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Expression of Interest to participate in the Study,
Construction and Use of a Neutrino Facility at the
Gran Sasso Laboratory

Humboldt University of Berlin:
K.Winter, 2 students

University of Bochum:
Cl.Rolfs, U.Greife, M.Junker

A.Geiser, from University of Dortmund

University of Hamburg:
F.-W.Buesser, K.Hoepfner, R.Klanner, B.Naroska, W.Schmidt-Parzefall

IPN Lyon :
L.Chaussard, M.Chemarin, Y.Déclais, J.Fay, S.Katsanevas, I.Laktineh

LAL Orsay :
J.E.Campagne, J.P.Repellin

LAPP Annecy :
J.Favier, H.Pessard

CERN LIBRARIES, GENEVA



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contact person : Yves.Declais@IPNL.IN2P3.FR

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We intend to participate in an experimental program to further study the implications of the anomaly of the atmospheric neutrino flux reported by the Super-Kamiokande experiment and the supporting evidence from the SOUDAN II- and MACRO-experiments. We are of the opinion, that these results open up a new era in neutrino physics to which Europe should contribute with a powerful neutrino facility at the Gran Sasso laboratory with the following elements:

1. A flexible, high intensity neutrino beam from CERN to Gran Sasso, which (depending on the development of the experimental situation) can be optimized for e.g. ν_τ appearance and/or ν_μ disappearance experiments.
2. A detector able to provide:
 - a high statistics sample of $\nu_\mu CC$ and $\bar{\nu}_\mu CC$ fully measured events (including the charge of the muon) from atmospheric neutrinos with the potential to establish the oscillation pattern in the L/E distribution and perform a precise measurement of Δm^2 in a wide range ($5 \cdot 10^{-3} \rightarrow 2 \cdot 10^{-4} eV^2$) for large values of $\sin^2(2\theta)$. The muon charge information will allow, for the first time, the search for CP violation effect. In addition the study of muon-less events may help in disentangling ν_τ from ν_s channels (hep-ph/9805249).
 - a background free identification and measurement of ν_τ from the CERN neutrino beam, as a demonstration of the physics origin of the atmospheric neutrino anomaly,
 - a high statistics measurement of the energy spectrum of charged current events and of the ratio of neutral to charged current events from the CERN neutrino beam. The decision about the construction of a close detector, needed in this measurement, can be taken once the result of the K2K experiment will be known.

We see the possibility of a combined detector including a background-free ν_τ appearance experiment and an optimised high mass (several tens of ktons), high resolution calorimetric detector including a magnetic muon spectrometer. We consider the OPERA-LOI, NICE-EOI and the ideas expressed in hep-ph/9805249 as interesting starting points. As a next step we plan to optimise and propose a detector for such a neutrino facility at the Gran Sasso laboratory in collaboration with the already existing groups.