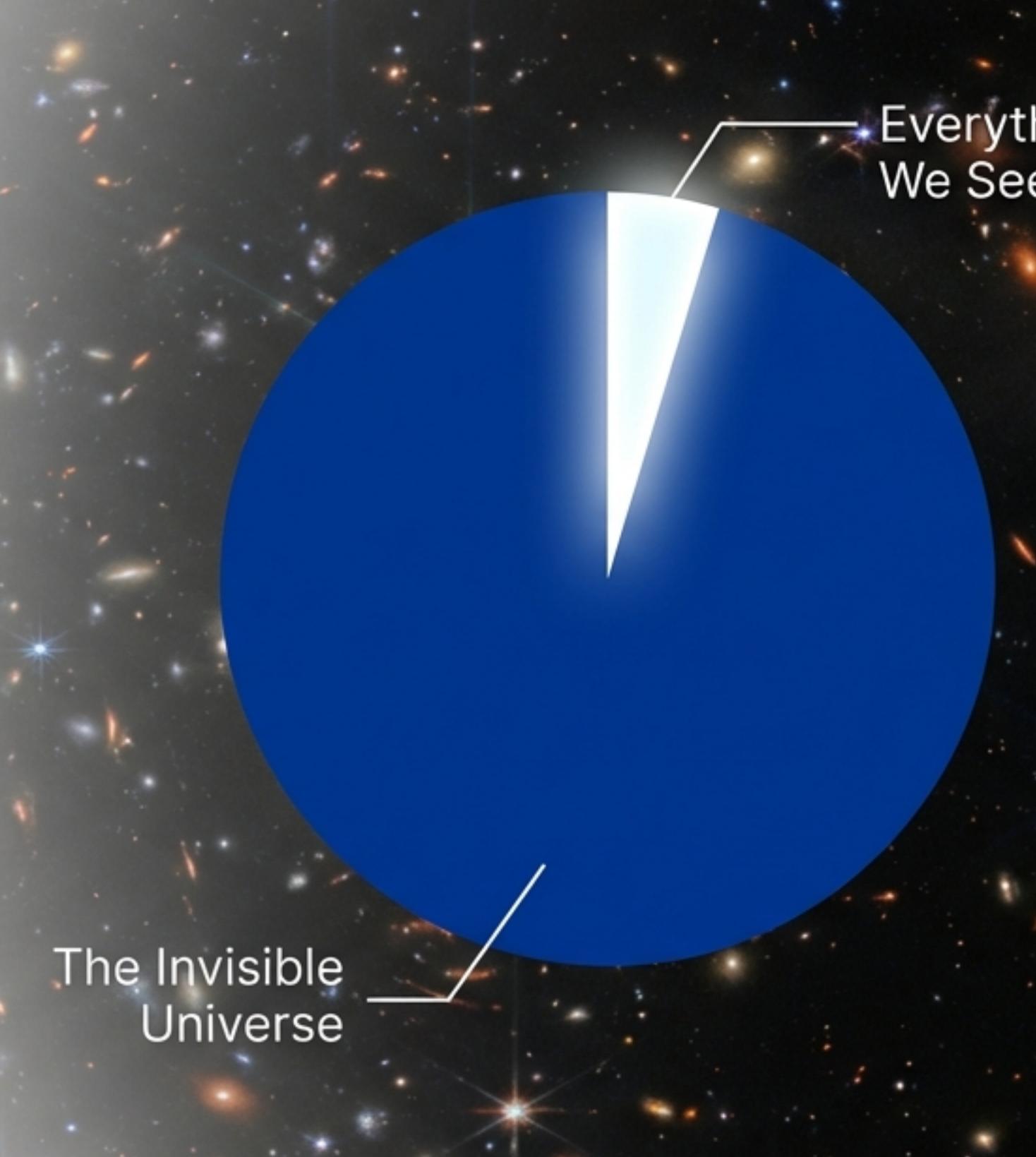


# 95% of the universe is invisible.

Every star, planet, and galaxy we have ever seen makes up just 5% of reality.



The Invisible Universe

Everything  
We See

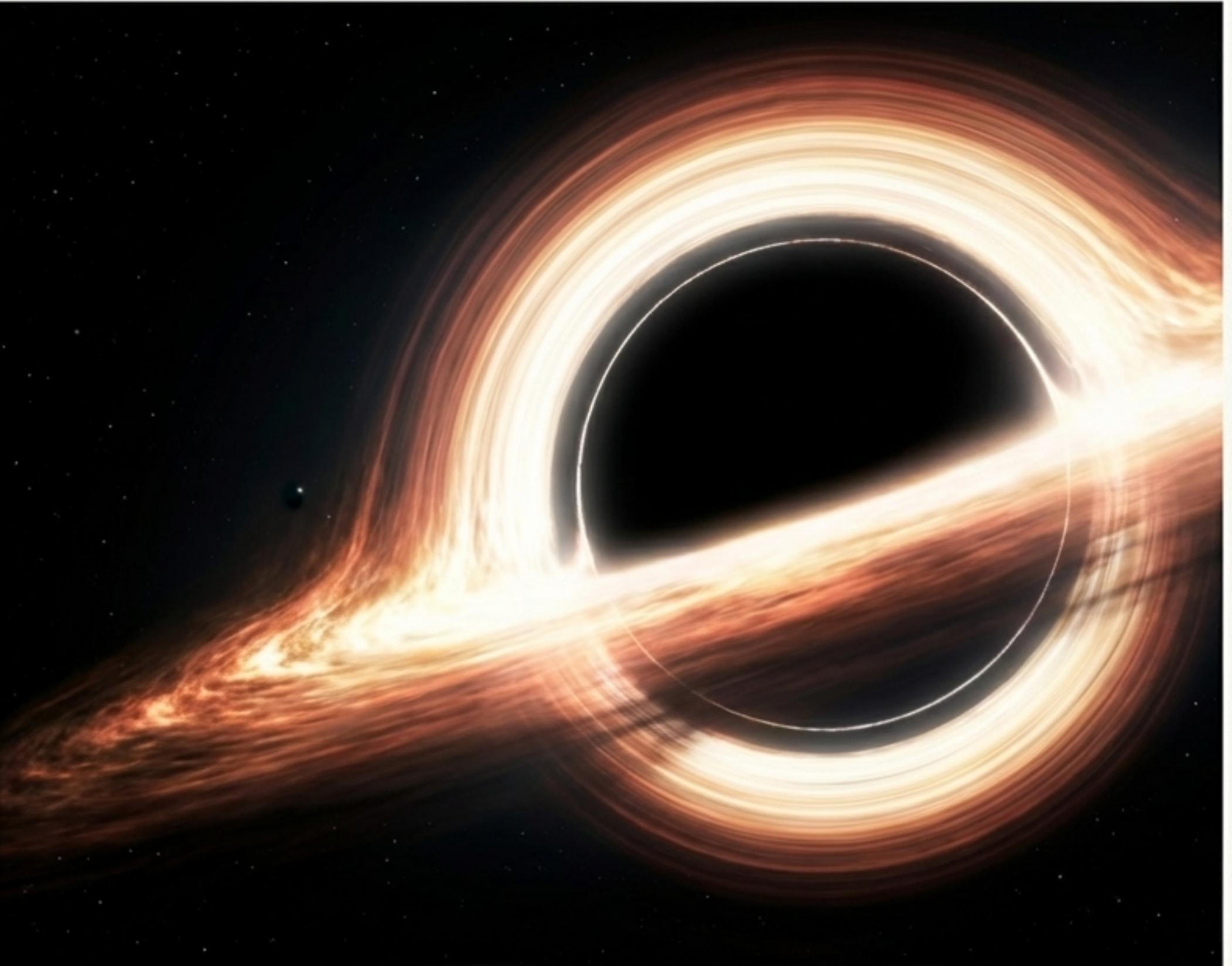
# This is the 5% we know.

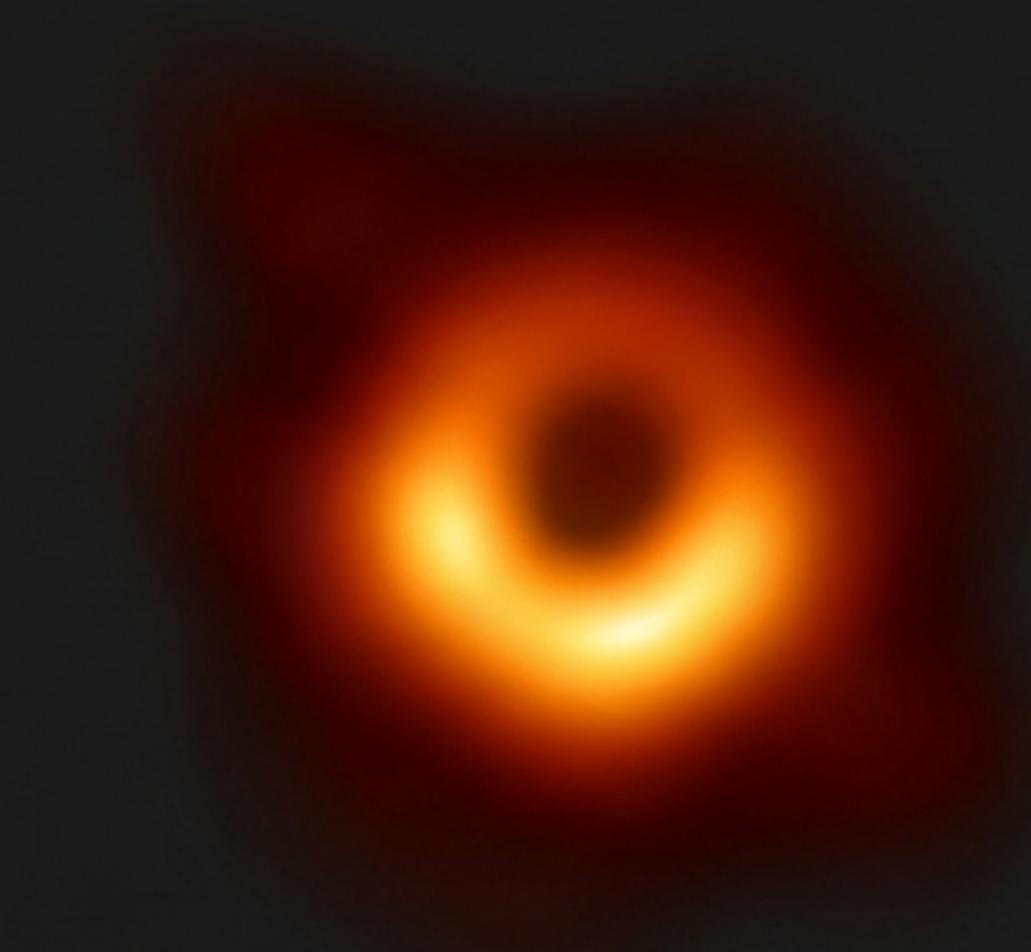
The visible universe contains hundreds of billions of galaxies, each with hundreds of billions of stars. It is everything humanity has ever observed. And it is only a fraction of what is truly out there.



# The first invisible giant: the Black Hole.

Black holes are not empty space. They are regions where an immense amount of mass is compressed into an infinitesimally small point, creating a gravitational field so powerful that nothing, not even light, can escape.





For the first time, we have seen the unseeable.

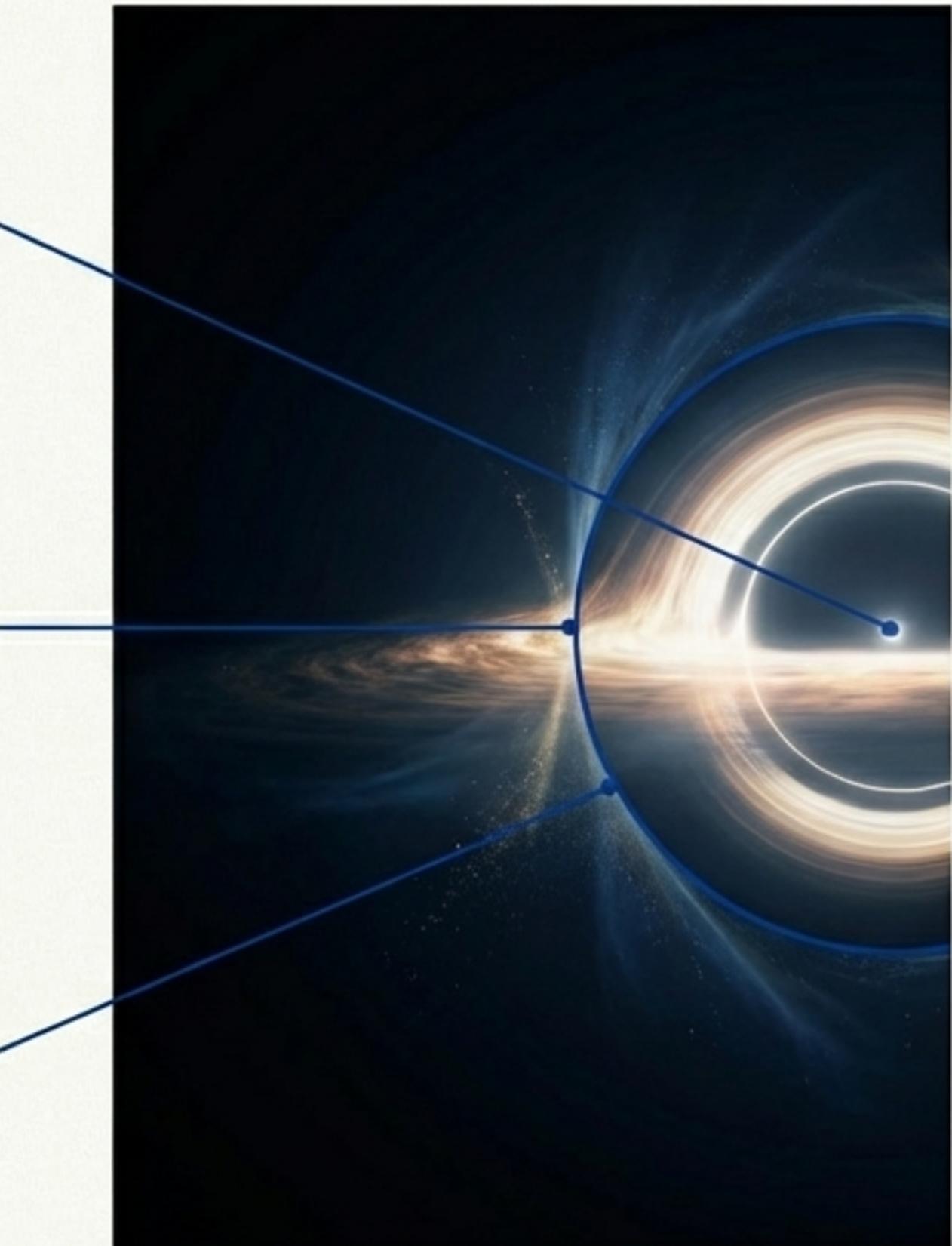
This is the first-ever direct image of a black hole, M87\*, located 55 million light-years away. Captured by the globe-spanning Event Horizon Telescope, it shows the shadow of the black hole against the hot, glowing gas orbiting its point of no return: the event horizon.

# The anatomy of a cosmic gravity well.

**Singularity:** A one-dimensional point at the center where gravity is infinite and the laws of physics break down.

**Event Horizon:** The boundary beyond which escape is impossible. It is the 'surface' of the black hole.

**Hawking Radiation:** A theoretical concept suggesting that black holes slowly evaporate over immense timescales, releasing faint thermal radiation.

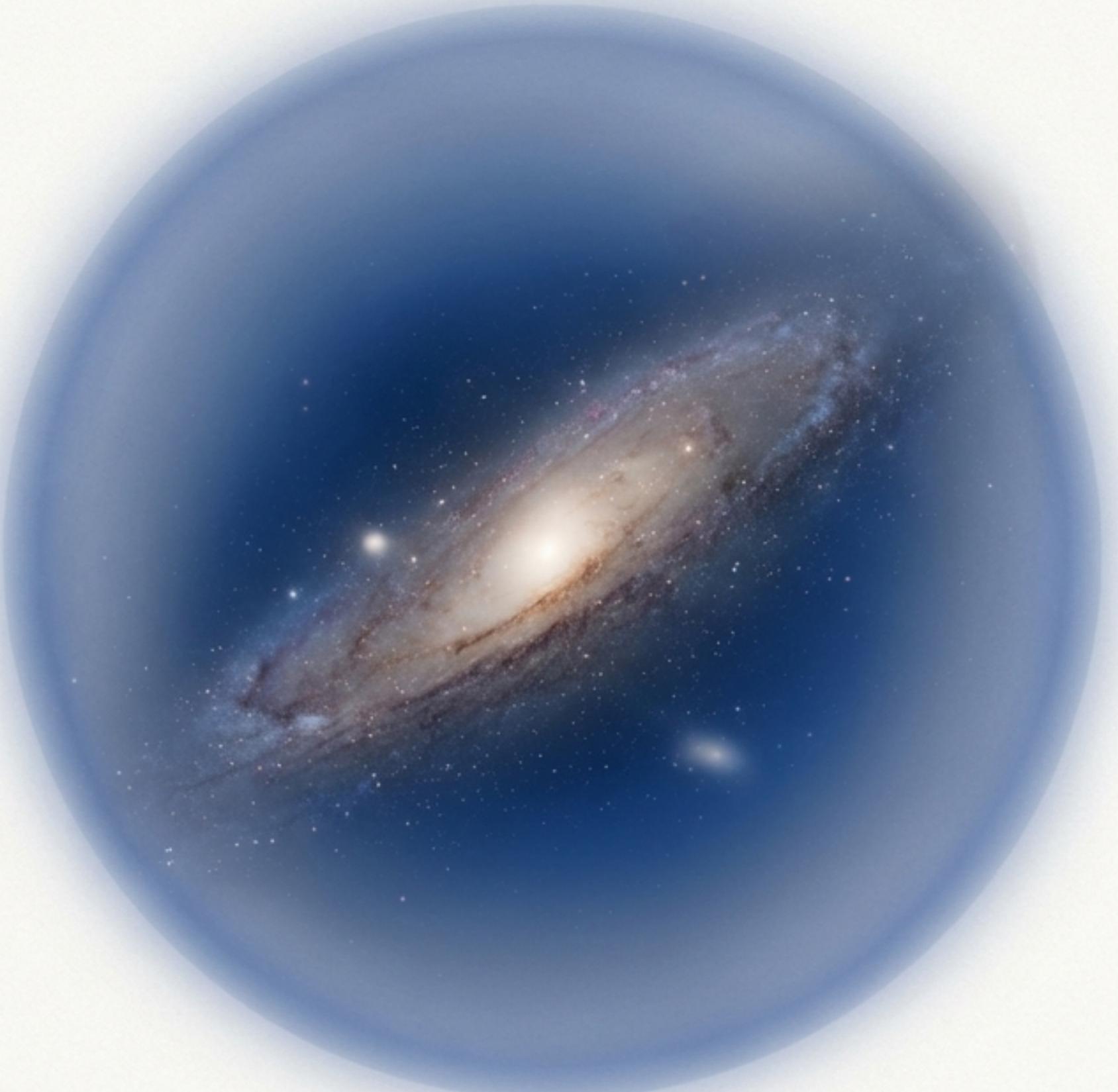


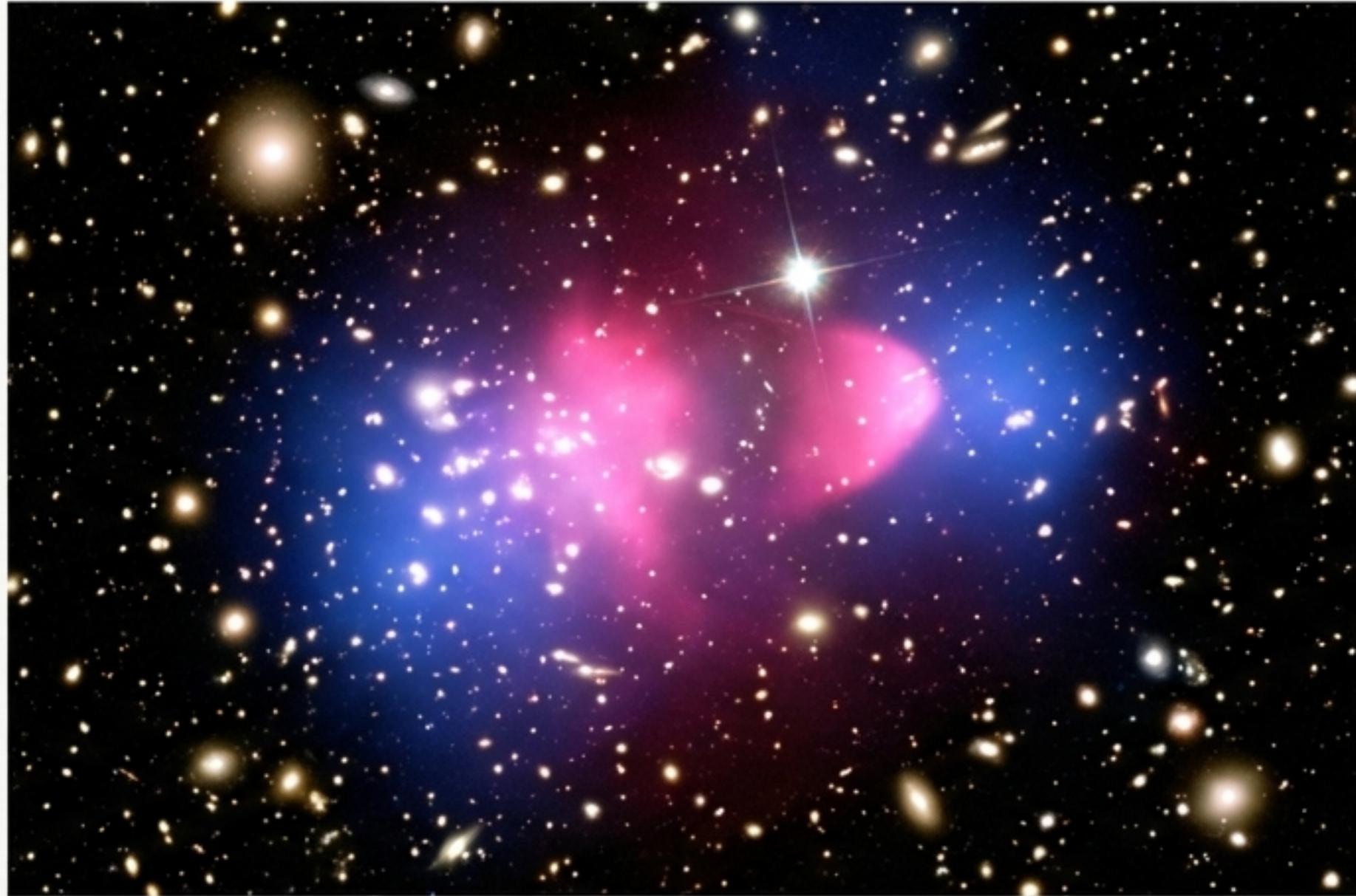
# **There is a hidden scaffolding that holds galaxies together.**

Observations show that galaxies are spinning so fast they should fly apart. The gravity of their visible stars is not enough to hold them.

This implies the existence of an invisible substance providing the extra mass: Dark Matter.

It constitutes 27% of the universe.

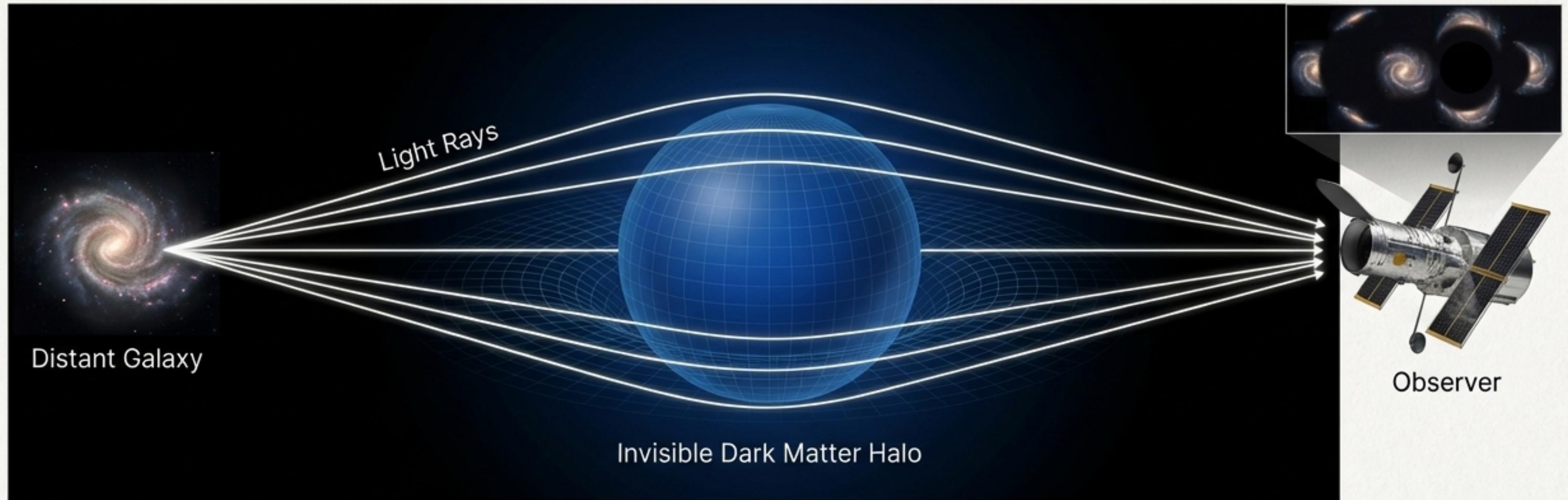




## The smoking gun: A collision of galaxy clusters.

The Bullet Cluster is the result of two galaxy clusters colliding. The hot gas (normal matter, shown in pink) crashed and slowed down. But gravitational mapping (blue) shows that the majority of the mass—the dark matter—passed straight through without interacting.

# We ‘see’ the invisible by watching how it bends light.



According to Einstein's theory of relativity, mass warps spacetime. The immense mass of dark matter acts like a cosmic magnifying glass, bending and distorting the light from galaxies located behind it. This effect, called gravitational lensing, allows us to map its presence.



## The hunt for dark matter is one of the great quests of modern science.

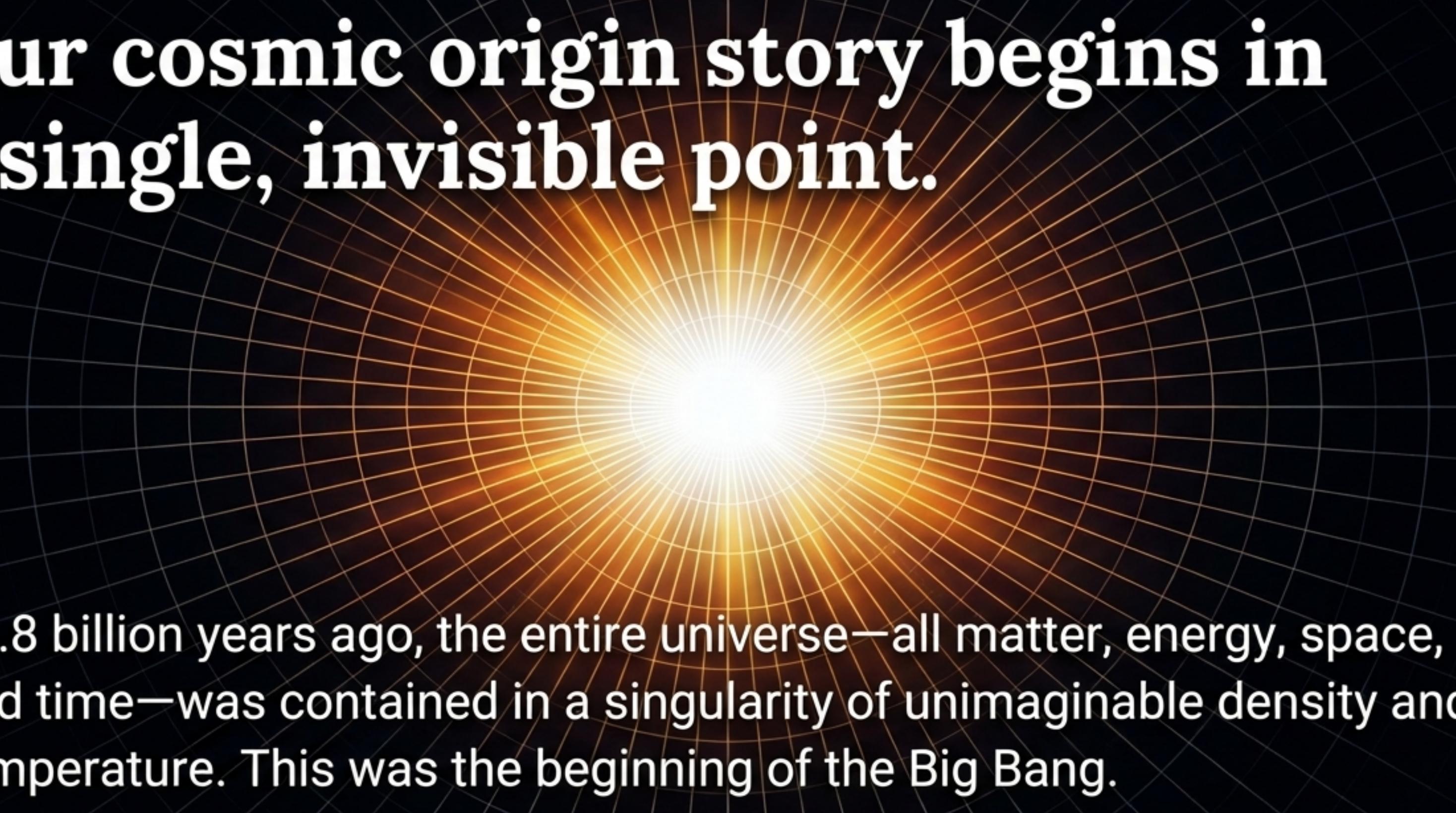
We know it's there, but we don't know what it is. It does not interact with light or normal matter. Physicists are searching for it in deep underground labs and with powerful colliders. Leading candidates for the dark matter particle include:

WIMPs (Weakly Interacting  
Massive Particles)

Axions

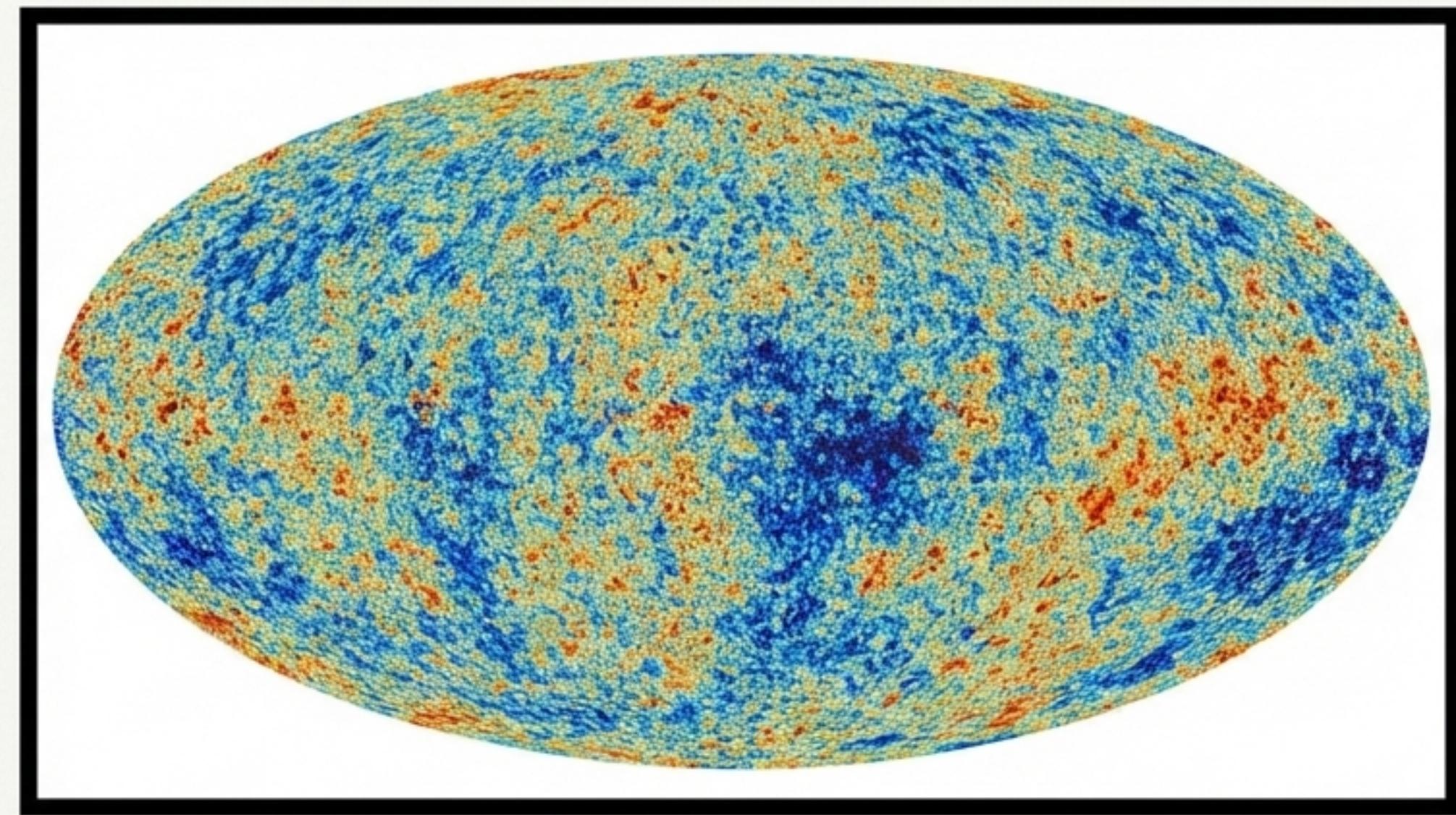
Sterile Neutrinos

# Our cosmic origin story begins in a single, invisible point.



13.8 billion years ago, the entire universe—all matter, energy, space, and time—was contained in a singularity of unimaginable density and temperature. This was the beginning of the Big Bang.

# This is the universe's baby picture.



This is the Cosmic Microwave Background (CMB). It is the oldest light in the universe, a "fossil" from just 380,000 years after the Big Bang. The tiny temperature fluctuations (the colors) are the seeds from which all future structures, including our own galaxy, would eventually grow.

Looking out into the universe  
is looking back in time.

Because light takes time to travel across cosmic distances, the farther we look, the earlier in the universe's history we see. Telescopes like Hubble are time machines. The most distant galaxies in this image appear to us as they were over 13 billion years ago, when the universe was in its infancy.

Early Universe (Most Distant Galaxies, ~13+ Billion Years Ago)

10 Billion  
Years Ago

1 Billion Years  
after Big Bang

Present Day (Nearby Galaxies)

# **Galaxy clusters are the great laboratories of the cosmos.**

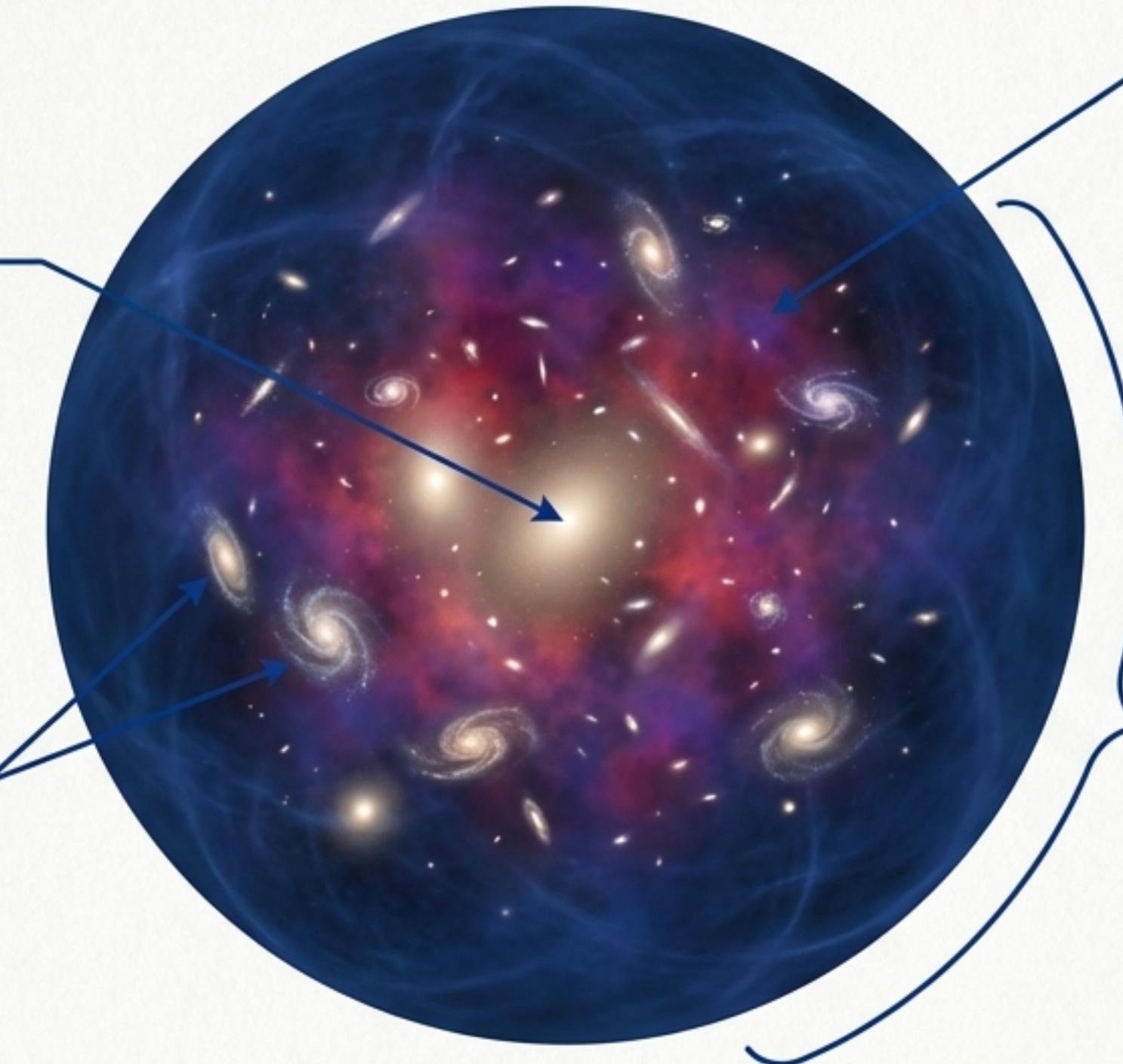
These are the most massive gravitationally-bound objects in the universe, containing thousands of galaxies, vast clouds of hot gas, and enormous halos of dark matter. In these cosmic crucibles, all the components of the universe interact on the grandest scale.



# Here, all the pieces of the invisible universe connect.

**Supermassive Black Holes**  
reside at the centers of  
the largest galaxies.

**Galaxies (Visible Matter)**  
orbit within a gravitational  
field dominated by an  
unseen force.



**Hot Gas** (also visible  
matter, but seen in  
X-rays) fills the space  
between galaxies.

**A Dark Matter Halo**  
provides the vast, invisible  
scaffolding that holds the  
entire structure together.



**“The invisible universe isn’t just  
just around us. It is us.”**

We live in a universe where 95% of everything is hidden from view, where light itself cannot escape certain regions, and where the echoes of creation still whisper across the cosmos. We are built from the remnants of this grand, invisible architecture. And we are only just beginning to understand it.