India-based Neutrino Observatory(INO)

August 22, 2019
***Source**: PIB and INO website*

The Government of India has approved a project to build the India-based Neutrino Observatory (INO) **at Pottipuram in Theni District of Tamil Nadu**. Briefly, the project aims to set up a 51000 ton **Iron Calorimeter (ICAL) detector** to **observe naturally occurring atmospheric neutrinos in a cavern** at the end of an approximately 2 km long tunnel in a mountain

About the project

- The India-based Neutrino Observatory (INO) Project is a multi-institutional effort aimed at building a world-class underground laboratory with a rock cover for non-accelerator based high energy and nuclear physics research in India.
- It **measures cosmic rays.** There is no other neutrino detector anywhere in India at present. ICAL at INO would be the first of its type.

The Project includes:

- **Construction of an underground laboratory and associated surface facilities at Pottipuram in Bodi West hills of Theni District of Tamil Nadu**
- Construction of an Iron Calorimeter (ICAL) detector for studying neutrinos, consisting of 50000 tons of magnetized iron plates arranged in stacks with gaps in between where Resistive Plate Chambers (RPCs) would be inserted as active detectors. Determination of neutrino masses and mixing parameters is one of the most

important open problems in physics today. The ICAL detector is designed to address some of these key open problems in a unique way.

- Setting up of National Centre for High Energy Physics at Madurai, for the operation and maintenance of the underground laboratory, human resource development and detector R&D along with its applications.

What are Neutrinos?

Neutrinos are fundamental particles belonging to the lepton family. They come in three flavours, one associated with electrons and the others with their heavier cousins the muon and the Tau. According to standard model of particle physics, they are mass less. However recent experiments indicate that these charge-neutral fundamental particles, have finite but small mass which is unknown.