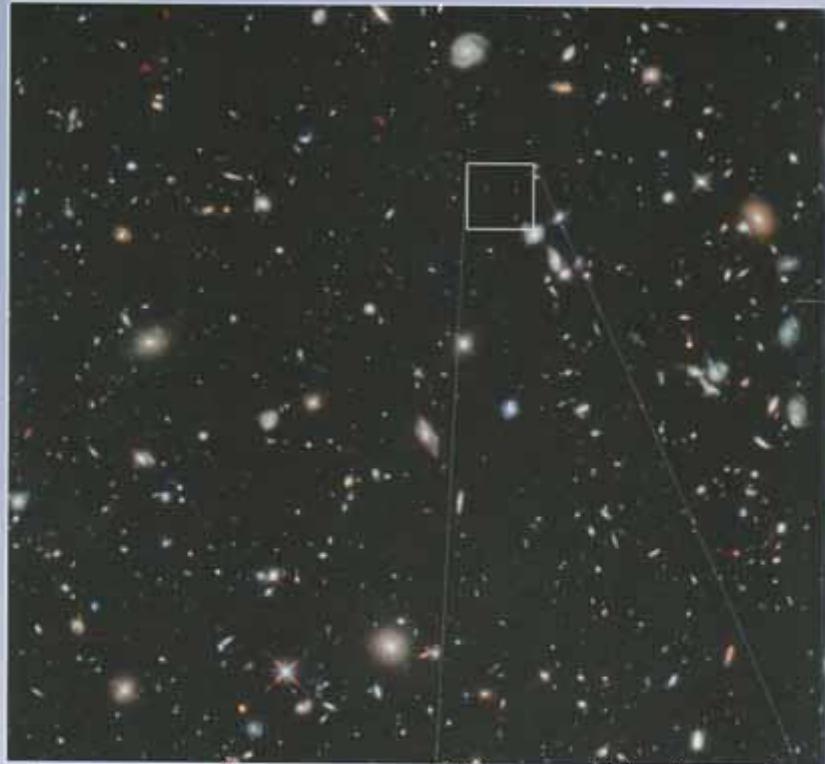
ИЗ ФОТОАРХИВА • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕЛЕННОЙ



«Хаббл» позволяет увидеть самые удаленные объекты наблюдаемой Вселенной

ИЗ ФОТОАРХИВА • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕЛЕННОЙ





Едва заметное красное пятно – инфракрасное изображение – показывает одну из самых первых галактик, какие мы видим во Вселенной.

Эта компактная галактика – «кирпичик» нынешних гигантских галактик – существовала уже через 480 миллионов лет после Большого взрыва.



Фото: Астрономический институт Университета Теннесси

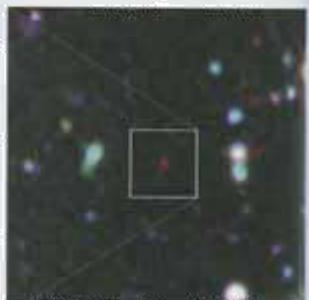


Фото: Астрономический институт Университета Теннесси

ИЗ ФОТОАРХИВА • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕБЕННОЙ



С помощью новейших технологий астрономы создали карту тёмной материи (вещества, которое невозможно увидеть) в массивном скоплении галактик Abell 1689.



ИЗ ФОТОАРХИВА. • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕЛЕННОЙ

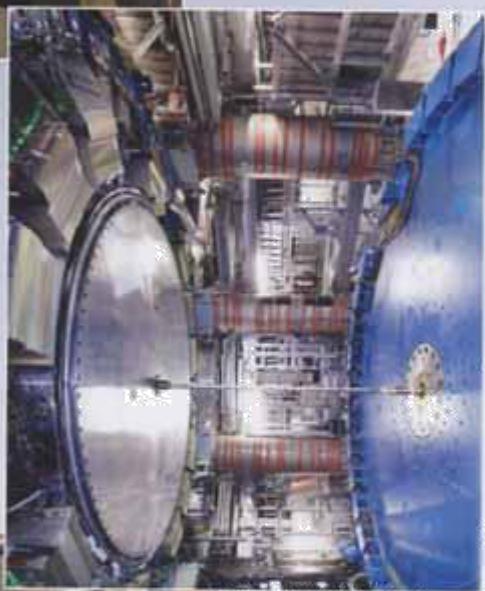


Большой адронный коллайдер (БАК) – международный проект, базирующийся в Европе, позволит заглянуть в начало времён.

ИЗ ФОТОАРХИВА • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕДЕННОЙ

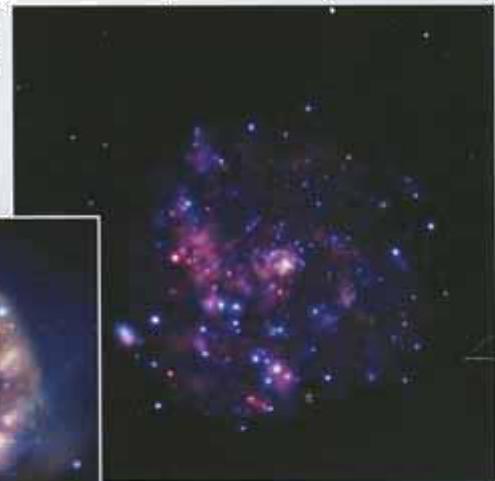
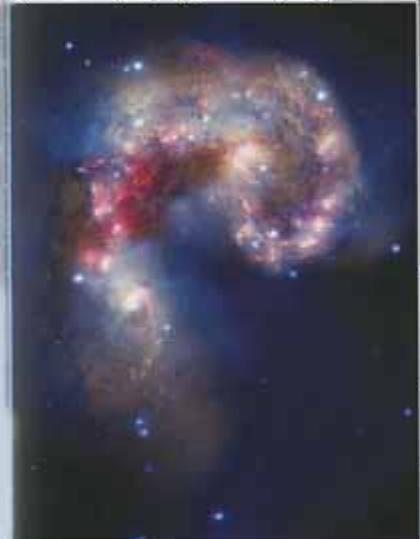


ИЗ ФОТОАРХИВА • НАШИ ПРЕДСТАВЛЕНИЯ О ЮНОСТИ ВСЕЛЕННОЙ



ИЗ ФОТОАРХИВА • ГАЛАКТИКИ

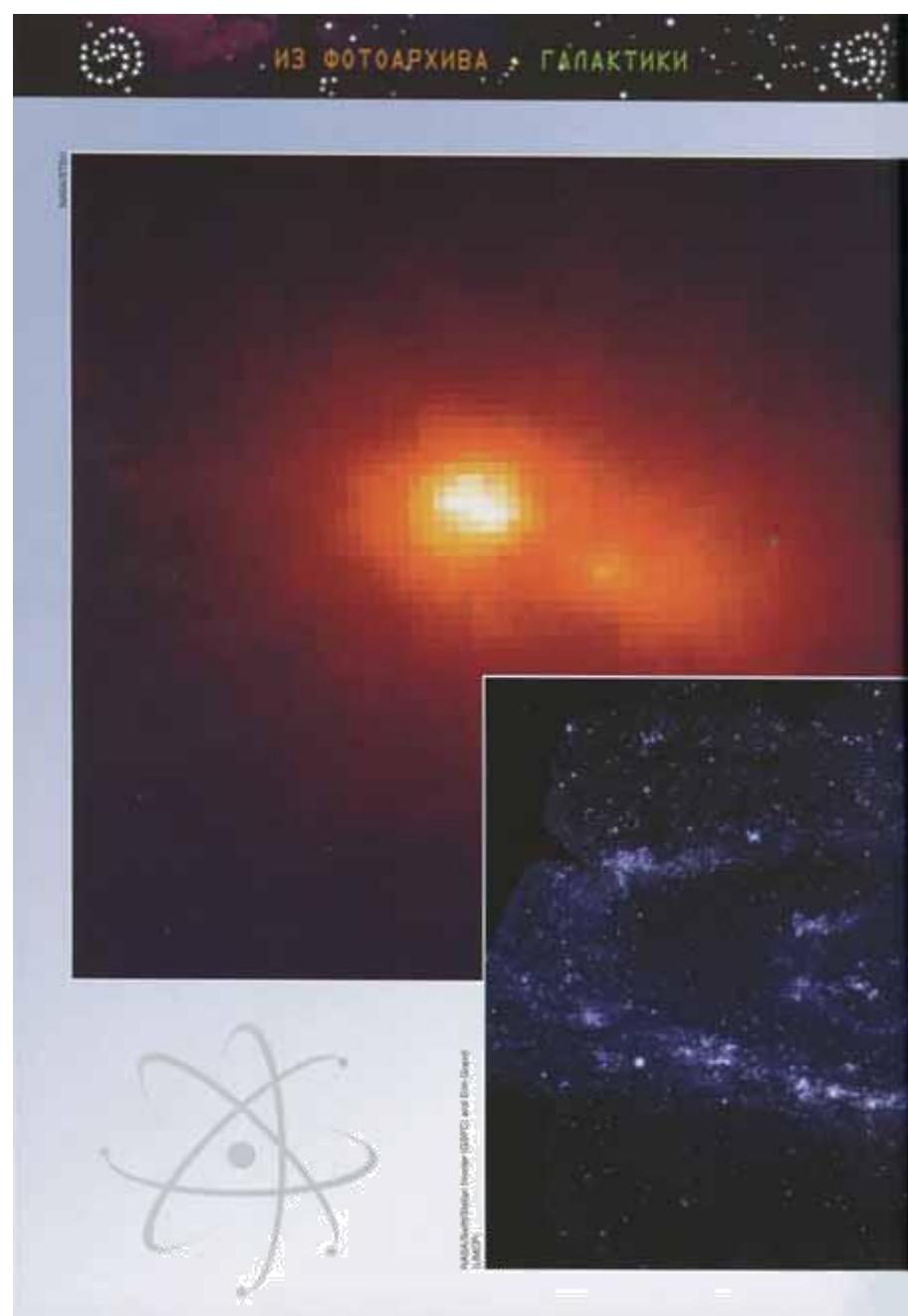
Галактика Вертужка почти вдвое больше нашего Млечного Пути.

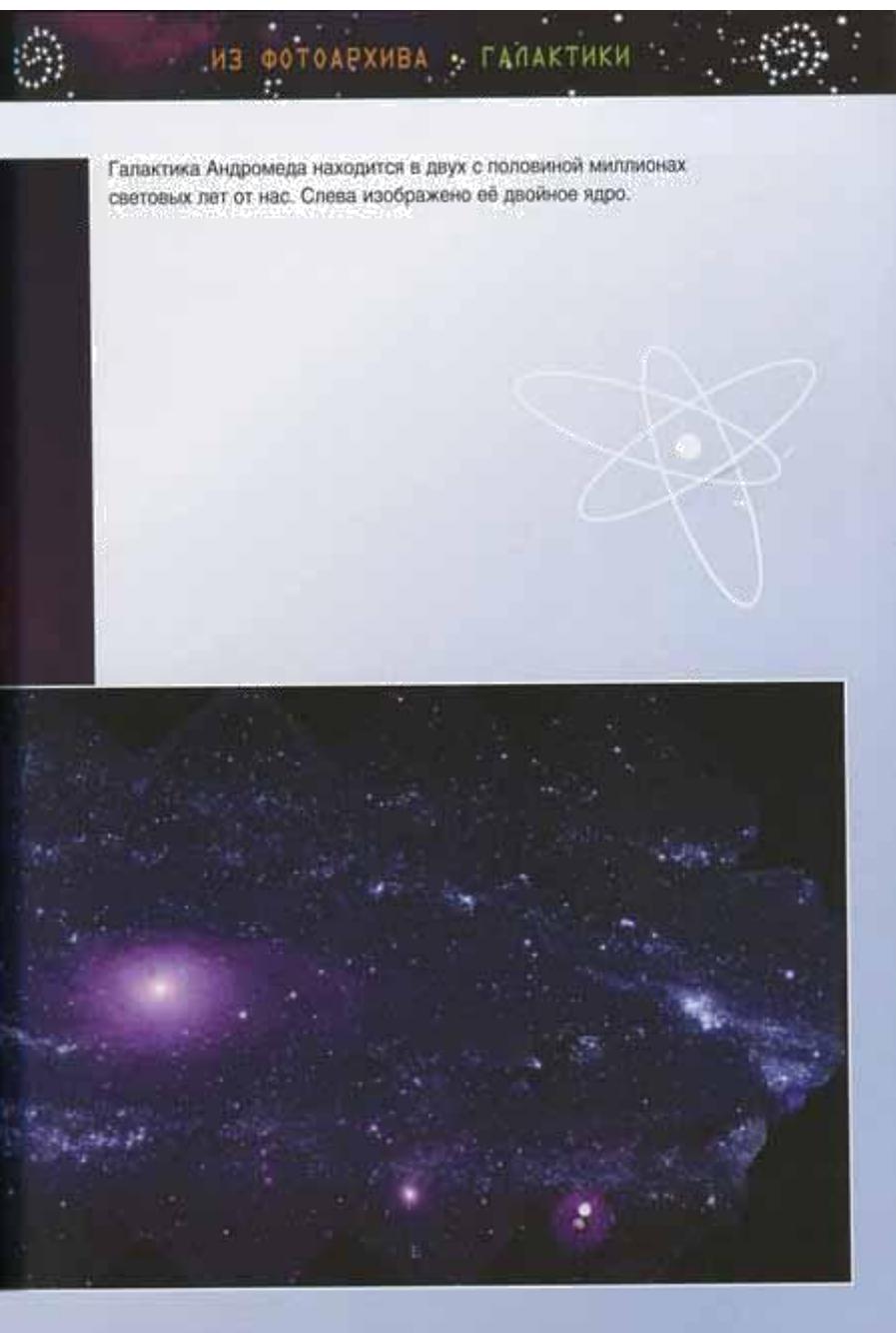


Антенны – пара взаимодействующих галактик в 62 миллионах световых лет от Земли.



Галактика Сомбреро – выпитая шляпа! Астрономы считают, что в самом её центре находится чёрная дыра.

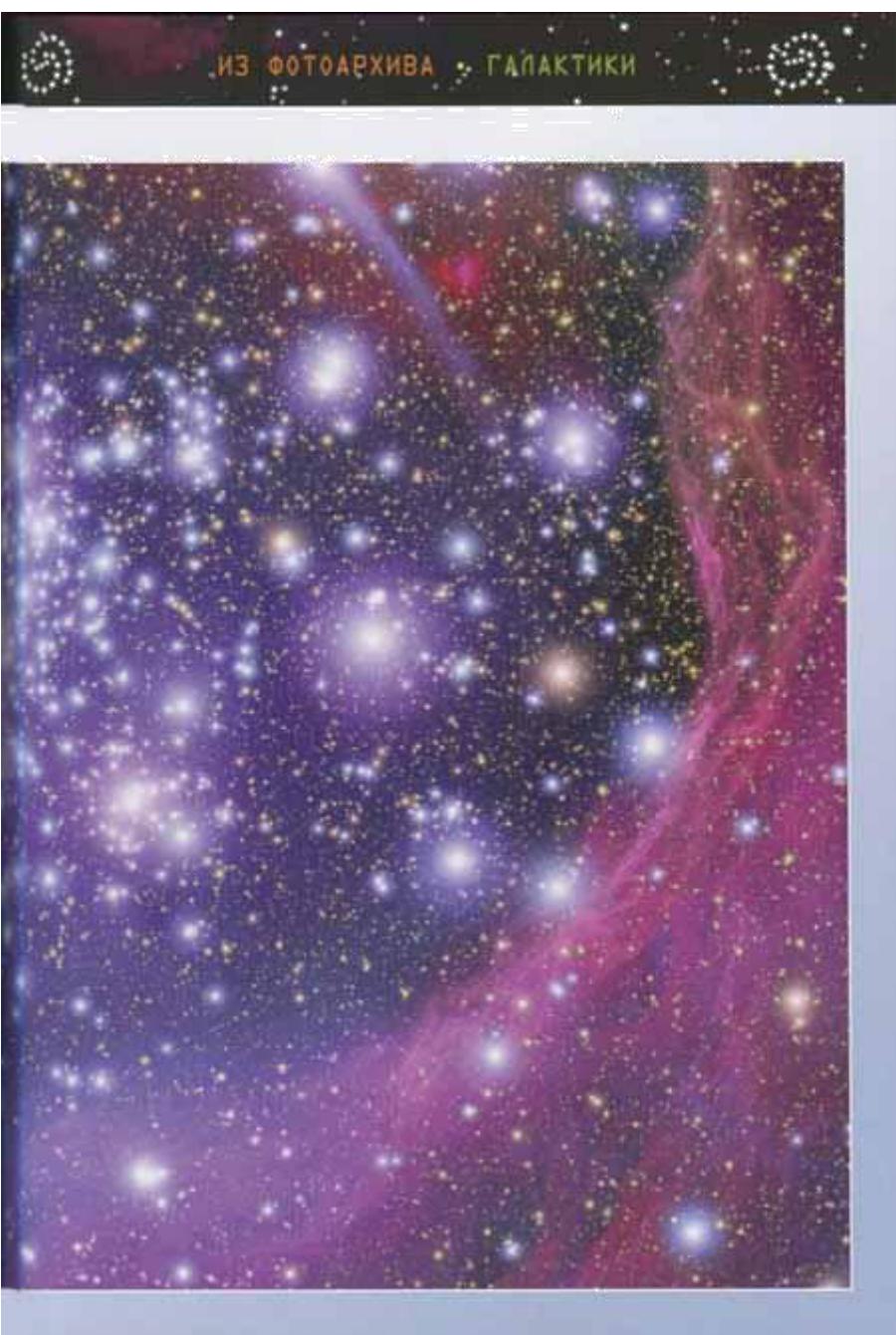


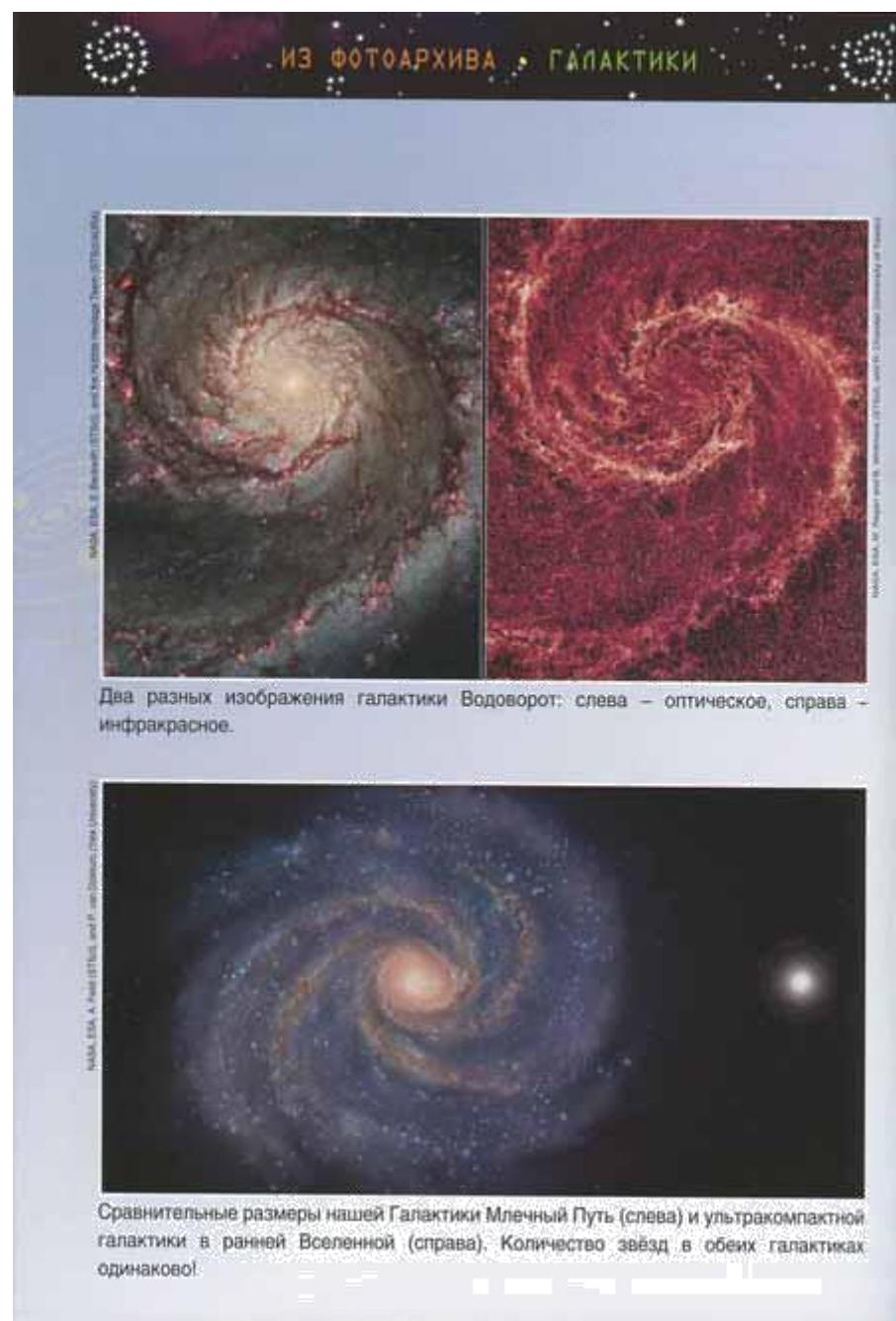


Галактика Андромеда находится в двух с половиной миллионах световых лет от нас. Слева изображено её двойное ядро.



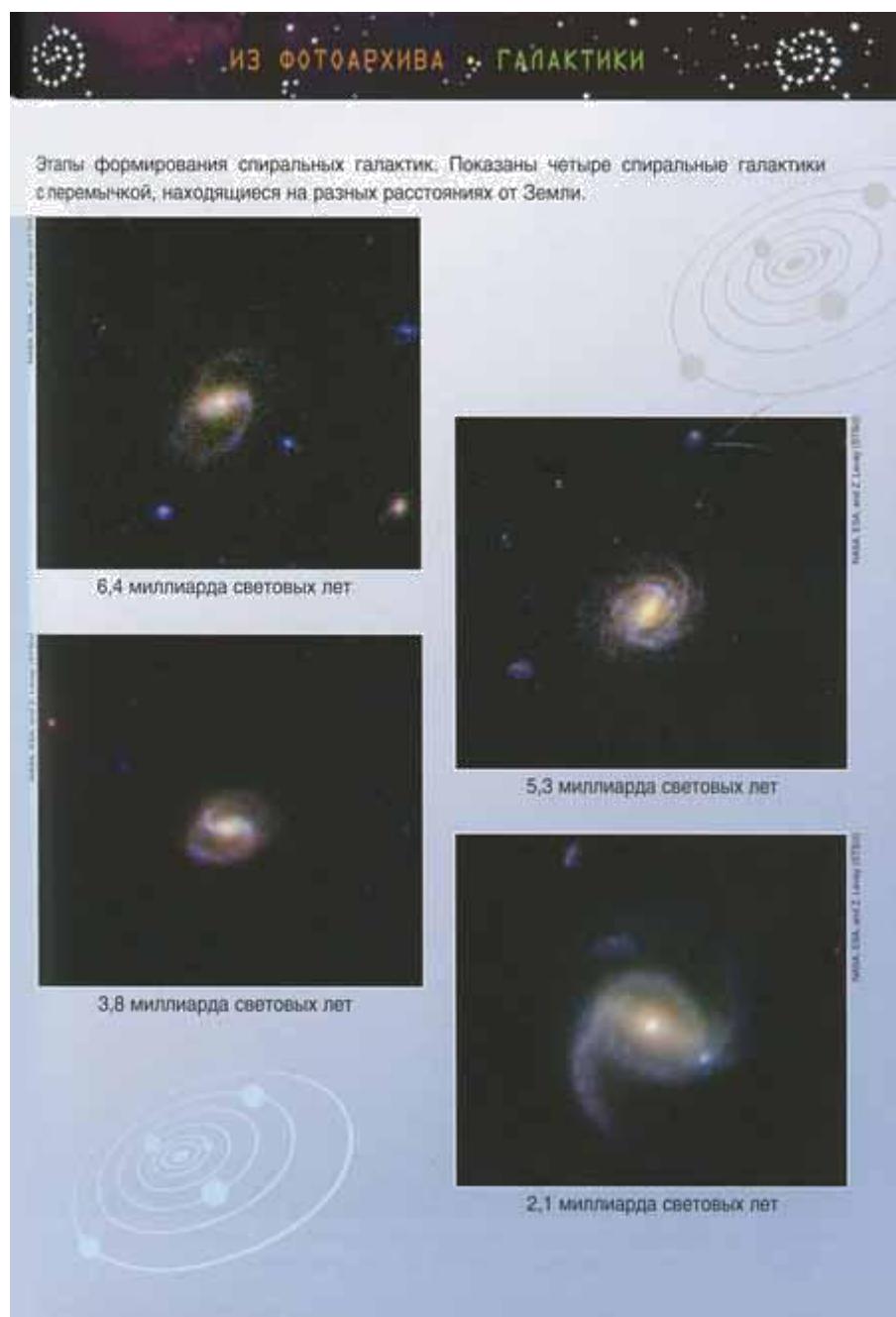
Так художник изобразил Скопление Арки, находящееся в глубине Млечного Пути.





Два разных изображения галактики Водоворот: слева – оптическое, справа – инфракрасное.

Сравнительные размеры нашей Галактики Млечный Путь (слева) и ультракомпактной галактики в ранней Вселенной (справа). Количество звёзд в обеих галактиках одинаково!





Объект Ханни – космическая загадка: единственная видимая часть газового потока длиной в 300 тысяч световых лет, тянущегося вокруг спиральной галактики.



Столб межзвёздного газа и пыли в Туманности Килья. Изображение в видимом свете (у разных газов разные цвета).



Инфракрасное изображение этого же столба (разными цветами обозначены разные длины волн).





ИЗ ФОТОАРХИВА • НАША ОРЕКРАСНАЯ ВСЕЛЕННАЯ



Космические «ледяные скульптуры» в Туманности Киль...

ИЗ ФОТОАРХИВА • НАША ПРЕКРАСНАЯ ВСЕЛЕННАЯ



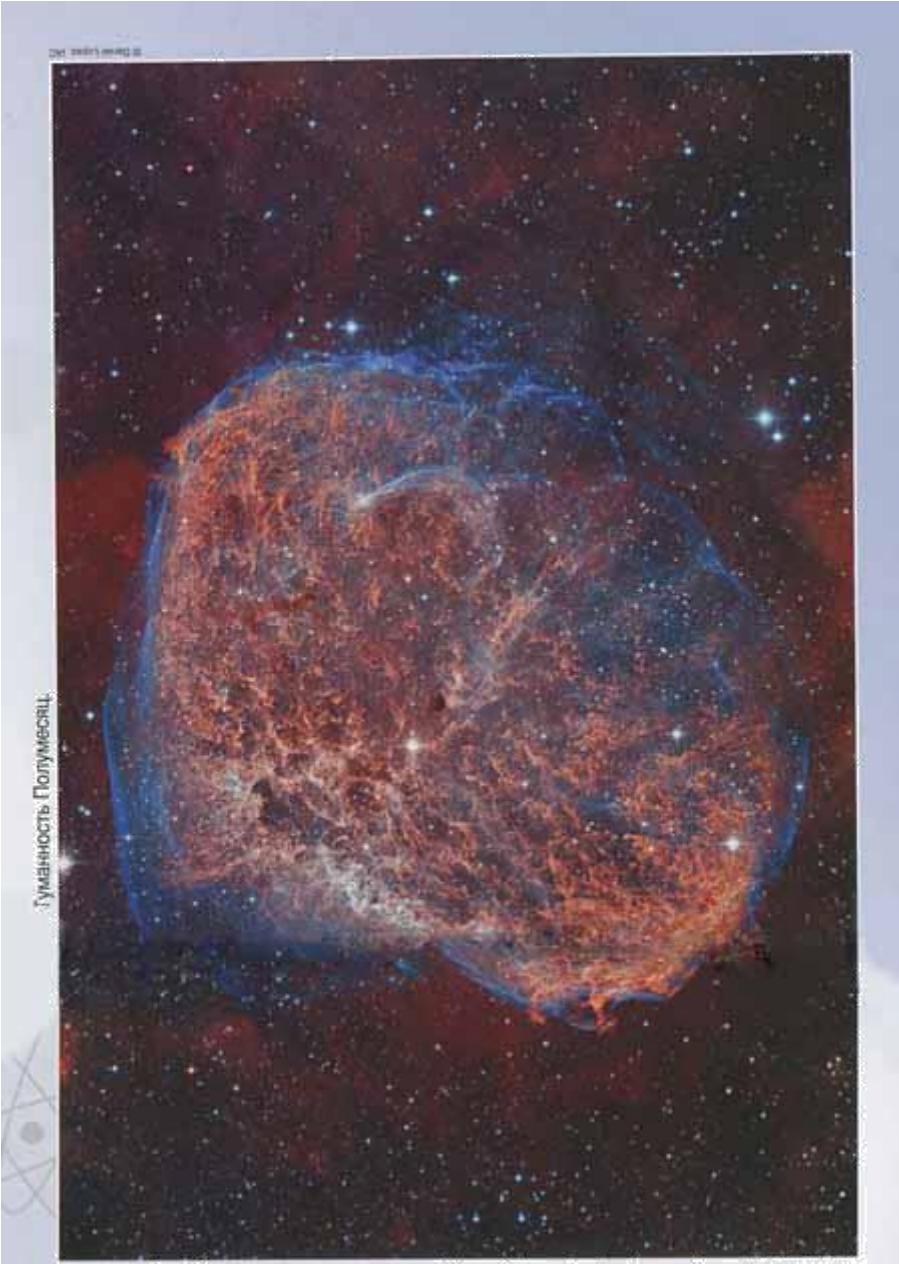


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Туманность Орёл.





Ученые Полумесец



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Межзвёздное грибовидное облако – газ от взрыва сверхновой вырывается в космос.



Comments

Our Solar System

Solar system we call a group of planets circulating in their orbits around our star - the sun.

Our solar system formed about 4.6 billion years ago.

How did our solar system

Step one

A cloud of gas and dust began to shrink - probably under the influence of shock waves from supernova explosions nearby.

Step two

It forms a ball that spun, drew vsè more gas and dust and becomes more flat, turning into the drive. This CD is gradually increased and rotated vsè faster.

Step three

The central part of the contracting cloud vsè getting hotter until the beginning of the light, becoming a star.

Formation of stars equal in mass to our sun, is about ten million years.

Step four

When a star is lit, dust particles in the disk around neè slowly began to stick together in clumps. These clumps gradually gathered in the stones, and those - in the planets orbiting our sun in orbits. As a result, two major groups were formed planets closer to the Sun, where the hotter, the planet's rocky; away, for Mars, gas: a thick layer of the atmosphere consisting of gas, liquid surrounds the inner region of the planet, in which there may be a tvèrdoe core.

Jupiter - the biggest planet in the solar system. Apparently, he played a major role in this "space clean."

Step five

Planets orbit cleared itself, absorbing all the pieces of material along the way.

Step six

Hundreds of millions of years later, the world began to move in the most permanent orbits, which move today. And pieces of material remaining in space were either in the asteroid belt between Mars and Jupiter, or much further, beyond Pluto in the Kuiper belt.

Are there other solar systems like our own?

For a century, astronomers suspected that besides our sun, there are other zvězdy around the world are traded. However, suspicion of the existence of extrasolar planets confirmed only in 1992, when it was discovered the planet orbiting the corpse of a massive star. The first planet orbiting this brightly shining star, was inaugurated in 1995. Since then, astronomers have found several hundreds of extrasolar planets, and some of them are moving around of stars very similar to our Sun!

Exoplanet - a planet that appeals not around our sun and other stars around.

If the planets were only every tenth of the stars of our galaxy (the Milky Way it is called), is equal to vsè would mean that in our galaxy alone - 20
billions of planetary systems!

Some of them are probably very similar to our solar system, some - not similar. For example, on some planet in a binary star system could be seen rising and setting of the sun is not one, but two. Knowing the distance from these planets to their stars, as well as the size and age of this star, we can calculate the probability of the existence of life on these planets.

Most of the known extrasolar planets in other systems of stars are very large, Jupiter-sized or even larger. This is understandable, because the larger the planet, the easier it is to detect. Now, however, astronomers are beginning to discover the world smaller, rocky, - and judging by the distance from these planets to their stars, they may be similar to our Earth.

The dangers threatening our planet

A collision with an asteroid

Asteroids - rocky celestial bodies remaining after the formation of the solar system about 4.6 billion years ago. According to the calculations uchěnyh in our solar system millions of asteroids.

Asteroids come in all sizes, from a few meters to several hundred kilometers.

Sometimes it turns asteroid from its orbit - for example, by the gravitational attraction of nearby planets - and can rush to the Earth, threatening her collision.

About once a year the size of the stone with a passenger car bursts into the Earth's atmosphere, but it is usually burnt, de before reaching the planet's surface.

Meteoroid - a stone flying in interplanetary space in our solar system. If it falls to Earth, we call it a meteorite.

About once every few thousand years the Earth falls a stone the size of a football field, and every few million years the Earth is impacted space object - an asteroid

or a comet - is so large that, if it happened today, the existence of civilization would be threatened.

If an asteroid or comet - a huge "snowball" of rock and ice, worn around the sun - flew to the Earth's surface and struck the earth's crust, then the entire planet could begin volcanoes. Then nothing life on Earth would not have survived.

65 million years ago an asteroid hit our planet. Perhaps it is this strike has caused the disappearance of the dinosaurs: shot up into the air a cloud of dust obscured the sunlight, which is why the dinosaurs and many other species of living things were doomed to extinction.

Gamma-ray bursts:

GAME OVER!

Another threat to the existence of mankind - from space gamma rays.

When a massive star dies, explodes, it sends into space not only raskalènnoy expanding cloud of dust and gas, but also deadly gamma-ray bursts - two powerful thin beams like a lighthouse. If the Earth was directly in the path of the beam and if the gamma-ray burst proizoshèl quite close to us, the beam would destroy our atmosphere by filling the sky brown clouds of nitrogen.

However, such outbreaks are rare. And that really hurt us, surge should occur within a few thousand light-years and the beam thus should cater exactly to the Earth. So astronomers have carefully studied this issue, do not worry too much.

self-destruction

We ourselves, without any asteroids and gamma rays have caused her a lot of harm to the planet.

Earth's population - more than 7 billion people.

The earth is suffering from perenaselènnosti.

This means that we need to produce more food vsè - and therefore stronger vsè deplete the natural resources of the Earth and emit gases vsè longer. On climate change was conducted and vedètsya a lot of controversy, but in one uchèneye sure tverdo: on our planet has become warmer, and the reason for that - human activity. It is assumed that the warming will continue, which means that some areas of the planet will suffer from heavy rains, while others - from drought. Sea level rise, and coastal residents pridètsya tight.

Almost one in four mammalian species and one in three amphibians mind on our planet are threatened with extinction.

People on Earth vsè more and more, and representatives of other species - vsè less and less. The extinction of animals - a huge problem; before our eyes the whole group of species are disappearing from the face of the Earth. What a pity that we are destroying our beautiful unique planet as they start to understand how it is arranged!

Theory of Everything

Throughout history, people have looked at the amazing and wonderful that surrounds us, and ask questions: "What are these objects? Why did they move and so changed? Do they always were? What do they tell us about our origins? "In the last few centuries, mankind has only started to find scientific answers to these questions.

CLASSICAL THEORY

In 1687, Isaac Newton, in his book "Mathematical Principles of Natural Philosophy" first formulated the three laws of classical mechanics, describing the effect of forces on the motion of objects, and the law of universal gravitation, which states that any two bodies in the universe attract each other by gravity. It is through this power we do not fall from the surface of the Earth, and the Earth revolves around the Sun, and it is thanks to this force formed planet and zvězdy. At the level of the planets, the galaxies of stars and the force of gravitational attraction - a grand architect of the universe building. Newton's laws allow to place in orbit satellites of the Earth and send spacecraft to other planets. However, when it idět of bodies with very large mass or a very fast-moving, needed more modern classical theory,

Newton's Laws

Laws of motion

1. Every body remains in a state of rest or uniform rectilinear motion until it because it is compelled to change that state forces.
2. Changing the amount of body motion is proportional to the driving force and occurs in the direction of the straight line in which that force is.
3. Every action has an equal and opposite reaction, in other words - the impact of two bodies on each other are equal and are directed in opposite directions.

The law of universal gravitation

Every body in the universe attracts every other body with a force (directed along the straight line connecting the body), is directly proportional to the product of the masses of the bodies, and inversely proportional to the square of the distance between them.

QUANTUM THEORY

Classical theory is suitable for large objects, whether galaxies zvězdy or bacteria, but the behavior of atoms, it does not explain. Moreover, according to this theory, the atoms can not exist!

At the beginning of the XX century physicists realized that they need a completely new theory, which would explain the properties of very small objects such as atoms or, say, electrons - quantum theory. A variant of this theory, summarizing all the modern knowledge of elementary particles and fundamental interactions, is called the Standard Model. It describes the particles that make up matter (quarks and leptons), the particles - carriers of interactions (gluons, photons, bosons W and Z) and the Higgs boson (which is the hardest

detect) needed to explain some of the masses of the other particles. Uchène Many believe that this is too difficult, and are looking for a simpler model. Moreover, in this model where tèmnaya matter open astronomers? And what about gravity? The particle - carrier of the gravitational interaction is called "graviton", but è difficult to include in the Standard Model because the gravitational interaction of the special: it changes the shape of space-time.

IN SEARCH OF THE theory of everything

The theory that explains all interactions and all particles - the "theory of everything" - may not be similar to all known theories because of neè need to explain not only gravity but also the space-time. But if such a theory is possible, it must explain the physical processes in the universe, including chèrnye holes, the Big Bang and dalèkoe future space. The emergence of such a theory would be a great scientific victory.

Moon

Question: When the Moon formed?

Answer: According uchènyh, more than four positions billion years ago.

AT.: How is it formed?

ABOUT.: Uchène believe that a certain body size of the planet crashed into Earth, throwing into orbit raskalènnoe cloud of dust and stones. As the cooling of the dust particles and clouds stones nèm attracted to each other, and so gradually the Moon formed.

AT.: What is the size of the moon?

ABOUT.: The moon is much smaller than Earth: in the globe could fit 49 Moons. The attraction of the Moon is weaker than the Earth's gravity. If on Earth you weigh 45 kg, then the Moon would weigh less than 8 kg!

AT.: Do you have the atmosphere of the moon?

ABOUT.: No. That is why the sky with the moon always seems chèrnym, which means that if you remain in the shadows, then the heavens vse time zvèzdy visible.

AT.: As mankind explains the appearance of the moon before uchène figured out how it was formed?

ABOUT.: In ancient times there was a belief that the moon - a mirror or a bowl of fire in the night sky. For centuries, people thought that the moon has magical powers and can affect life on Earth. In opredelènnom sense, they were right: The moon does affect the Earth. But there is no magic here. The attraction of the moon affects the Earth's oceans, causing tides.

AT.: Could there be life on the moon?

ABOUT.: Life on the Moon can not - except in cases where a living creature dressed in a space suit. But here's a consolation prize: accumulating evidence that the Moon contains far more water - the main ingredient required for the existence of the known forms of life - than uchène believed only a few years ago. However, this water

frozen, so that those who decide to emigrate from Earth to the Moon, pridètsya work hard to bring the water in life-friendly liquid state.

AT.: Is Moon representatives of extraterrestrial civilizations visited?

ABOUT.: Earthlings have visited the moon six times. From 1969 to 1972, on the surface of the moon visited 12 American astronauts. Is it possible that eschè before the advent of the world of human civilization the moon, our nearest neighbor, visited by aliens and left on it traces of their stay? The probability of this is very, very small; but some uchèneye on Earth began again to study the lunar soil in search of confirmation of this hypothesis.

The emergence of the universe

There are many different stories about how our world appeared. For example, according to the myth of the cube of the Central African people, in the beginning was only darkness, water, and the great god Bumba. One day Bumba stomach ache, he vomited the sun. The sun dried up the water, and the dry land appeared. But belly Bumba never proshèl, and then he vomited from itself eschè Moon zvèzdy animals - leopard, the crocodile, the turtle - and finally, man.

In other nations - the other stories. All these myths - not that other, as attempt ancient answer the most important questions:

- Why are we here?
- Where did we come from?

The first scientific evidence needed to answer these questions surfaced about 80 years ago when it was discovered that other galaxies are moving away from our own. It turns out that the universe is expanding and galaxies scatter. This means that in the past they were closer to each other. Nearly 14 billion years ago the universe was very hot and compressed. This point we call the Big Bang.

Starting with the Big Bang, the universe is expanding faster and faster vsè. This is called inflation - the universe inflated, as the prices in the stores. Only here the inflation of the universe in the early going eè market faster inflation. We call inflation "high", when prices for the year increased by half; the size of the universe a fraction of a second doubled many times.

Due to inflation, the universe has become a very large and very flat and smooth. But not completely smooth: in some places eè were tiny deviations. Because of these variations arose tiny differences in temperature of the early universe; we find them in the cosmic microwave background radiation. These variations mean that some parts of the universe expands slightly less quickly. Gradually these slow sections cease to expand and contract again, forming galaxies and zvèzdy. This deviation we owe our existence. If the early universe was completely smooth, then there would be no stars, no galaxies, and hence could not be life.

Stephen

Big Bang - lecture

Imagine that at the same moment, at the beginning, you are sitting in the universe (obviously, however, that would not be able to sit outside the universe to you). At the same time you need to say a toughie, because the temperature and pressure in the broth of the Big Bang - is unthinkable, are incredibly high. All matter we see around us today, was then compressed into a space the size is much smaller than an atom.

It's only a tiny fraction of a second after the Big Bang, but in all directions, wherever you look, vsè looks exactly the same: no swelling ball of fire, and the sea raskalènnoy matter filling the space vsè. What is the matter? We do not know. Maybe particles, which are no longer in our time, perhaps even loops "strings"; but it's certainly exotic matter that you and I can hardly allowed to see even in the largest particle accelerators.

This infinitesimal ocean very hot exotic matter expands as rastèt filled in space. Matter is spread out in all directions from you, and the ocean becomes less dense. The farther it flows away, the more expanding space between you and it - the sooner it is removed. A matter that is furthest away from you, is removed at a speed exceeding the speed of light.

And very quickly - in the same first second after the Big Bang - there are many complex changes. Due to the expansion of the universe tiny exotic hot liquid cools down in a tiny ocean. At the same time in the universe occur abrupt changes such as those that occur with the water when it freezes and turns into lèd.

When a brand new universe vsè eschè much smaller than an atom, one of these changes in the fluid causes a tremendous increase in the rate of expansion, called inflation. The universe is doubled, then doubled eschè then eschè and eschè - and so èè sizes doubled about 90 times, and the transition from elementary particle scale to the scale of man. As we came to make the bed, straighten the sheet, and the tensile universe straighten all the bumps and bulges matter. In the final schète our observable universe becomes very smooth and almost the same in all directions.

On the other hand, the minute ripples in the fluid is also stretched and elongated, that later will give impetus to the formation of stars and galaxies.

Inflation stops abruptly. This releases an enormous amount of energy, why there is a lot of new particles. Exotic matter has disappeared, èè changed over the known particles: quarks (the building blocks for the construction of protons and neutrons - which will form later on, when it is not so hot), antiquarks, gluons (flying between quarks and antiquarks), photons (the particles that make up the light), electrons and other particles familiar to physicists. Among them may be tèmnoy particles of matter, but, although they are supposed to be, we do not begin to understand what they represent.

Where did the exotic matter? Part èè while inflation has departed from you in those regions of the universe, of which we may never see; the other part with decreasing temperature, dissolved into less exotic particles. The matter around you have not so hot and thick as before, but Do not begin hotter and denser than today, wherever that may be, including the inside of stars. The universe is now filled with plasma - hot glowing mist, consisting mainly of quarks, antiquarks and gluons.

The expansion continues (much slower than inflation), and the temperature is gradually reduced so that the quarks and antiquarks are already able to communicate in groups of two or three to form protons, neutrons and other particles known as hadrons; and antiprotons antineutrons and other antiadrony. A glowing plasma foggy little that can be discerned, and the universe, meanwhile, has already fulfilled one second.

Then start the fireworks that last for a few seconds: this is the mutual destruction of most of the previously proizvedènnoy matter and antimatter, generating new streams of photons. The fog now consists mainly of protons, neutrons, electrons, and photons tèmnoy matter (their most), but charged protons and electrons do not allow photons to scatter too far, so the appearance of the blur and the cooling mist ostaètsya very weak.

When the universe for several minutes, the surviving protons and neutrons together to form atomic nuclei - is mostly hydrogen and helium nuclei of atoms. They are also charged, so the fog is still thick and through it can not see anything. At this stage, the substance of which the mist resembles what presently is inside of stars - only this material fills the entire universe.

After the frenzied activity of the first minutes of the universe for a few hundred thousand years ostaètsya virtually the same - it continues to expand and cool, hot mist constantly diluted, dims and reddens, as the wavelengths of light are increased at the expense of expansion of space. Then, after 380 thousand years, when that part of the universe, which will then be visible from Earth, extends to millions of light years away, the fog finally dissipated: the electrons are captured by the nuclei of hydrogen and helium, and formed the whole atoms. Since the electric charges of electrons and nuclei are mutually compensated, these atoms do not carry an electric charge, so that photons can already travel without obstacles - the universe became transparent.

What you see now, after waiting for hundreds of thousands of years, until the fog clears? Only dimming red glow in all directions. The space continues to expand, the photon wavelength - stretch, and it becomes vsè glow redder and dimmer vsè. Finally, this light at all perestaèt be visible. Everywhere you look, only darkness. We have entered the space Tèmnye century.

Photons from the latter since glow and travel across the universe, constantly becoming even redder eschè; Today they can be found in a relic cosmic microwave background radiation; they are everywhere and now reaches the Earth.

These Tèmnye century Universe last few hundred million years, and throughout this time to look literally nothing to. The universe is still filled with matter, but almost all of it - tèmnaya matter, and the rest - the gases, hydrogen and helium, and none of this creates a new light. However, changes are slowly taking place in complete darkness.

Ripple, once the smallest, but the acceleration of inflation, meaning that in some regions of the universe mass of little more than the average. Consequently, the attraction of these regions increases, the mass of the engaging eschè and tèmnaya matter, hydrogen and helium are drawn closer together. Slowly, over millions of years, as a result of the increasing attraction appears tèmnoy clumps of matter and gas, which are gradually growing, sucking in vsè more matter. Sometimes growth is accelerating - when they collide and merge with other bunches. When gas gets into the clot, its atoms are accelerated and heated. Every now and then this

the gas becomes so hot that perestaèt contract; cool, he can only by emitting photons, and shrink - Only when faced with another cloud of matter.

If the gas cloud shrinks too much, it breaks up into spherical droplets are dense, the heat of which can not escape. In the final schète a point is reached when the hydrogen nuclei in the center of these droplets are heated so strongly and attracted to each other, they begin to stick together (coalesce) into helium nuclei and emit nuclear energy. You sit in one of these contracting tèmnoy clots of matter and gas (because that is where many, many years, there is our galaxy); and what is your surprise when the darkness around you suddenly illuminated by bright light - it broke the first one closest to you drop. Thus are born the first zvèzdy. This is the end Tèmnyh centuries.

First zvèzdy quickly burn its hydrogen, and in the last stages of his life join together all the core, which can only be found to create atoms heavier than helium atoms: carbon, nitrogen, oxygen, and other more tyazhèlye atoms, which today are around (and inside) us. These atoms like ashes scattered back into the next gas clouds with huge explosions and again swept into a pile in the formation of a new generation of stars. The process continues: from accumulating gas and ash generated new zvèzdy, then they die and again scatter the ashes. As the new birth of stars of our galaxy - the Milky Way - takes a spiral shape. The same happens in other clusters tèmnoy matter and gas scattered throughout the visible universe.

It takes nine billion years after the Big Bang - and that of hydrogen, helium, and the ashes of burned dead of stars, a new, young star, okruzhènnaya planets.

Eschè four and a half billion years, the third planet from the star is the only place in the known universe, where they can live and feel great representatives of the human race. They - that is, you and I - will see in heaven zvèzdy, clouds of gas and dust, the galaxy and the cosmic microwave background radiation - but not tèmnyu matter constituting most of the matter in the universe. Do not we see and the parts of the universe, which is so far from us that even photons of the CMB did not yet flown to the Earth; and it is, perhaps, are part of the universe whose light never reaches our planet.



Вот она, наша прекрасная Земля...

Expansion of the universe

By studying the night sky using the 100-inch telescope mounted on Mount Wilson in California, the American astronomer Edwin Hubble discovered that some of the nebula - obscure cluster of luminous dots in the sky - in fact, galaxies like our own Milky Way (even of different sizes) and each of them contains billions and billions of stars. And eschè Hubble discovered a startling fact: the other galaxies are moving away from us than they are on the higher their speed. Suddenly it turned out that our universe is much, much more than people think. The universe is expanding: the distances between galaxies are increasing with time. One can imagine the universe as the surface of the balloon, on which someone painted circles - the galaxy. If you inflate the balloon, then these galaxies move apart in different directions, and the farther away they are from each other,

redshift

Hot celestial bodies, such as zvèzdy emit visible light, but because the universe is expanding, zvèzdy in distant galaxies are moving away from the Earth. Because of this, their light, flying to us, is stretched, the stronger prichèm than a star is removed faster. Due to the tension visible light is red; this is called the cosmological redshift.

vacuums

What is a vacuum, and how does it relate to vacuum cleaners?

The vacuum - the space is so empty that there are no air nèm. For example, if a pump to pump all the air out of the room, then we get the vacuum.

Vacuum cleaner - this is a vacuum dust extraction device actions.

B vacuum cleaner air pump sozdaèt a weak semblance of a vacuum that helps to absorb every single speck of dust. But this is not a vacuum, which we're talking about. For ours, the experiment would require a much more powerful pump.

B ray tubes of the LHC created a vacuum-like space: in nèm absolutely no molecules of the gas!

Remove from the room all the particles in the air is not so simple.

But even if the room there are no atoms, it still contains vsè radiation:

- infrared photons emitted tèplymi room walls
- radiophotons of television transmitters
- microwave photons left over from the Big Bang
- other particles fly out of space (for example, neutrinos emitted by the Sun)
- and even tèmnuyu matter!

And if we could remove this radiation, cooling the tèplye wall? Then our room would be quite empty - more empty than the space between the galaxies! However, it still vsè something that would remain. That "something" - the quantum field, that is what remains when there is no photons, neutrinos, electrons and all other particles. Status of quantum fields, having a minimum energy physicists call the vacuum state; it is in this state, without any kind was observed particles, and have remained our imaginary room.

But if we could be a peer, you would make out the tiny ripples in space-time and gravity - gravity waves.

In short, we may seem to be downloaded from the room, the air molecules, we fully eè devastated, but in reality it is not so!

If you add in the vacuum state energy (physics would say - bring a vacuum), then there will be nèm particles (and antiparticles). It is believed that such a vacuum - a state with minimum energy. There may be other vacuum state, on the other energy - if they initiate, they will generate the familiar types of particles. It is possible that in the Early Universe, the temperature was

much higher space existed for some time in a state of false vacuum, the higher energy, and the particles have appeared today exotic. When the temperature dropped, the false vacuum was to come into the state of the current vacuum with low energy. A true vacuum - a vacuum that really has the lowest possible energy.

There is not the slightest reason to believe that any earthly experiment was able to plunge us into a state of some other vacuum!

The space-time and relativity

Chetyrèhmernoe space-time

When we want to go to some place in the world, we tend to imagine this place in two dimensions - the north-south and east-west. According to this principle, maps arranged. We always use the two-dimensional direction. As somewhere to walk or drive? Vperèd or back, left or right. This is because the Earth's surface is two-dimensional.

But the pilot samolèta, choosing the direction, not tied to the Earth's surface! Samolèt can fly eschè and up or down; consequently, its position relative to the Earth's surface is added eschè and height on this surface, that is, to two dimensions added the third. When lètchik vedèt samolèt direction "north" or "east" or "up" will depend on the location samolèta. "Up," for example, means "far away from the center of the Earth," so "up" over Australia and the "up" over Britain - a completely different direction!

The same can be said about the commander of the spacecraft far away from Earth. The commander of the ship can move in measurement where trèh wish - but these areas will always be three, because the space in which we exist, our Earth, our Sun, zvèzdy all galaxies - this space trèhmerno.

And, of course, when you want to get somewhere, such as a friend's birthday or a football match, then you never know where it will take an event - it is necessary eschè know when. Thus, any event in the history of the universe must have four coordinates: three spatial and one temporal. Therefore, in describing the universe and vsè that it happens, we chetyrèhmernogo terms of space-time.

Relativity

Private Einstein's theory of relativity states that the laws of nature, including the speed of light should be the same regardless of the speed with which the observer moves. It is easy to verify that the two people that move relative to each other, and come to different conclusions about the distance between two events: for example, two events that occur in the same jet samol Ye with grave ones, to an observer on the Earth will be separated by a distance that is crossed samol Ye with grave tons between these events. Therefore, if an observer in samolète and the observer on Earth will decide to measure the speed of a light signal,

samolèta flying tail to his nose, the distance traveled by light from the submission of the signal until it enters the nose samolèta, they will be different. And since the rate - is the distance delènnoe at the time, they also diverge on the question of how much time has elapsed between the filing and prièmom signal - if these observers agree on the question of the speed of light (in nèm, according to Einstein's theory, they just agree!).

It follows that while, contrary to the opinion of Newton, not absolute: it is not to mark the event in such a way that all agreed. Instead, each observer must have his own measure of time, and two observers moving relative to each other, will have different estimates of the time.

To test this theory have been sent round the world polèt highly accurate atomic clocks. On his return it turned out that they barely escaped from the same clock that remained on Earth and finds vsè time in the same place. This means that if you are constantly flying around the Earth, it is possible to extend your life!

However, this effect is minuscule (about 0.000002 seconds per revolution), and you can easily wipe out, if you constantly eat that food, which are fed in samolètah!

Andromeda Galaxy

Andromeda Galaxy (aka Andromeda Nebula, aka M31) - the nearest to our own Milky Way large galaxy. The Milky Way and Andromeda - the largest in the Local Group of galaxies, which consists of at least 40 nearby galaxies, attracted to each other.

In fact, the Andromeda Galaxy, is located at a distance of 2.5 million light-years from us - not the closest galaxy to us (that title belongs rather dwarf galaxy in the constellation of the Great Pès), but comparable to the nearest of our size and weight.

Modern raschèty suggest that the Milky Way (including tèmnuyu matter) has a greater weight, but the longer of stars in Andromeda.

Like the Milky Way, Andromeda - a spiral galaxy.

In the center of Andromeda, as well as the center of our galaxy is a supermassive chèrnaya hole.

Like the Milky Way, Andromeda has several (at least fourteen) satellites - dwarf galaxies orbiting near in orbits.

Unlike the majority of galaxies, Andromeda refers to objects whose light has a blue shift. The reason is that the expansion of the universe, because of which the galaxies are moving away from each other, overcome by the attraction between the two galaxies: Andromeda is attracted to the Milky Way and a speed of about 300 km / s is flying toward us. We can face it in about 4.5 billion years, and gradually merge, and can and to miss. Collisions between galaxies are not considered unusual: for example, a dwarf galaxy in Canis Major, apparently, now merged with the Milky Way!

Uniformity space

To apply the general theory of relativity to the universe as a whole, we usually make the following assumptions:

- all places in space behave identically (homogeneity)
- and all directions in space have the same properties (isotropy).

Hence we get a picture of the universe, which is:

- It has the homogeneity of space
- It begins with the Big Bang
- and then it expands in all directions uniformly.

This picture clearly confirm astronomical observations - what we see in space with the help of ground-based and space-based telescopes.

Since the same laws of physics apply everywhere, we assume that all galaxies are formed in a similar manner. Consequently, zvèzdy, planets, asteroids, comets to distant galaxies should be similar to zvèzdy, planets, asteroids and comets of our Milky Way.

And vsè the universe can not be completely uniform in space, or as if it were a galaxy, and zvèzdnye system, the planet and people? To understand how emerged and began to compress the first cloud of gas and tèmnoy matter, it is necessary to allow the smallest ripples in this uniformity.

Where did this primordial ripples is not well understood. According to the best at the moment of the theory, it originated from tiny quantum fluctuations, which increased in the course of rapid expansion - inflation - an event for the very first tiny fraction of a second after the Big Bang.

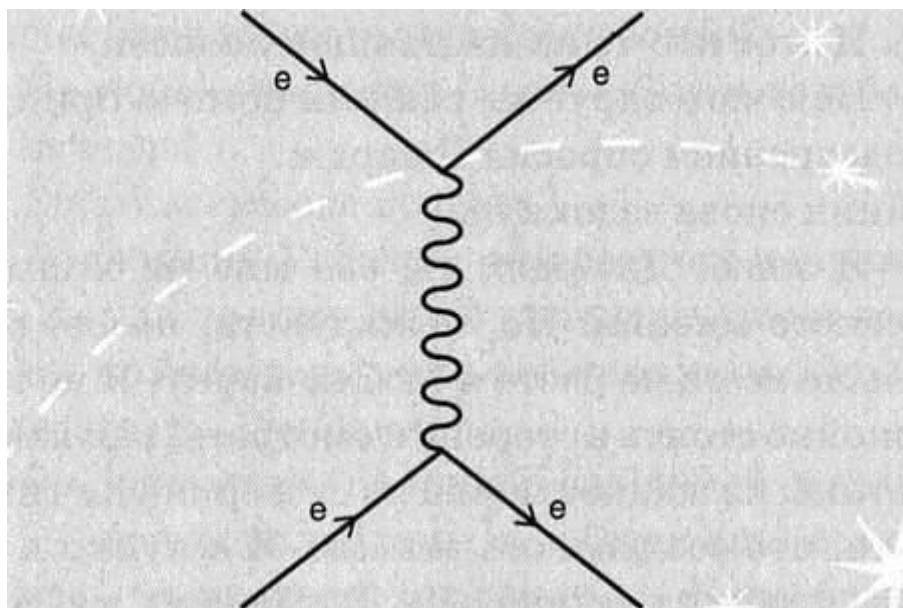
particle collisions

If not for the interaction, the particles after the collision in devices such as the Large Hadron Collider, have emerged from them exactly the same as they were there.

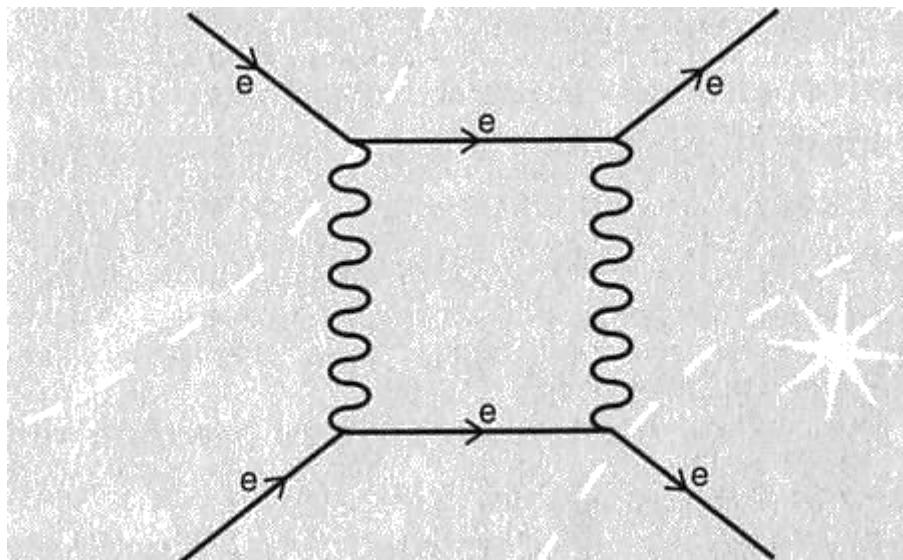
Interactions also allow elementary particles in collisions affect each other (up to conversion into other particles!) Putem emission and absorption of specific particles - the gauge bosons that act as carriers of the fundamental interactions.

Physicists represent collisions of particles with the help of Feynman diagrams. Are diagrams showing how the collision particles might behave with respect to each other. Each Feynman diagram - only part of the description of the behavior of particles in a collision; to get a full picture of the collision, the chart is necessary to put together.

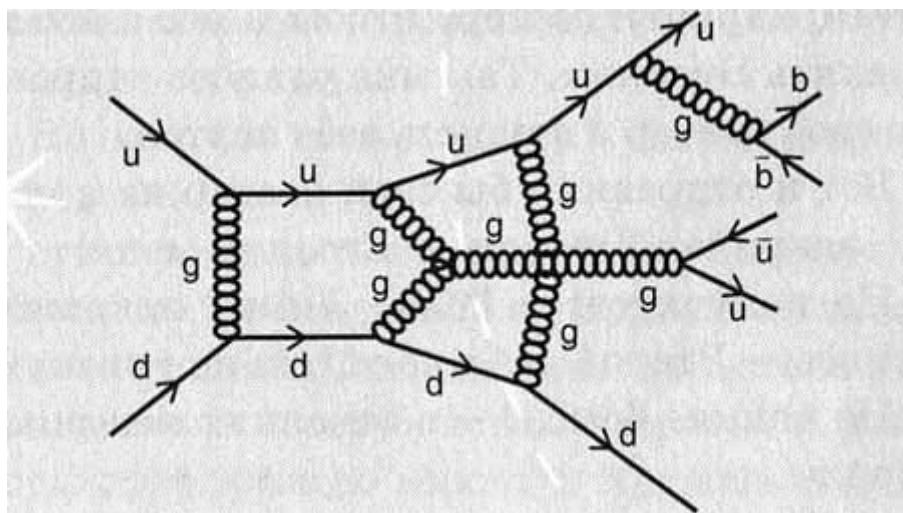
Here is a simple graph in which two electrons are close to each other, sharing one single photon, and then go on their way. The arrows indicate the direction of time - from left to right, a wavy line - a photon, straight lines represent electrons (e). This diagram includes all instances when a photon is moving up and down, or down and up (the wavy line so positioned vertically)



More complex processes are described in more complicated Feynman diagrams, which include more than one virtual particle. For example, a chart with two virtual photons and two virtual electrons:



In order to fully describe a particular particle reaction, you must besschëtnoe variety of diagrams. Fortunately, uchèneye learned how to get a very good approximation, using only simple diagrams. Here's what might happen at the Large Hadron Collider in the collision of protons! The letters u, d and b quarks are indicated, the letter g - gluons:



Tèmnaya side of the universe

One of the most simple questions, which may occur to a person, is: what is in our world?

In ancient times the Greek philosopher Democritus suggested that vsè things built up of tiny indivisible particles - atoms. And he was right, but found out some details for the last two thousand years.

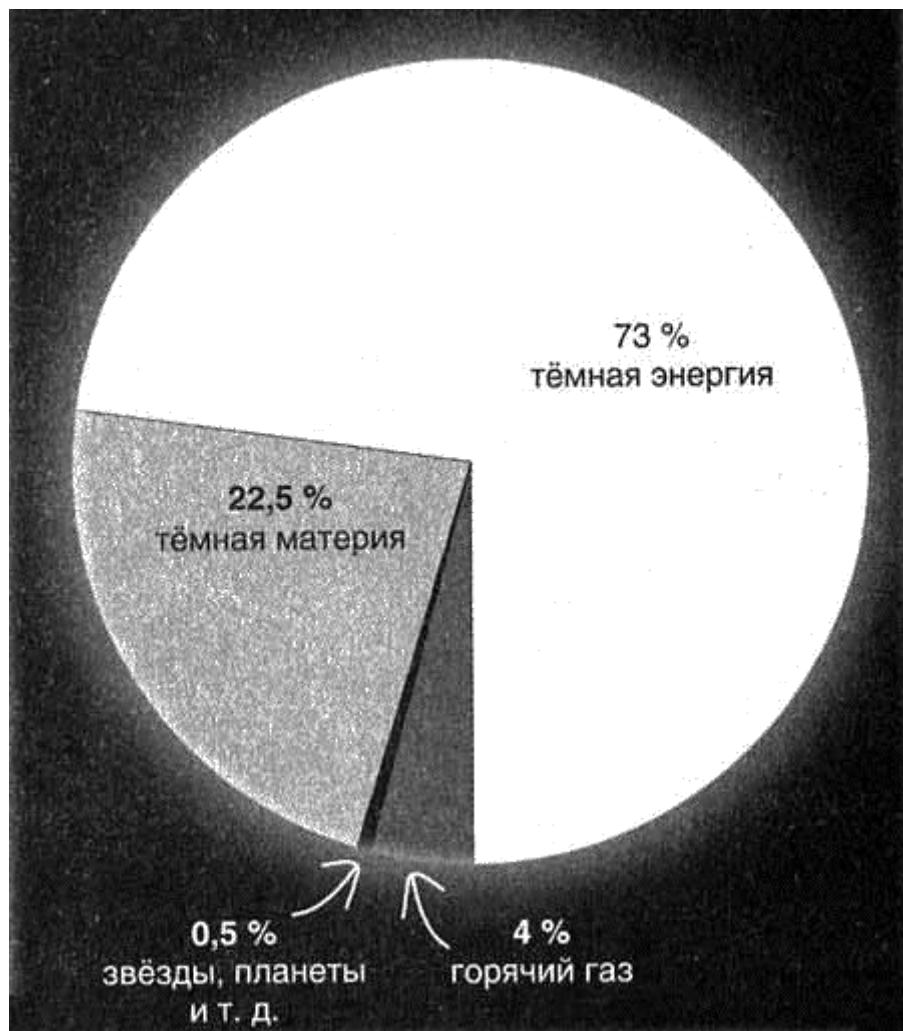
Vsè that is in our world is made up of combinations of 92 different kinds of atoms, ie elements of the periodic system - hydrogen, helium, lithium, beryllium, boron, carbon, oxygen,

и etc. to uranium (number 92). Plants, animals, mountains, minerals, the air we breathe and the vsè that there is on the planet Earth, is composed of these 92 elements. And we know that the rest of the planets in our solar system, our sun itself, and other zvèzdy also consist of the same 92 chemical elements. We are well studied atoms and cool them to get the hand to swap back and forth, getting vsè anything - including my favorite fried potatoes! Chemistry - is, in fact, is the science of how to build from atoms vsè anything; sort of "Lego", where instead detalek - atoms.

B Today we already know: outside our solar system have something eschè that surrounds us incomprehensibly huge universe with billions of galaxies, each containing billions of stars и planets. Of what is this universe? And then it starts surprises. Our solar system, other zvèzdy and planets are made up of atoms; but, assuming that the rest of the universe is also a member of them, we oshibèmsya. It consists of very strange things - tèmnaya matter and dark energy - which we know is that much less than about atoms.

Nachnèm with numbers: if we talk about the universe as a whole, 4.5% eè make up atoms, 22.5% - tèmnaya matter, and 73% - tèmnaya energy. For a moment digress, we note that less than a tenth of atoms forms zvèzdy, planet or, for example, living organisms; remaining atoms exist in the form of gas is too hot to form a celestial body.

So tèmnaya matter. How do we even know about it? What is it? And why do we find no eè on Earth, or even on the Sun?



We know what it is, because the power of attraction holds together our galaxy, Andromeda, and all other large structures in the universe. The visible part of the Andromeda Galaxy, as well as all other galaxies, located in the middle of a very large - more than ten times that of the visible part - the ball from tèmnaya matter; Astronomers call this ball of the galactic halo. If not for the attraction tèmnaya matter, most of stars, solar systems, and everything else that is in the galaxies would simply flew on space anywhere, and it would be very bad.

So far we do not know exactly what it consists of tèmnaya matter (in much the same was true of Democritus, who correctly guessed about atoms, but did not know how they work). However, something that we still know vsè.

Tèmnaya particles of matter, unlike atoms, not made up of protons, neutrons and electrons: it is a completely different form of matter! Do not be surprised: humanity took almost 200 years to discover all the chemical elements, and over time many new forms of nuclear material was discovered.

Since tèmnaya matter is not made of atoms, it does not pay any attention to them - as they neè. Moreover, the particles of matter are not interested tèmnaya even tèmnaya other particles of matter. A physicist would say that tèmnaya particles of matter interact with atoms and each other very little, if at all interact. Therefore, when our and other galaxies formed, tèmnaya matter remained in a very large and diffuse galactic halo, in

While the atoms collide with each other and settled in the center of this halo, gradually forming zvèzdy and planets, consisting almost entirely of atoms.

So, zvèzdy, planets, and we are with you do not consist tèmnøy matter, but from the atoms precisely because of this "shyness" tèmnøy particulate matter.

Nevertheless tèmnøy matter particles rushing around us: at any given time in any teacup naydètsya least one such particle. And it tells you how you can check out a bold hypothesis. Tèmnøy particles of matter, of course, "shy", but the same can vsè from time to time to leave quite an imprint on the very, very sensitive particle detector. So physicists have built a large detectors and placed them under zemlèy (protected from cosmic radiation bombarding the surface of the Earth), to determine whether the halo of our galaxy really consists of particles of matter tèmnøy.

Eschè more exciting idea - to establish itself tèmnøy particles of matter in particle accelerator, turning the energy into mass according to Einstein's famous formula $E = mc^2$.

Large Hadron Collider in Switzerland, the most powerful particle accelerator in history, designed to create particles of matter tèmnøy and follow them.

And the satellites in the sky looking for parts of atoms, which are formed when particles of matter in the halo tèmnøy randomly collide and generate the ordinary matter (a process opposite to that which is trying to achieve with the help of particle accelerators).

If any of these methods bear fruit - and I hope that at least one prinesèt yes - it is confirmed that most of the matter in the universe is not atoms, but something else. Can you imagine? That's just the same.

Now we are ready to talk about the greatest mystery of all scientific vremèn: about dark energy. I am sure that will not be able to unravel the mystery in the next few years - this will your generation. Perhaps the clue even perevernèt upside down Einstein's theory of gravity - the general theory of relativity!

We all know that the universe is expanding and growing in size over the last 13.7 billion years since the Big Bang. Since eighty-odd years ago, Edwin Hubble discovered this extension vsè astronomers tried to measure how much it slows down due to gravity. Gravity - a force that does not fall daèt us with the Earth and keeps the planets in their orbits around the sun - a sort of cosmic glue. Gravity pulls objects together, slows the rate of shells and rockets fired from the earth; so that the expansion of the universe should have slowed down due to the fact that vsè it is attracted to everything.

Now, astronomers have discovered in 1998, this simple, but very logical idea is completely wrong: it turned out that the expansion of the universe is not slowing down, but rather accelerated. It was found thanks to the special properties of telescopes rodnyaschemu them with the time machine: Since light takes time to reach us through the universe, then, looking at udalènnye objects, we see them as they were long ago. With the help of powerful telescopes, such as the famous space telescope "Hubble", uchènye were able to determine that in the past the universe was expanding more slowly than now.

How can this be? According to Einstein's theory, there is something strange eschè more in our universe than tèmnaya matter - something having a "repulsive gravity".

"Repulsive gravity" - is gravity, which does not draw the objects to each other, but rather pushes them away from each other, which is very strange! It was called "tèmnaya energy" and can be something very simple: for example, the energy of the quantum vacuum - or, on the contrary, something very strange: for example, the impact of the additional dimensions of space-time! Perhaps no dark energy do not, and then replace pridetsya Einsteinian general relativity on something better.

Understand what tèmnaya energy eschè important because of neè determine the fate of the universe. Now tèmnaya energy pressing on the gas pedal, and the universe is expanding faster vsè, which suggests that it will expand forever, and after about 100 billion years, the sky again plunged into darkness.

Since we do not know anything about dark energy, it is possible that at some point in the future it is going to hit the brakes - and this will cause the collapse of the universe.

Answers to all these questions will find uchènym new generations. Maybe even you.

Michael

The Large Hadron Collider

CERN

CERN (CERN) - The European Organization for Nuclear Research - the world's largest international Particle Physics Laboratory, located on the border of France and Switzerland. Abbreviation CERN comes from the French Conseil Européen pour la Recherche Nucléaire - European Council for Nuclear Research.

CERN was founded in 1954. For more than half a century in nèm investigate elementary particles, including by means of colliders (accelerators).

B 1990 uchèny and CERN Tim Bèrnars-Lee invented the World Wide Web - a technology that allows the physicists at CERN to quickly and easily share information. Now, this "web" has truly become global, and many can not imagine life without neè.

B 1983 Super Proton Synchrotron (SPS) in collisions of protons with their antiparticles - antiproton - were opened W- and Z-bosons - the carriers of the weak interaction. Super Proton Synchrotron, built in a circular tunnel protyazhènnostyu 7 kilometers, today is preaccelerator protons for the LHC.

B 1988 trèh after years of work, was completed construction of a new circular tunnel 27 kilometers in length, laid at a depth of 100 meters. In nèm placed the Large Electron-Positron Collider (LEP) for collisions between electrons and their antiparticles - positrons.

B 1998 began rytè underground halls for the LHC detectors. B November 2000, experiments at Large Electron-Positron Collider ended - he had to give way in the tunnel of the LHC.

The first launch of the Large Hadron Collider was held in September 2008.

TANK

It is the world's largest particle accelerator.

According to the circular tunnel dvadtsatisemikilometrovomu extend two pipes - a sort of giant electromagnetic treadmills - which carry two colliding proton beams.

The tubes from which pumped almost all the air sozdaètsya vacuum in outer space, to the protons on svoèm path not faced with air molecules.

Pipe Large Hadron Collider - the most lifeless place on Earth!

Since the tunnel is curved, more than 1,200 powerful magnets control the movement of protons, so that they are not faced with the walls of the pipes. These magnets have superconductivity, that is able to generate a very large field with very little loss of energy. For this purpose, they must be cooled by liquid helium to a temperature of -271 degrees Celsius; It is colder than outer space!

In total, the Large Hadron Collider near 9300 magnets.

At full capacity, each proton will make 11 245 times per second at a speed of 99.99% the speed of light. In the second will occur before 600 million of direct collisions between protons.

The LHC is designed for collision not only protons but also lead ions (nuclei of lead atoms).

GRID

Even the most modern equipment can not cope with the obèmom data, which produces the LHC detectors: about one megabyte per collision. Computer algorithms are selected only the most interesting events - the rest of the data, more than 99% are discarded.

But it is assumed that the data from the Large Hadron Collider will be about 15 million gigabytes of data per year (enough to the eyeballs scored 75,000 personal computers with dvuhsotgigabaytnymi zhèstkimi disks). This raises the problem serèznaya storage and processing of information - especially with the account of the fact that physics, who need the data, scattered around the world.

storage and processing tasks are putèm fast transfer of data via the Internet to the computers that are in different countries. All these computers with the computers at CERN form a computer network Large Hadron Collider (LHC Computing Grid), based on Grid technology and simply referred to as "grid".

Detectors

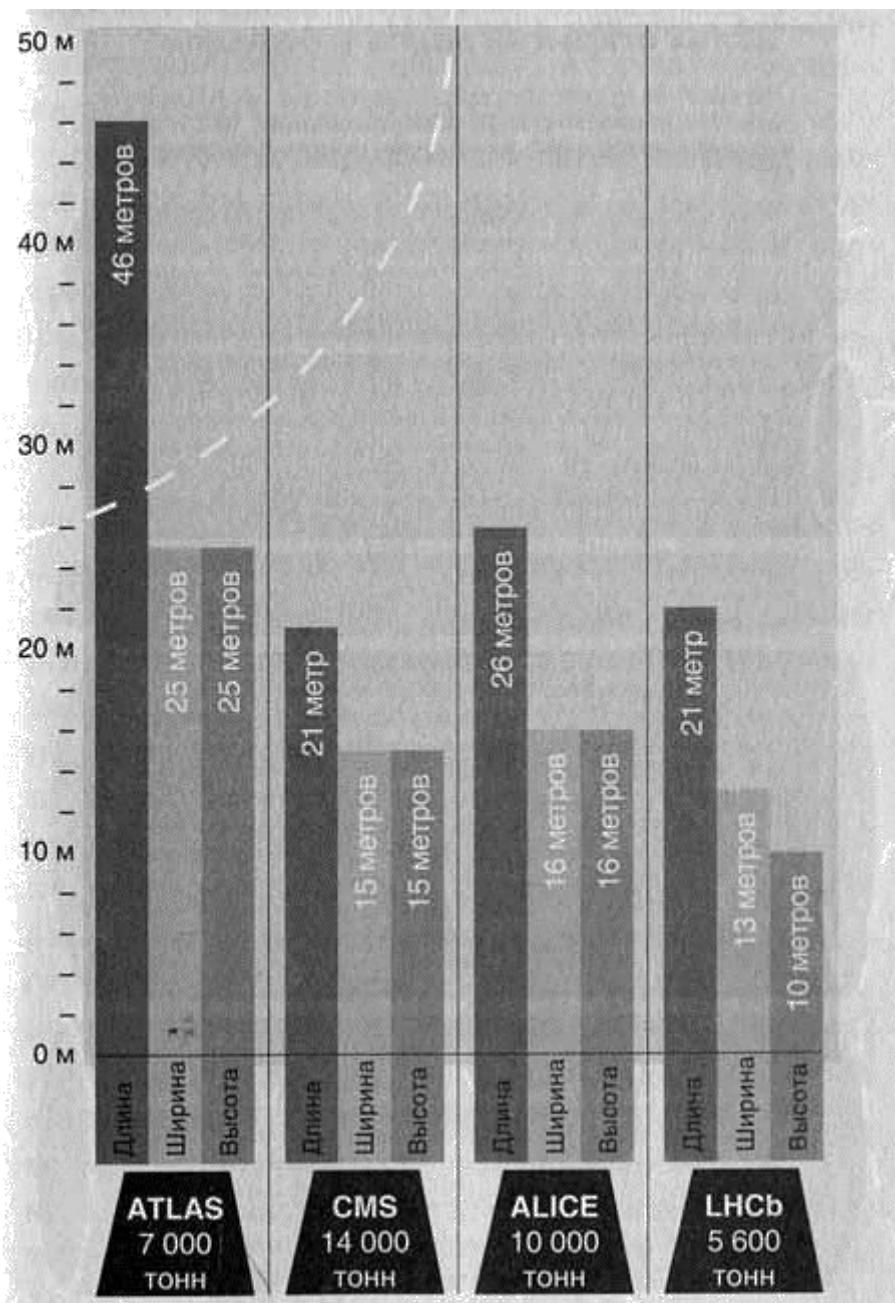
On the Large Hadron Collider are four main detector razmeschennyh in underground halls around the tunnel. To beams encountered in those four positions the points where the detectors are located, using special magnets.

ATLAS - The largest in the history of the detector 46 meters long, 25 meters wide, 25 meters high and weighing 7000 tonnes. He raspoznaèt particles produced when high-energy collisions by tracing their path of flight and measuring their energy.

CMS detector is arranged differently than the ATLAS, but it is intended to study the same processes (different arrangement of two detectors allows to obtain independent confirmation for each opening). CMS Length 21 meters, width and height - 15 meters, and it weighs more than the ATLAS, - 14 000 tonnes.

ALICE detector is specifically designed to search for a quark-gluon plasma, generated by collisions of lead ions. It is believed that in the first moments after the Big Bang the universe existed in the form of a plasma. ALICE detector length of 26 meters, width and height - 16 meters, weight - about 10 000 tons.

LHCb detector is designed for the study of b-quarks. His goal - to clarify the differences between matter and antimatter. The length of the detector is 21 meters, height - 10 meters, width - 13 meters, weight - 5 600 tons.



What discoveries await in the future?

The Standard Model of particle physics describes: fundamental interactions; particles which they are transferred; three generations of particles of matter. But:

Only 4.6% of the universe consists of matter known to us. Of what is vsè else? What are tèmnaya tèmnaya matter and energy?

Why elementary particles have mass? The answer to this question can be obtained, if it is possible not only to detect, but also to study the Higgs boson - a particle predicted by the Standard Model. Now physics is carried out this research at the Large Hadron Collider.

Why is the universe so much more matter than antimatter?

Within a very short time immediately after the Big Bang, quarks and gluons were raskalènnymi such that they could not connect and form protons and neutrons. At this point, the universe was filled with matter in an unusual condition - the so-called quark-gluon plasma. This plasma is to be reconstituted at the Large Hadron Collider; ALICE detector is specifically designed to detect and investigate её. Uchène hope that by studying the quark-gluon plasma, they learn a lot about the strong nuclear interaction and the development of the universe.

New theories try to incorporate gravity (as well as space and time) in the same quantum theory, which now describes the remaining interactions and elementary particles. There are hypotheses that in addition to four positions familiar dimensions of space-time, there may be others. If these "extra dimensions" do exist, particle collisions at the Large Hadron Collider will help them to discover!

Are there many benefits of Mathematics at unlocking secrets of the universe?

It is obvious that there are predictable and unpredictable events in our world. Everyone knows that the sun rises every day in a strictly определенное time, but the weather changes without warning - unless, of course, you do not zhivete I, in Arizona, which is almost always warm and sunny. You can start the evening with an alarm clock and no doubt that in the morning he will wake you at the right time, but do not choose the evening dress for tomorrow - with the weather you can not guess.

Events scheduled in the occurrence of which we have no doubt, are described by the numbers - for example, the number of hours in the day or days of the year. The numbers can be expressed and less predictable things such as the weather - for example, the daily maximum temperature of the air - but these numbers are difficult to deduce some regularity.

Our ancestors noticed the set of laws in nature: not only day and night, but и shift времён year, the movement of the moon, of stars and planets, the tides. Sometimes they described these observations using numbers, and sometimes composed songs and poems. The desire to describe the numbers laws of motion of celestial bodies was common to many ancient peoples. People were interested to predict solar eclipses - both frightening and fascinating events, when the moon obscures the sun in broad daylight and visible звезды. In order to calculate the exact time of the eclipse, it took a long tedious calculations. It is not always able to count все exactly - but when managed, it made a great impression on all.

B Long ago, no one knew why nature is so often repeated patterns that can be described mathematically. But about 400 years ago, some people began to explore these laws more closely. In different parts of the world, especially in Europe, there were skillfully made tools for accurate observations and measurements: chronometers

и a sundial, all sorts of devices to measure distances, angles and lengths of time. Gradually appeared and small telescopes. Researchers who use these devices, called themselves natural philosophers or naturalists; in fact, it was those who today call ученными.

B Specifically, many natural philosophers have speculated that such a movement. At first it seemed that there were two kinds of movement: the movement of the celestial bodies - of stars and planets - and the motion of bodies in the world. Everyone knows that, if you throw the ball, he will fly along a curved path, and do not need long to suffer, to be sure, if throwing a ball at the same angle and at the same speed, then the path will always be the same.

Of course, our ancestors knew that moving objects move in a simple and predictable trajectories. They knew this because it depended on their lives. The hunter must be sure that the stone off from a sling or an arrow shot from a bow, today will behave exactly the same as yesterday. Inventive Australian Aborigines, ie the indigenous people of Australia, had managed to make a boomerang - flat curved projectile with an amazing trajectory of flight, returning to the one who threw it.

By XVI century mathematics has moved beyond simple arithmetic. There was algebra and other methods, and natural philosophers were able to with the help of equations to describe many of the observed regularities in nature, as well as the trajectory of flight of arrows and cannonballs. One simple equation describes a circle, another, slightly different from him - a flattened circle, that is, an ellipse, and the third - verèvki form between two pillars. Due to the advancement of mathematics has become possible to describe a great variety of patterns and shapes are not just words but symbols and equations. These equations were recorded on paper and printed in books, so that they can read and other natural scientists and mathematicians.

However, it was only a description (although, of course, very useful) natural laws, but their explanation. Vsè changed at the beginning of the XVII century thanks to the work of the Italian uchénogo Galileo. Everyone knows that when the object falls from a height, the more it approaches the ground, the faster the flies. But how much faster the object flies through the second after the fall? Two seconds? Three? .. Is there a pattern? Galileo vsè decided to find out. And he began to experiment: drop objects timing with. To slow down the movement, and thus simplify your work, Galileo blew balls roll on a smooth inclined plane. Then, using the results of their observations and measurements of arithmetic and algebra methods, he brought a single formula that correctly describes the acceleration of falling bodies.

Galileo's formula is simple: the speed of freely falling body increases in proportion to time. This means that two seconds after the beginning of the fall of the subject falls exactly twice as fast as one second. But it did not yet vsè. If the object does not simply fall from a height, and thrown under opredelènnym angle, it not only falls down, but eschè and moves horizontally: According to Galileo's formula, it moves in a parabola - a curve, already known to mathematicians of geometry.

The decisive step was taken when the English uchéný Isaac Newton figured out how to change the motion of bodies (it accelerates or slows down) under the influence of forces applied to them. And he described a very simple equation.

The force that acts in the case of falling objects Galileo - is, of course, gravity, or the force of gravity. This force we experience constantly. Newton suggested that the Earth draws vsè down to its center, with a force proportional to the amount of substance in the physical object - that is, its mass. Linking to an equation of power and acceleration, Newton, Galileo explained the formula for falling bodies.

But that was just the beginning. Newton suggested that not only the Earth, but also all the bodies in the universe - including the sun, moon, planets, zvèzdy and we are with you - draw the rest of the body, and the power of attraction decreases with increasing distance between them, as if to say exactly - it is inversely proportional to the square of the distance between them. This inverse square law implies that if the distance from the center of the Earth (or the Sun or the Moon) will be doubled, the force is reduced four times, if the distance will increase three times, then the force is reduced by nine times, and so on.

Using this formula, and its equation relating force and acceleration, Newton was able to make complex mathematical prièmy (some of which he invented himself) to the movement of the planets and comets around the Sun under the influence of solar attraction. It is designed and the movement of the Moon around the Earth. And all these raschèty were true! Moreover, he even correctly describe the orbits form! For example, astronomers have found that the orbits of the planets are elliptical, and its great Newton raschètami proved that the way it should be! Not surprisingly, all believed Newton's character and genius, and even the English king appointed him manager of the Mint.

However, the meaning of Newton's works, posvyaschennyyh the laws of classical mechanics and gravitation, much deeper. Newton suggested that he formulated the law of universal gravitation and the relationship between force and acceleration, which he described by the equation - it's the laws of nature. That is a law that must act in the same way in all parts of the universe at all times and always remain the same - about God, in which Newton believed. Before Newton, many thought that the motion of bodies in the world, whether cannonballs, ships or poultry, has nothing to do with the movement of celestial bodies such as the moon or a planet. Thanks to Newton, people have learned that all bodies obey the same laws. Other uchènye described the move as Newton explained it in terms of mathematical laws.

In practice, this was a huge step vperèd, because now anyone could stay in a comfortable chair with a pen, ink and paper and calculate the motion of any body, not seeing himself this body. For example, you can calculate where popadèt cannonball released to the defined speed under opredelènnym angle to the horizon. And it is possible to calculate the speed with which it has to be released, so that it never returned to Earth. With the help of simple equations of Newton's engineers can calculate exactly where the rocket should aim to launch a spacecraft to the moon or Mars, prichèm do this long before there will be money for the construction of these missiles.

That is why the science of physics that studies the basic laws of the universe, has predictive power. Formulas and equations allow physicists to predict what eschè nobody knows - for example, the existence of an unknown planet. Since Neptune was discovered: the astronomers based on Newton's laws found out where in the sky to be located an unknown planet, which affects the motion of Uranus; and now we are using the same laws predict the existence of planets orbiting other of stars.

Pretty soon, physicists have tried to apply the same principles to other forces, such as electricity and magnetism - and, of course, it turned out that these forces are subject to a simple mathematical laws. Then, when the study of atoms and their nuclei, it was found that their behavior can also be explained in detail by mathematical formulas. So now a lot of formulas in physics textbooks.

Some physicists are asking whether it always - or all laws and equation in some way merge into a single superzakon? Many talented uchènyh looking for a link between different laws and equations - and sometimes find.

Here is the famous example in the XIX century Scottish physicist James Clerk Maxwell discovered that it is possible to combine the laws of electricity and magnetism laws; and when he did it and formulated the equation, it turned out that obedinènnaya "electromagnetic" force can generate electromagnetic waves. Bring them out of their equations of velocity of these waves, Maxwell found that it is equal to the speed of light. Wow! So, Maxwell said, the light - is electromagnetic wave!

Finding superzakona, which would unite all the interaction going on. To reduce vsè together, you need a real genius. Perhaps now he goes to school.

When I myself went to school, I enjoyed a beautiful girl. Èè named Lindsey. One day I was doing homework in physics - solved the problem, which had to be calculated (ie, predict), the angle at which it is necessary to throw the ball into the side of the hill, having a certain slope to the ball flew to the maximum distance. So I solved this problem, and Lindsay

- She was a humanitarian class - was sitting opposite me in the school library, why I was very happy, though a little bit nervous. She asked what I was doing, and when I described the problem, she was surprised to clarify: "And you're going to consider it on a piece of paper, without the ball? How do you know where it will fly? "At that moment I thought it was a stupid question. Once it is set in the house, so you can learn. In fact, Lindsay touched upon a very important, very profound question. Why is it possible with simple mathematical methods to describe and even predict events occurring in the outside world? Where did the laws of nature? I mean, why are laws of nature in general? And, why these laws are so easy (to take if for some reason they need it, for example, even the law of gravity - the inverse square law)? It is possible to imagine a universe described as complex and subtle mathematical laws that do not comprehend the power of even the most brilliant mathematician.

No one knows why the universe is explained by relatively simple mathematics or why the human brain is capable of such an explanation. Maybe we were just lucky? Someone thinks that there is a God-mathematician, who created the universe exactly as it is. But we uchèneye, poorly versed in the gods. Maybe life could arise only in the universe with simple mathematical laws? In this case, nature is required to be described mathematically, otherwise we would simply not have been, and no one would think about it. And maybe many universes - and each of them has its own laws, not similar to ours, and some do not have any laws. And therefore, there is not a physicist or mathematician. Or maybe it is.

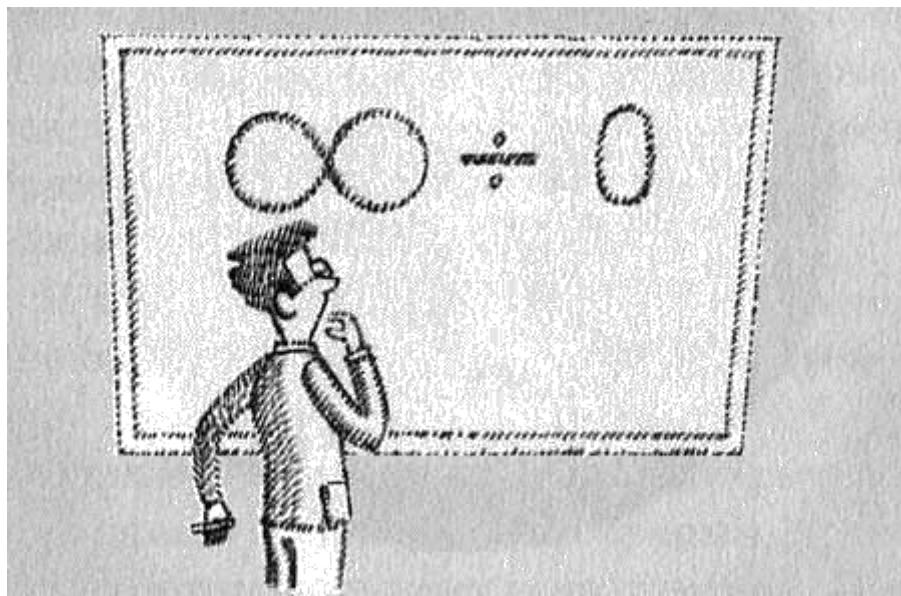
Frankly, vsè is a great mystery, and many uchèneye believe that it is not their problem to solve èè. They just take the mathematical laws of nature as a given, and rely on them in their raschètah.

But I'm not one of these uchèneyh, and of those nights without sleep tossing and turning in search of clues. I would like to find the answer. However, regardless of whether there is a reason for simplicity in the mathematical universe, one thing is clear: physics and mathematics are inseparably linked. Humanity will always be needed, and those who carried out the experiments, and those who engaged in calculations. And it would be good if they exchange information!

Floor

Singularity

Singularity - is a place where mathematics used by physicists, perestaèt act! So, as we approach the center of the h Ye with grave molecular hole (h Ye with grave rnaya hole - one of the varieties of the singularity), the curvature of space-time increases to infinity, and in the center of the normal mathematical rules do not work (for example, there is a division by zero, and yet everybody knows that zero can not share!).



Sometimes physical raschèt includes the assumption that in opredelènnny time is false and reveals a singularity. In this case, you can correct the error, correct raschèt: Then math again starts to operate properly, and the singularity disappears.

More interesting are the singularities that are not so easy to get rid of. In such cases, it is assumed that a new theory. For example, in mathematics of general relativity there are singularities chèrnoy holes and the Big Bang. Perhaps to understand what's really going on, we need a completely different mathematics.

In short, uchènym there is something to do. They hope that the theory of everything will get rid of these singularities.



The space containing vsè that we see around us in the universe shrinks to zero - and then break off all roads leading into the time clock. This is the cosmological singularity - the state of the universe at the moment of the Big Bang.

The quantum world

Neopredelennost and cat Shrèdingera

The world of quantum physics - the world of atoms and subatomic particles. The world of classical physics - it's the world of people and the planet. And these worlds seem to be very different:

In the world of classical physics

We both know where the body is and how fast moves.

Moving from point A to point B, the body moves along the defined path. If there is a path at its wall with two holes, then it either passes through one hole or via another.

We know that the body moves it to point B, but not somewhere eschè.

Passive surveillance does not affect the movement of the body.

In the world of quantum physics

We can not at the same time to know where the body is and how fast moving - and possibly can not know either one or the other (this is the principle of uncertainties of Heisenberg).

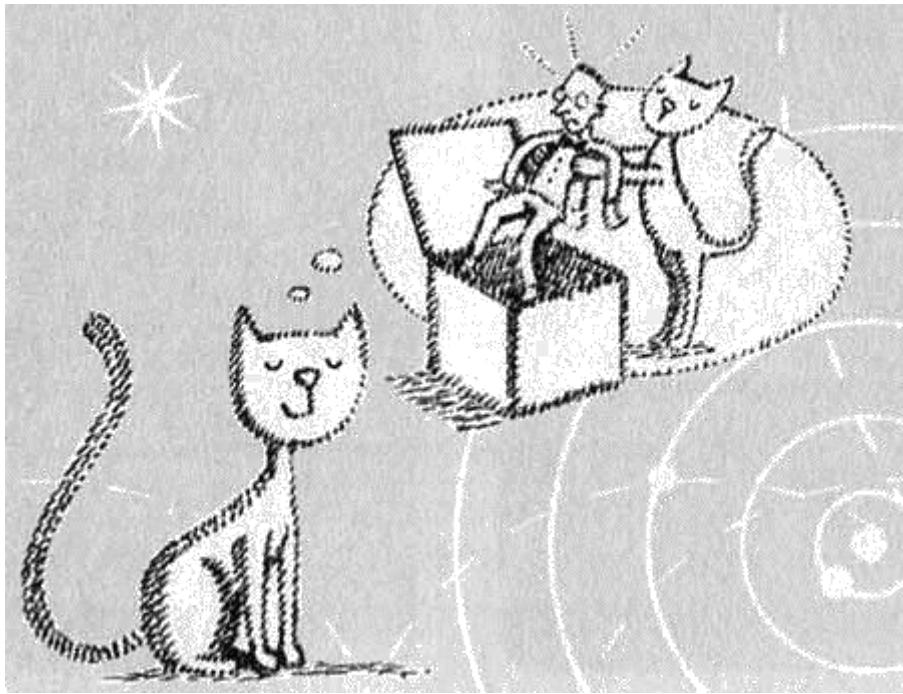
The particle moves from point A to point B over all possible paths, including through the various holes; All these paths are added to form the wave function, diverging from point A as ripples.

The particle can be everywhere, wherever comes the wave function. Where exactly it was, we uznaèm through observation.

Observation reverses the wave function: for example, if we see our particle at point C, the wave function collapses at this point, that is, collapses to a point (and then diverges again).

Cat in a box

Cat (creature from the world of classical physics) consists of atoms (and this is the quantum world). Erwin Shrèdinger decided to apply the Heisenberg uncertainty principle to the cat. (But please do not do so with your pets Shrèdinger really nothing with his cat did not do - it idèt an imaginary cat.) He imagined what would happen if a cat locked in a light- and soundproof box, along with some the amount of radioactive material, radiation detector and èmkostyu with poison gas. When razdaètsya detector signal (because an atom of a radioactive substance disintegrated, emitting radiation), automatically opens èmkost with poison gas. Question: Is the cat alive? The atoms in the box (including the atoms that make up the cat) are in all possible states: in some of these states there is radioactive decay and poisonous gas is released, in others - not. Just spent watching - in other words, opening a box - we will know whether the cat is alive. And before that, you can not argue with opredelènnostyu alive cat or mèrtv because he in some sense alive and mèrtv the same time!



"Wormholes" (also known as "wormholes") and time travel

Imagine that you are an ant living on the surface of the apple. Apple hanging from the ceiling on a string. The thread so thin that descend and climb on it, you can not, so that the surface of the apple - this is your whole universe. Neè you with nowhere to go.

Now imagine that worm gnawed apple in your pass-through hole. You can get there with one half of the apple to the other in either of two ways: on the surface of the apple (your universe) or through a wormhole, cutting path.

What if our universe is like this apple? What if there are "wormholes" (their eschè called "wormholes") in it, linking one place in the universe to the other? And if so, what they seen us?

In such wormholes should have two inputs, one at each end. One input can be located, for example, in London, at Buckingham Palace, where Queen zhivèt, and the other - on the beach in California, on the West Coast. Assume that the input round. I am looking at the ones that in London, you can see - as if in a crystal ball! - As the ocean waves splashing, the raids on the sand, and the wind swaying palm fronds. And your friend California, looking into a round hole in its side, you will see in London against the backdrop of the Royal Palace and next to you in time bearskin hats. But this is not a crystal ball: in these holes can enter! While in London, you take a step in this round hole, you nesèt for outlandish tunnel - and you're on the California beach, where each is waiting for you on board for sèrfinga!

The inside of the apple trèhmerna (east-west, north-south and up-down), and the surface is two-dimensional. Wormhole in the apple connects two points on a two-dimensional surface, passing through trèhmernuyu apple core. Similarly, it is our wormhole connects London California trèhmernoy in our universe, passing through chetyrèhmernoë

hyperspace (And maybe in nèm and four dimensions, and more!) That is not part of our universe.

Our universe is governed by the laws of physics. They dictate what can happen and what cannot. Admit whether these laws allow the existence of wormholes? Amazingly, the answer - "yes"!

Unfortunately, according to the same laws of most wormholes to collapse (because the walls would collapse tunnels) so quickly that nothing and no one will have time to go through them unscathed. To avoid collapse, it is necessary to fill in a special form of wormhole matter - *cloth from negative density energy* this energy will generate force "Antigravity", thanks to which the wormhole will remain open.

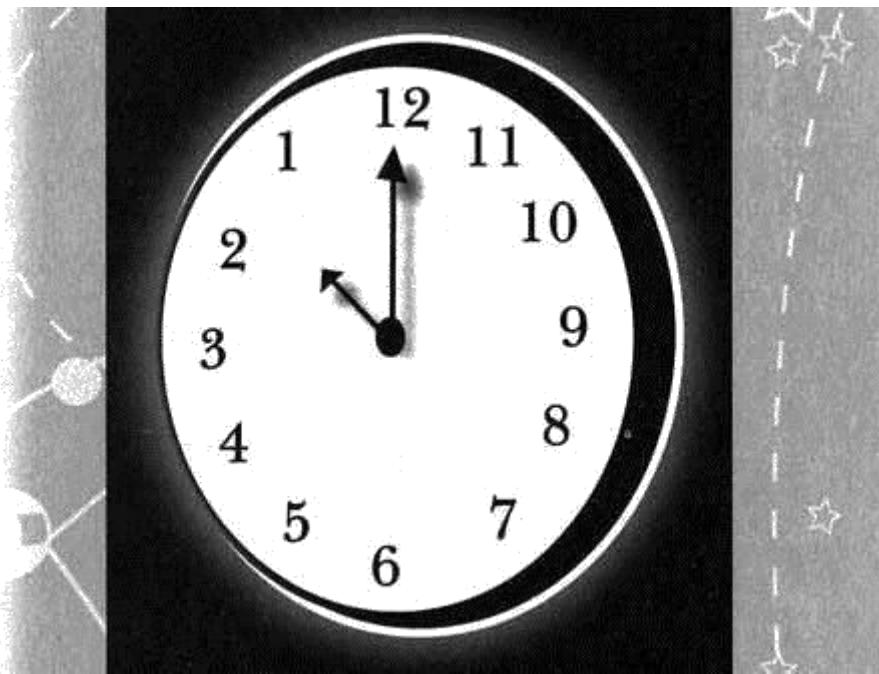
But if the existence of matter is possible with negative energy density? Oddly enough, the answer to this question is positive again! This matter daily is created in physics laboratories, but only in tiny quantities and at a very short time. It is created by borrowing energy from the regions of space, where there is no energy - that is, borrowing energy from the so-called "vacuum". However, when you do something in a vacuum, it is necessary to very quickly give back unless borrowed very little. How do we know that? Considering the laws of physics with the help of mathematics.

Let's say you - a brilliant engineer and want to keep the wormhole open so that it is not imploded. Is it possible to collect enough energy in a hole with negative density and retain it there for so long, that your friends had to go through the hole? As far as I can judge my knowledge - no, impossible. However, nobody in the world does not know this for sure - yet knows. We still did not yet so smart enough to figure it out.

If the laws of physics do allow to keep a wormhole open, whether it happens in our universe naturally or not? It is very likely that there is. Most likely to create such holes and keep them open will be possible only thanks to the work of engineers.

How far advanced engineers from having to learn it? Very, very far. If the wormhole technology at all possible, it is not excluded, that to us it is just about as much as the cave people to space travel. However, for highly developed civilization that possess this technology, wormholes could be the perfect, the ideal way to travel through star systems.

Imagine that you are - an engineer and at the same time representative of just such "advanced" civilization. You receive one of the inputs of the wormhole (the same round, like a crystal ball), put it in a spacecraft, sending the ship into the universe, and then just return it to the home planet at great speed. The laws of physics tell us that from the point of view of an observer on the spaceship is traveling zaymet a few days, and from the point of view of an observer on the planet - for several years. The result will be odd: entering through one entrance to the wormhole tonneleobraznyu and went out through the other, you will leave for a few years before entered, then there will be in the past. Thus transformed into a wormhole time machine.



And with such a machine could be to try to change history! Back to the past, to meet with yourself, only younger, and tell this young myself sitting at home - because when you are in the morning, go to work, you are hit by a truck.

Stephen Hawking has suggested that the laws of physics do not allow you to create a time machine, and thereby protect the history of changes. This hypothesis is called a "chronology protection hypothesis" (chronology - a sequence of events in the order in which they occurred). We do not know exactly whether this hypothesis is true of Stephen, but we know the two ways in which the laws of physics could really prevent the creation of a time machine, and thereby protect the chronology.

Firstly, according to this law, even the most brilliant engineer could not accumulate enough negative energy to wormhole stayed open and allowed to pass through itself. Prichèm Steven applying the laws of physics, proved that any time machine would require negative energy; This means that it is impossible to create not only a time machine that would unlock wormholes, but generally no.

Secondly, my colleagues-physicists have shown that any time machine would destroy itself - perhaps putèm giant explosion - at the moment, as soon as someone tried to turn eè. The laws of physics quite clearly hinted that things would have been that way; but we did not yet so well studied these laws and the resulting predictions to say for sure.

So the final conclusion has not yet been made. We do not know for sure, if the laws of physics allow an advanced civilization to create wormholes to mezhzvèzdnyh travels or a time machine to travel back in time. To judge this with certainty requires a deeper understanding of the laws of physics. This level of understanding neither Stephen nor I, nor our colleagues have not yet reached.

I hope that it will be possible to you - a new generation of uchènyh.

Kip

M-theory: 11 measurement!

How to combine the classical general theory of relativity, which describes the shape of the universe and the gravitational interaction with the quantum theory to explain the rest of fundamental interactions and the behavior of elementary particles?

Most successful attempts this kind Unions They include himself ***additional spatial dimensions and supersymmetry.***

These extra dimensions are so tight svěrny that large objects do not notice them!

Supersymmetry assumes that the known particles have a particle-superpartner: for example, a photon - photino have quark - squark! Uchène hope that experiments at the Large Hadron Collider will help to detect these particles, and perhaps even extra dimensions!

Superstring theory (supersymmetric string) replaces particles (points) with tiny strings (lines). Vibrating in different ways - both when playing the guitar - the strings behave like elementary particles of different types. And, strange as it may sound, the strings can explain gravity!

Superstrings must exist in ten dimensions - hence, six of them remain hidden. How does this happen? At the same time, we did not yet figured out until the end.

In 1995, American physicist Edward Witten has compiled all the various versions of superstring theory, reducing them to a single - already eleven-- M-theory.

Uchène differ in opinion about what is the letter "M" in the theory of the title, "magic", "mysterious", "parent" or maybe, "membrane"? To find out it will have a new generation of physicists.

Uchène very serèzno engaged M-theory, but so far did not yet know whether it is really a theory of everything.

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Editing, layout: Andrew D'Alembert (DARK STYLE) ||YA@DarkStyle.org