Graduate Training Program of the INDIA-BASED NEUTRINO OBSERVATORY

http://www.ino.tifr.res.in/ino/

About INO

The existence of non-zero neutrino masses has profound implications on fields as varied as nuclear physics, geophysics, astrophysics and cosmology apart from being of fundamental interest to particle physics. The discovery of neutrino mass and oscillation is but a first step and there are several questions that may require different experiments spanning many decades to be resolved. We still do not know the scale of neutrino mass, we only partly know the extent of mixing and not even sure if the neutrino is its own antiparticle or not. The experimental field of neutrino physics is now moving into a phase where decisive and high precision experiments are needed. It was in this context that an initiative began to take shape a few years ago leading to the idea of the India-based Neutrino Observatory (INO).

Neutrino detectors have to be shielded from background radiation so that the neutrino signals can be easily identified. The detectors in INO will be placed inside a mountain at Theni near Madurai in South India. The rock burden of over 1 km on all the directions shields the detector from other cosmic rays. The geographical location is particularly interesting, as all the existing neutrino detectors are at latitudes larger than 35 degrees N or S. There is none close to the equator as yet.

Experiments

The INO project will host many neutrino experiments. The main experiments on the cards are listed below.

Iron Calorimeter (ICAL)

This massive detector (50 kton), with Resistive Plate Chambers (RPC) as active detector elements has been designed to achieve a statistically significant number of neutrino interactions in a reasonable time frame with good energy and angular resolution. The magnetic field in the detector gives the possibility of distinguishing between neutrino and anti-neutrino interactions.

Neutrinoless double beta decay

This experiment will reveal the nature of neutrinos (Majarona or Dirac) using low temperature bolometric detectors. A crucial criterion for detector design for this experiment is high energy resolution for a precision measurement of the sum energy of two electrons emitted in the decay.

Main Goals of INO

- Unambiguous and more precise determination of oscillation parameters using atmospheric neutrinos.
- Study of matter effects through electric charge identification,
- Study of CP violation in the leptonic sector and possible CPT violation studies.
- Study of very-high energy neutrinos and multi-muon events.
- Study the nature of neutrinos (Majarona or Dirac)

GTP

A large number of well trained physicists and engineers will be needed to lead the experimental activities in high energy physics to be carried out using the INO facility. In order to achieve this goal, a graduate training program (GTP) with strong emphasis on experimental high energy physics was started in August 2008.

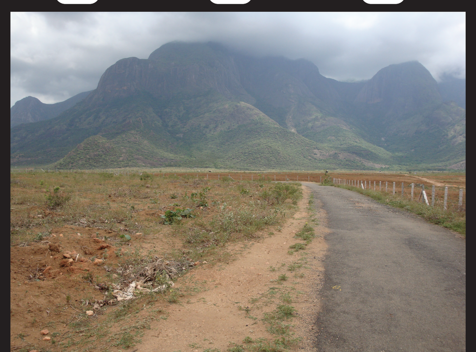
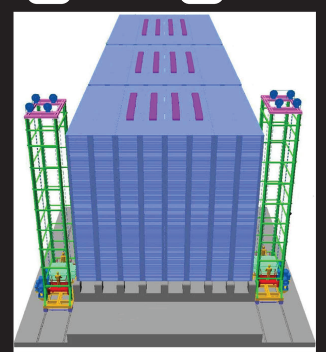
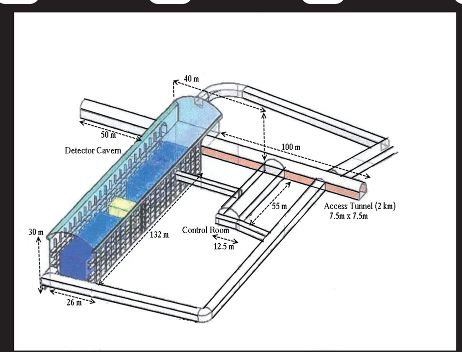
The application procedure and written test for this program is combined with the TIFR's Graduate School Admissions. Please visit the website http://univ.tifr.res.in/gs2011 for applying as well as for all other detailed information.

The selected candidates will be enrolled as Ph.D. students of the Homi Bhabha National Institute and will take up 1 year course work at TIFR, Mumbai in both theoretical and experimental high energy physics and necessary foundation courses specially designed to train people to be good experimental physicists. Successful candidates after the course work will be attached to Ph.D. guides at various collaborating institutions.

Eligibility:

Applicants must have a minimum qualification of M.Sc. in Physics or B.E./B.Tech. degree in any one of Electronics, E & CE, Instrumentation and Electrical Engineering subjects with strong motivation for and proficiency in Physics.

The applicants must also have secured a minimum of 55% of marks in the respective qualifying examinations.

Contact:

Prof.Naba Mondal, (nkm@tifr.res.in)
Spokesperson, India-based Neutrino Observatory,
Dept. High Energy Physics,
Tata Institute of Fundamental Research,
Homi Bhabha Road, Mumbai 400005, INDIA