



## High-Energy Neutrinos Detected

Recently, researchers have located a deep-space source for omnipresent subatomic particles called high-energy neutrinos. These observations have been made at the **Ice Cube Neutrino Observatory** at a U.S. scientific research station at the **South Pole in Antarctica**.

- Detection of neutrinos will provide the scientists a new way to expand the understanding of the Universe.

### Key Points

- High-energy neutrinos are produced by the same sources as cosmic rays, the highest-energy particles.
- Cosmic rays cannot be traced straight back to their source because strong magnetic fields in space alter their trajectory.
- Neutrinos are electrically neutral, undisturbed by even the strongest magnetic field, and rarely interact with matter. The direction from which they arrive points directly back to their original source.
- Neutrinos are produced during natural radioactive decays and all sorts of nuclear reactions in nuclear power reactors, particle accelerators or nuclear bombs.
- However, the most common sources of neutrinos are celestial phenomena i.e. the birth and death of stars, collisions, and explosions happening in space.

### Application of High Energy Neutrinos

- The high-energy neutrinos in astronomy enable a more robust examination because astronomers have relied upon electromagnetic observations (studying light) but this approach has limitations because too many aspects of the universe are indecipherable using light alone.
- Neutrinos are nature's ideal astronomical messenger because it can essentially escape their site of production and bring that information directly across the cosmos to their point of detection.

**Note:** The India-based Neutrino Observatory (INO) is located at the Bodi West Hills region in Theni District of Tamil Nadu.