



# Neutrinos

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**Neutrinos** play an important role in [particle physics](#) and **astrophysics**. It is a **fundamental elementary particle**, and atmospheric neutrinos can be studied when [solar radiation](#) hits the Earth's atmosphere.

## Neutrinos:

- Neutrinos are **subatomic particles** that have **no electric charge**, have a small mass, and **are left-handed (the direction of its spin is opposite to the direction of its motion)**.
  - They are the **second-most abundant particles in the universe after photons** and the most abundant among particles that make up matter.
- Neutrinos **interact with matter very rarely**, making them difficult to study.
- Neutrinos can change from one type (**electron-neutrino, muon-neutrino, tau-neutrino**) to another as they travel and interact with other particles, a phenomenon called **neutrino oscillation**.
- Neutrinos can **carry information across large distances** due to their low interaction rate with matter.
  - They could **potentially be used to transmit information, replacing electromagnetic waves in communication channels**.
- Physicists have built large and sensitive detectors to study neutrinos and maximise the number of interactions between neutrinos and the detector's matter.
- [India's Neutrino Observatory project](#) is proposed to be set up at **Pottipuram village in Theni (Tamil Nadu) in a 1,200-metre-deep cave**.

Read more: [Indian Neutrino Observatory](#)

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