

INSTITUT FÜR ISOTOPENFORSCHUNG UND KERNPHYSIK  
DER UNIVERSITÄT WIEN

E I N L A D U N G

zum

I N S T I T U T S S E M I N A R

von

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**The Gran Sasso underground laboratory:  
a review of the research activities and  
the laboratory facilities**

The Gran Sasso underground laboratory (LNGS) is located about 130 km East from Rome in Italy. The 3800 m.w.e. coverage (1400 m of rock), the characteristics of the surrounding rocks and the easy access make the LNGS the first underground laboratory in the world. The laboratory consists of three main experimental halls and several service tunnels for a total volume of about 180,000 m<sup>3</sup>. Low background facilities are installed and under way in the laboratory to search for neutrino physics with neutrinos coming from the Sun, the Earth and from Supernovae; to search for rare events such as WIMPs, as cold dark matter candidate, and neutrinoless double beta decay; and to search for nuclear reactions of astrophysical interests.

After the first attempt to search for neutrinos outside the Earth by Homestake and Kamiokande the interest in (extra)galactic neutrino physics has grown. New data from a second generation of experiments (SNO, SuperKamiokande, GNO, KamLAND) have confirmed that neutrinos are massive particles as suggested by the first results. Further underground measurements can shed light on the way stars shine and supernovae collapse. Moreover, the discovery of neutrinoless double beta decay can show whether neutrinos are Dirac or Majorana particles. For these and other reasons the Gran Sasso laboratory can play a leading role in the underground physics over the next ten coming years. In the talk the main characteristics of the laboratory are reviewed and the fundamental research goals are discussed together with some of the existing and under way projects.

**Donnerstag, 04. März 2004, 16:30 Uhr**

**1090 Wien, Währingerstr. 17, "Kavalierstrakt",  
1. Stock, Seminarraum von VERA**

P. Hille

W. Kutschera