INDIA-BASED NEUTRINO OBSERVATORY

EXECUTIVE SUMMARY
A unique science laboratory is coming up deep inside the mountains in Idukki-Theni districts of Kerala and Tamil Nadu in India for neutrino research. The lab has to be located in deep underground with 'walls' and roof of at least 1000 meter thickness for filtering the cosmic rays. There will be a big laboratory of 3432 sq meters in area and 32.5 meters in height and three smaller ones of 1600 sq m and 10 m high. The length of the tunnels will be 2491 meters and its portal of entry is in Theni district of TN. The projected life of the lab is 120 years. This mega science project of the Department of Atomic Energy (DAE) costing Rs 1,300 crores was approved for XI^{th} five year plan. Tunneling will start soon. High energy neutrinos manufactured in Neutrino Factory at Chicago in USA will be beamed towards INO to study the changes occurring during the journey.

Neutrinos are part of a group of fundamental particles known as leptons. There are 12 fundamental particles -6 leptons and 6 quarks. All matter in the universe are thought to be made of these particles. Neutrinos are produced in Sun and other stars. They travel in straight line at near speed of light. They come in different energy levels starting with a few electron volts (eV) to trillions and even higher eV. Sun is the major source of neutrinos on earth. Every second more than 6 million solar neutrinos pass through every square centimeter area of our body. Most of these are of low energy of Million eV (MeV). Solar neutrinos and other low energy neutrinos are not hazardous as they interact with other matter particles extremely rarely. Occasionally particles of ultra-high energy are also seen and they interact with matter more often and create radioactive particles. A collimated high energy neutrino beam hitting an atom bomb hidden in a silo or submarine can cause its explosion. High energy neutrino beams can also be used as a tactical weapon to kill a small group of leaders/commanders with high radiation within minutes. This is useful for 'regime changes' or 'war against terrorism'. Since neutrinos cannot be blocked by any material, this is a defense-less weapon. No time for early warning either.

INO site selection was not transparent. There are several issues concerning the safety of the people and the Eco-system which need to be discussed and resolved. The key issues of concerns are listed below:

VIOLATION OF Federal Principles: According to DAE, the tunnel will end at the Kerala border and the laboratories (caverns) will be in Tamil Nadu. From the sketch and descriptions given in the project documents, 700 meters of the tunnel and the main cavern and the two smaller ones will be under Kerala. Sanction has been obtained from the Government of Tamil Nadu; Government of Kerala has not even been informed. Since even a hairline crack in the wall (one km wide) or the roof can topple the detector, digging of wells or
development projects like irrigation tunnels, mining etc. will have to be banned within a kilometer from the laboratory cave.

RADIOACTIVE CONTAMINATION: Official studies conducted in US and Europe show the potential of high dose radiation-contamination, hundreds of kilometers away from the factory and detectors. Most of the neutrinos beamed from Chicago will pass through the detector laboratory and emerge through the land above the laboratory. Radioactive particles like carbon14 and tritium will be generated at the point of emergence and these can travel long distances along with stream and groundwater.

MPACT ON DAMS –Idukki is a geologically sensitive district with a dozen reservoirs (within 60 km of INO) holding some four billion cubic meters of water which is the lifeline for three districts in TN and Kerala. Dams can be impacted in two ways: (1) Explosion induced seismicity. The cave making involves removal of 800,000 tons of hard rock with about 5 to 10 lakh kg of explosives, 3 times a day for three-four years. (2) Radioactive contamination of water. If radiation-contamination occurs, the dams will have to be emptied. Farm products can also be contaminated which can cause the collapse of the plantation economy and tourism.

ACCIDENTS LIKE BEAM MISDIRECTION. Under accidental conditions like loss of electricity, beam misdirection is possible. In such cases, if the beam emerges through high-occupancy places like schools can irradiate a lots of people will be harmed.

INO’s is a part of the US Fermilab project. Its mandate is to provide information on the quality of neutrinos detected at INO to the US lab, more or less like a hospital undertaking drug trials. The project proposal was written by scientists of Fermilab and submitted to the Indian Planning Commission for funding in Feb 2006. US is not likely to share the weapon developed with India. Details of this collaboration with US are not available in any of the document or official websites in India.

The idea of using neutrino as a weapon was first floated in 2003 by the scientists from Japan. The existing and the planned research can lead to the weapon. The neutrino weapon issue has not been discussed by the global disarmament community consisting of agencies of the governments/United Nations and also the peace movements. The societal, ethical and other aspects of these studies should be discussed widely.

Cave making will generate about one million tons of muck, of which one lakh tons will be in dust form and 10,000 tons in nanometer size. This can contaminate the farmlands and water sources in TN portion. We have only highlighted the known hazards of neutrinos published by scientists working with the neutrino research establishments. The knowledge about neutrinos is extremely limited. Even though billions of them are flying around, none of them are similar to the factory-produced ones. One does not know if their passage through different layers of earth can cause other major impacts like earthquakes. Because something like this has never happened before. There is also a concern that the Department of Atomic Energy may use the underground space for storing their high level radioactive waste from 20+ nuclear power plants. An underground space with more or less unlimited scope for expansion and nobody to monitor is tempting.

Neutrino research has immense physics potential and societal value as well. The research will have implications for astrophysics, phenomenology and particle physics. Neutrinos hold the key to several fundamental questions on the origin of the Universe and the energy production in stars. Neutrinos can be used for tomography of the earth and human body also and they are less hazardous than X-rays. Neutrinos
may tell us more about dark energy and dark matter and ultimately help us exploit them as the earth is getting depleted of its material and energy sources.

However, its site related safety risks and global issues related to weaponization should be discussed openly and the project need to be placed for public scrutiny.

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**Brief Biodata:  VT Padmanabhan**

Studied in Gauhati University (BA), University of Poona (MA) and Jawaharlal Nehru University, Delhi (MCH)

Studied the site and machine-related safety risks posed by the Kudamkulam Nuclear Power Plant (KKNPP) in Tirunelveli district of Tamil Nadu

Studied the health effects of ionizing radiation among the workers and their progenies in the Indian Rare Earths, BARC, TAPS and MAPS

Radiation monitoring around the Madras Atomic Power Plant

Health studies of people living in proximate (6, 40 km) and distant (400 km) villages of the Madras Atomic Power Station (MAPS), Kalpakkam

Radioactive waste disposal in River Periyar/Arabian Sea and Unsafe storage of radioactive materials by the Indian Rare Earths Ltd (IREL), Eloor, Kerala

Genetic effects of ionizing radiation among children born to people exposed to high natural background radiation region (Chavara-Neendakara) in Kerala

Review of genetic and somatic studies of bomb survivors and their offspring in Hiroshima-Nagasaki

Genetic effects among children of people exposed to MIC gases IN Bhopal disaster of 1984 (from Union
Carbide/Dow Chemicals)

Occupational hazards and environmental problems caused by the Gwalior Rayon plant at Nagda, Madhyapradesh.

Reduction of birth weight of children born during the operation of CocaCola bottling plant at Plachimeda in Kerala

Currently working on (a) Neutrino weapons and (b) Space Weather Anomalies

**Affiliations**

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WEAPON IDEA


COLLABORATION WITH USA


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INDISTINGUISABLE FROM MAGIC” - Arthur C Clarke