

LABORATORI NAZIONALI DEL GRAN SASSO

SEMINAR ANNOUNCEMENT

On February 26, 2008 at 2:30 pm, Alexander Studenikin
from Department of Theoretical Physics, Moscow State University
will give a seminar entitled:

“Neutrinos and electrons in dense matter: a new approach”

Abstract:

I present a quite powerful method in investigations of different phenomena that can appear when neutrinos propagate in dense matter. The method is based on the use of the modified Dirac equations for particles wave functions in which the correspondent effective potentials account for the matter influence on particles. For several particular cases we have found the exact solutions for particles energy spectra and wave functions in matter. On this basis, such phenomena as neutrino trapping and reflection, neutrino-antineutrino pair annihilation and creation in medium can be considered. With use of the same method a neutrino motion in rotating medium is also discussed. We show that the neutrino energy spectrum exhibits very exiting properties: neutrino motion in the plane transversal to the matter rotation axes is quantized and can be interpreted as a set of circular orbits very much like the well known Landau levels for an electron moving in a constant magnetic field. A new mechanism of the electromagnetic radiation that can be emitted by a neutrino or electron when these particles move in a dense medium (“spin light of neutrino” and “spin light of electron”) are also considered within the developed method.

(“B. Pontecorvo” room)