Period 11

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Physic IA

Decay

Explain what's the relationship with the times of the decay period

Word count :1164

Introduction

Radioactive decay is a kind of change which happen on the nuclear, and in this process, this element will became another element because the charge with the atom will be decrease and have a totally change, then it will lose this charge and became another element. We know that Marie Curie was find this kind of element, they always became another element and will have radioactive to the air, because this gamma rays and conversion electrons will decay and get out of the air. By which a nuclear of an unstable atom loses energy by emitting radiation. A material that spontaneously emits such radiation. In that, according to middle theory, it is impossible to predict when a particular atom will decay. The chance that atom would decay never changes, that is, it does not matter how long the atom has existed. There have so many different of decay of radioactive. A decay, or loss of energy from the the nucleus, results when an atom with one type of nucleus.
I will try to figure of this and have a research.

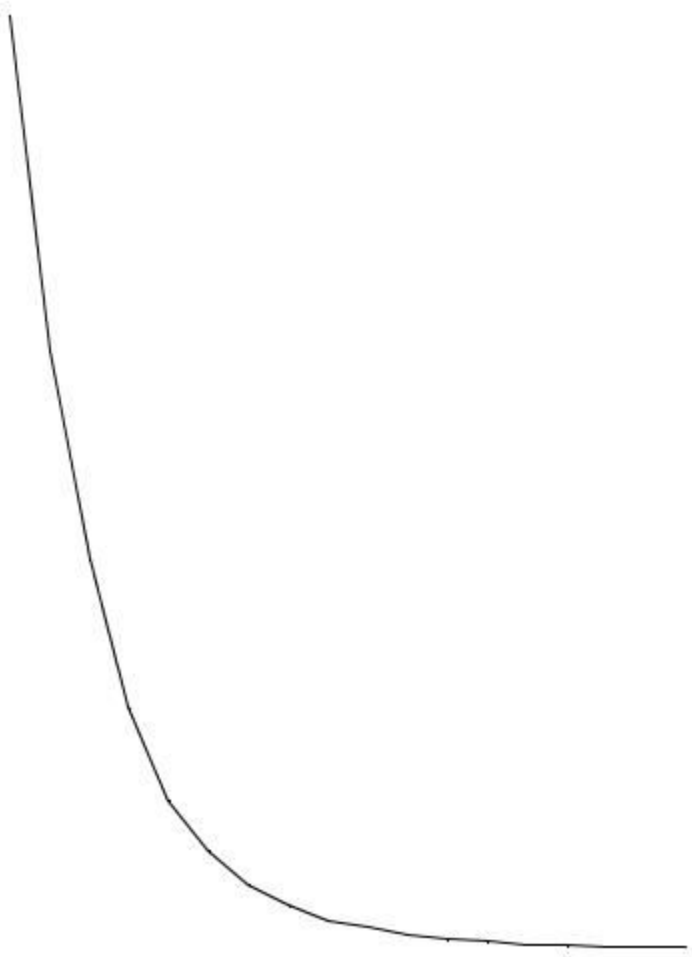
Question
Explain what's the relationship with the times of the decay period.

Apparatus
Computer, Java and program about decay lab.

Instruction 1 single atom's situation of the decay.

Of cause I can't just do the decay lab by the real way, because it was so away of me. As we know it need very high technology to do this real stuff and it should be do in the very expert lab, and we can done with it. And of cause for our high school we can't do this lab, that's so much cost with the instructions. That's means I choose a wrong question and a topic to talk? No, in fact, we can find another way to do it. Our physics teacher, Dr. Schultz was know how to get the data, he was a expect computer programmer too, when he is a Dr with physics, he made a very nice java programs to help me to create this data. It use the formula and the other very important theory about the randomness of the Quantum Theory to get the data, and we can have a good research when we want to have a data simulate, and we can pick and data we want to get.
Here is the step of the one part of the "lab"
Step 1, I get these programmer by teacher and I get it by git hub
Step 2, I set up the program by CMD, the command in the windows, because this program need to have a situation to work with text Interface .
Step 3. We need do this command and we will can use the program.
C:\Users\simon>cd DSM

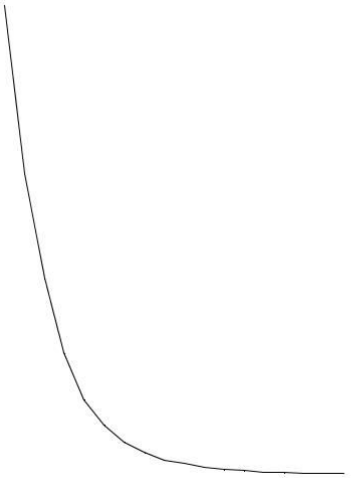
C:\Users\simon\DSM>java Nuclear
input N, the initial number of atoms.
As we see, it said what happen with it. It show the number with the program, and then I choose one number of 1000 and then about the probability of decay I choose 0.342, then it will show me what happen:
input N, the initial number of atoms.
1000
input P, the probability of decay.
0.342
1000 644 429 290 196 138 94 63 35 25 15 14 11 7 3 2 2 0
The number of time steps was 17

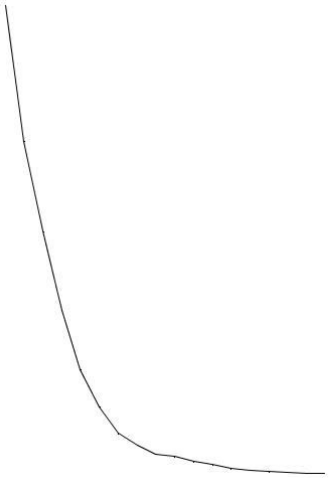


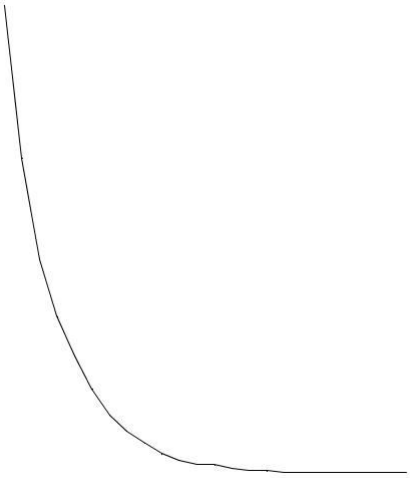
The picture of this data
As we see it have a very nice showing with the lab, then is do the data college

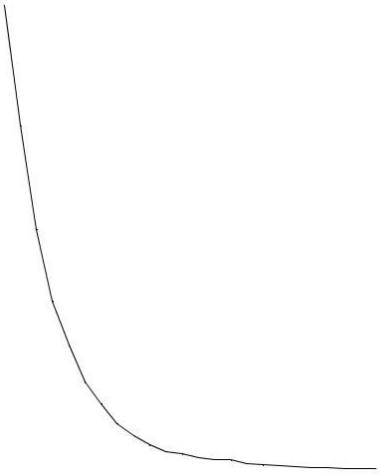
Data destruction 1 with single atom’s situation of the decay

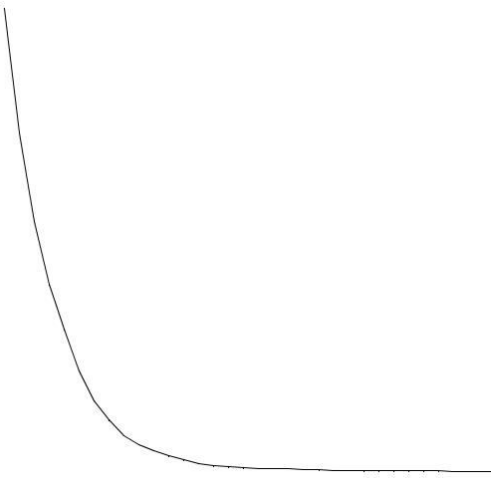
No.	initial number of atoms	probability of decay	time steps
1	1000	0.342	17
2	1000	0.321	17
3	1000	0.3	23
4	1000	0.279	23
5	1000	0.258	34
6	1000	0.247	20
7	1000	0.226	26
8	1000	0,205	27
9	1000	0.184	34
10	1000	0.163	35
11	1000	0.142	41











The graph of 1,2,3,4,5.

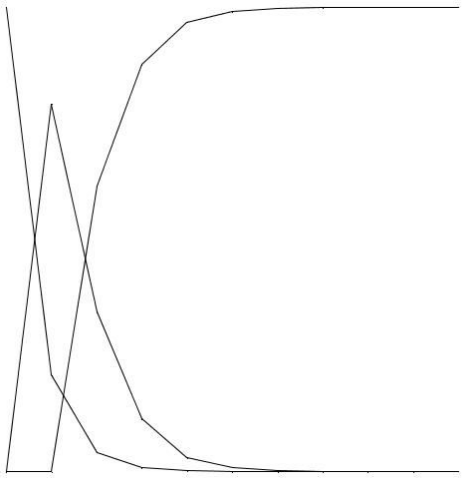
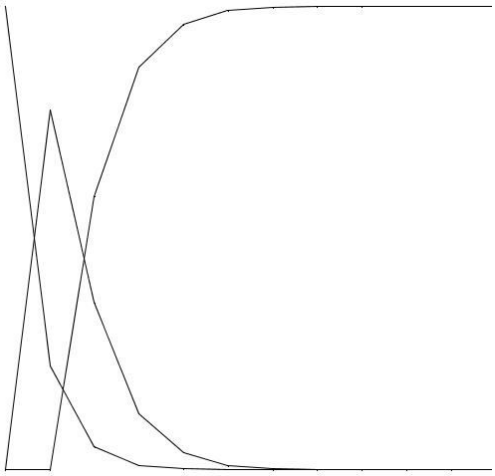
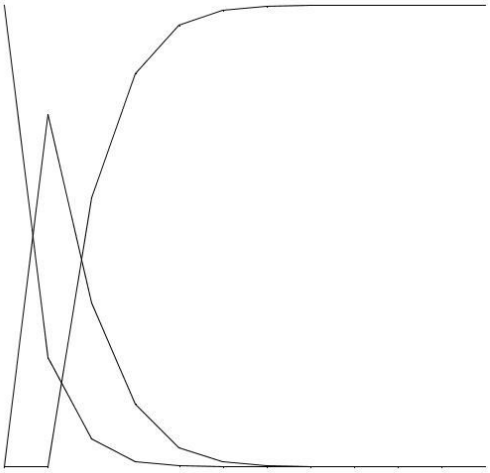
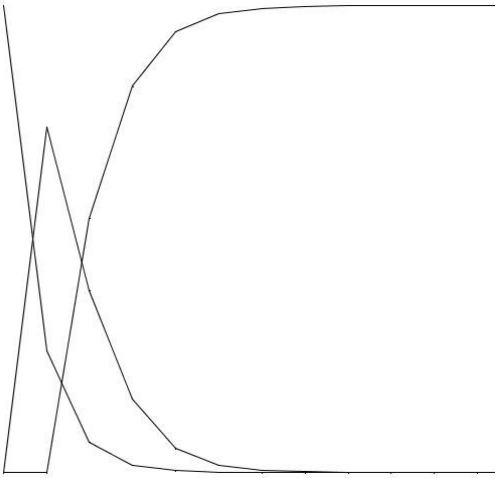
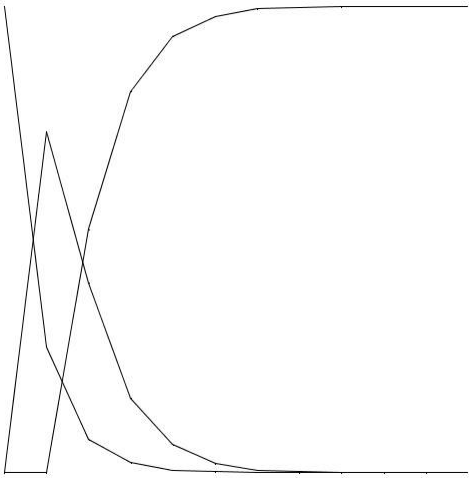
As we see the data have a inverse ratio in this data, and for the time and the decay ‘s situation is same. At first we saw it have the probity of the decay and it’s the number lower then zero. As we know, nuclear transmutation is the charge changing , and it became slow because it will became stable and stable. And the probability of the decay show the happening with the data--- inverse ratio.

Instruction 2 with the situation of between the A-B-C charge
Because it totally change the idea with the first situation, and we need to repeat step 1 and 2. But we need to do
C:\Users\simon\DSM>java Nuclear2
Because we change the idea, I need use other program which is the teacher give me. And I will choose a initial number which is didn’t change and I choose 10000 because it need very big number to calculate. Then I choose 0.7899 and 0.7799 which is blank 0.01 which the data and we get
input the initial number of atoms.
10000
input P, the probability of decay for A to B.
0.7899
input P, the probability of decay for B to C.
0.7799
steps A B C
0 10000 0 0
1 2075 7925 0
2 439 3334 6227
3 99 1074 8827
4 14 307 9679
5 1 82 9917
6 0 21 9979
7 0 2 9998
8 0 1 9999

The number of time steps was 9
It was same perfect for the data, and we can continue our research.

The data 2 with the situation of between the A-B-C charge

No.	initial number of Atoms	probability of decay A-B	probability of decay B-C	time steps
1	10000	0.7899	0.7799	10
2	10000	0.7788	0.7688	11
3	10000	0.7677	0.7577	11
4	10000	0.7566	0.7466	9
5	10000	0.7455	0.7355	14
6	10000	0.7344	0.7244	11
7	10000	0.7233	0.7133	11
8	10000	0.7122	0.7022	10
9	10000	0.7011	0.6911	10
10	10000	0.69	0.68	12
11	10000	0.6899	0.6799	11

The graph of 1,2,3,4,5.

But on the other hand the situation of the electric distant was very stable, as we see, the data of the charge between A and B and C became very well and have a stable

ratio and it always 10 or 11, that's means it was have very samey time steps of the track of charge.

Conclusion

We can saw the time step is have a decrease ratio with the probity of the decay because we can saw the data is have a decrease situation and it show the losing theory of the charge and show the connection of the decay probity, but other hand, the different decay lab of the A-B-C is show the change between this charge is very stable.

Function

nuclear transmutation

$$c = \frac{\lambda}{N_0}.$$

population formula

$$N = N_0 e^{-\lambda t}$$

Partial mean life

$$T_{1/2} = \frac{\ln 2}{\lambda_c} = \frac{\ln 2}{\lambda_1 + \lambda_2}$$

Time constant and mean-life

$$\tau = \frac{1}{\lambda}.$$

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