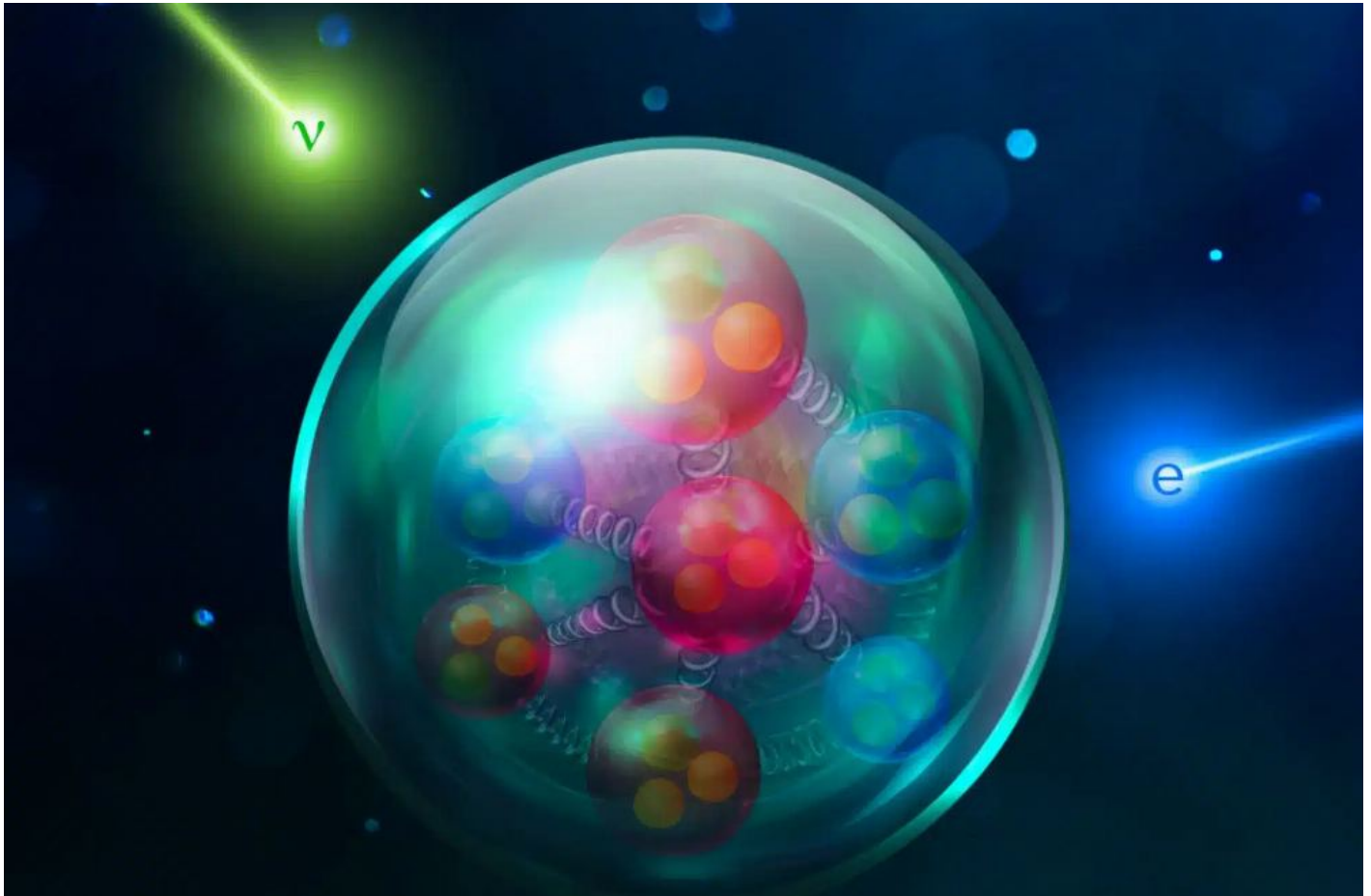


What is NOvA (NuMI Off-axis ve Appearance) Experiment?

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About NOvA (NuMI Off-axis ve Appearance):

- It is an experiment **to study** one of nature's most elusive particles: **neutrinos**.
- It is **managed by the U.S. Department of Energy's Fermi National Accelerator Laboratory**, located outside of Chicago, **United States**.
 - Fermilab **sends a beam of neutrinos 500 miles north to a 14,000-ton detector** in Ash River, Minnesota.
 - **By measuring the neutrinos and their antimatter partners, antineutrinos**, in both locations, **physicists can study how these particles change their type as they travel**, a phenomenon known as **neutrino oscillation**.
- **NOvA aims to learn** more about the **ordering of neutrino masses**.

What are Neutrinos?

- They are **elementary subatomic particles** with **no electric charge, very little mass**, and **1/2 unit of spin**.
 - They **travel at near lightspeeds**.
 - Neutrinos **belong to** the family of particles called **leptons**, which are **not subject to the strong force**.
 - They are often **called ‘ghost particles’** because they **barely interact with anything else**.
 - Neutrinos are, however, the **most common particle in the universe**. Approximately 100 trillion neutrinos pass completely harmlessly through your body every second.
 - **Every time atomic nuclei come together** (like in the sun) **or break apart** (like in a fission reactor or particle accelerator), **they produce neutrinos**.
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Q1: What is Antimatter?

Antimatter is the same as ordinary matter except that it has the opposite electric charge. It is also known as “mirror” matter. The antimatter particles corresponding to electrons, protons, and neutrons are called positrons, antiprotons, and antineutrons; collectively they are referred to as antiparticles. These anti-particles can combine to form anti-atoms and, in principle, could even form antimatter regions of our universe. Matter and antimatter cannot coexist at close range for more than a small fraction of a second because they collide with and annihilate each other, releasing large quantities of energy in the form of gamma rays or elementary particles. Antimatter was created along with matter after the Big Bang.

Source: New NOvA data deepens mystery of subatomic particle’s mass

Source: <https://vajiramandravi.com/current-affairs/nova-numi-off-axis-ne-appearance-experiment/>

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