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C. SCHUR

# India digs deep to build neutrino lab

India's high-energy physicists have been given the go-ahead to build an underground laboratory to study neutrinos.

The plan to investigate these elusive subatomic particles has been in the works since 2001. But the Department of Atomic Energy has now given it the green light and the nation's planning commission has approved its funding, says Naba Mondal, a physicist at the Tata Institute of Fundamental Research in Mumbai and spokesman for the project. It is expected to cost US\$170 million to build and should be online by 2012.

Home for the India-based Neutrino Observatory (INO) will be a man-made cave about 2 kilometres beneath the tallest peak of the Nilgiri Hills, 250 kilometres south of Bangalore. The rock above it will shield the observatory from unwanted cosmic radiation.

Initially, the lab will study neutrinos

produced by cosmic rays in Earth's atmosphere. "A large experiment whose goal is to study atmospheric neutrinos has never been built," says Maury Goodman, a neutrino physicist at Argonne National Laboratory in Illinois. "In that way the INO is unique and important."

The INO will use a 50,000-tonne magnetized iron calorimeter to detect particles called muons that are produced on the rare occasions that neutrinos interact with matter. Because the detector can distinguish between muons with a positive and a negative charge, says Mondal, it should help researchers to work out the respective masses of the three types of neutrino.

John Learned, a physicist at the University of Hawaii at Manoa in Honolulu, says the iron detector is an "excellent choice" that will

also allow the study of neutrino 'oscillations' — when one type of neutrino changes into another as it travels through space.

The INO aims to recapture the pioneering spirit of studies in a gold mine in Kolar,

**"This could bring about a resurgence of the expertise in particle astrophysics in India."**

southern India, which led to the detection of atmospheric neutrinos in 1965. But the facility was abandoned in 1992, and many researchers left for abroad.

Now, India wants to revitalize its neutrino physics community. The INO collaboration currently includes at least 100 scientists from 18 Indian institutions and the University of Hawaii. Learned says the project is likely to bring about "a resurgence of the expertise in particle astrophysics in India".

Project scientists are also in talks with US, Italian and Japanese researchers about collaborating, says Mondal. **K. S. Jayaraman**

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