

PROJECT

The India-based Neutrino Observatory (INO) Project is the brain child of scientists from nearly 25 Research Institutes and Universities in India with Tata Institute of Fundamental Research

(TIFR) as the host institute. The observatory is devoted to study the properties of Neutrinos, the elusive elementary particle about which little is known.

Just as a Telescope observes the sky through visible light, INO will enable scientists to observe the sky through neutrinos. These neutrinos emanate from the Sun and other stars, supernovae, our own atmosphere and are there as relics from the birth of the Universe.

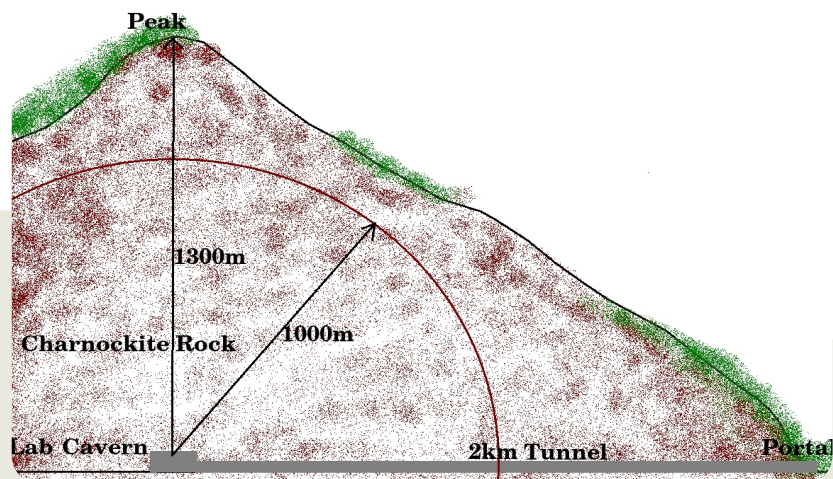
The Project is an ambitious one, and plans to employ the world's most massive magnetized detector for neutrinos. The detector is based on a magnetized iron calorimeter, developed indigenously. The project is estimated to cost around Rs. 900 Crores.

NEUTRINOS

Neutrinos are elementary particles produced in the course of energy generation by celestial bodies. They have a tiny mass whose value is still not known. The proposed Observatory will enable scientists to know about the properties of neutrinos, which in turn would provide clues to understand the mechanism of energy production in the Sun, and the origin of the Universe itself.

In spite of their presence in copious numbers, neutrinos are difficult to detect except in an environment free of radiation such as Cosmic rays and other natural radiation that is already present on the Earth. A radiation free ambience can be created only if the detectors are enveloped by more than 1000 metres of rock mass. Hence, Neutrino observatories are set in underground laboratories, situated in deep

mines or in special man made caves inside tall mountains. At present, there are four underground neutrino observatories functioning in the world in Sudbury in Canada, Kamioka in Japan, Gran Sasso mountains in Italy and Soudan mines in



USA.

SITE

INO project envisages two large man made caves in a mountain to house the observatory's detector. The steep slopes with geologically stable and dense rocks found in the mountains of Western Ghats of Tamil Nadu are ideal for locating the caves. While Singara in Nilgiris district and lower Suruliya in Theni district are among the best suited sites for the project, these are ruled out owing to their proximity to Wild Life Sanctuaries. Scientists consider the West Bodi Hills near Pottipuram in Theni District as a viable site. Access to the caves cut deep inside the mountain will be through a horizontal tunnel of about 2 km length.

EXECUTION

The project is expected to take about five years for execution. When completed, it will provide opportunities for about 200 scientists annually to participate in experiments, with about 20 scientists located at the site at any given time.

Besides neutrino studies, the facility would be open to scientists needing a clean and controlled environment for carrying out experiments in other scientific areas like Geology and Biology.



Prototype Stack at TIFR, Mumbai.