



Séminaire du Laboratoire de l'Accélérateur Linéaire

Amanda Porta

CEA

Jour et salle inhabituels

Vendredi 6 Mars 2009 à 11 :00

Reactor neutrino detection for non proliferation with the Nucifer experiment

The idea of using a neutrino detector to monitor nuclear reactors was firstly proposed in the 1977 by Mikaelian. Tremendous progresses have been achieved since then in both detection technology and understanding of fundamental neutrino physics. This allows for an application of reactor neutrino detection to thermal power measurement and survey of the isotopic composition of the reactor fuel. In France, the Double Chooz collaboration plans to use their near detector for a precision nonproliferation measurement. The motivation of the Double Chooz experiment is to measure the θ_{13} oscillation parameter by comparing the reactor neutrino fluxes in two identical detectors located respectively at 400 m and 1 km away from the cores. Since the Double Chooz near detector design is too complex and costly for widespread safeguard use, part of the Double Chooz collaboration decided to apply their experience to the development of a small, compact and simple detector dedicated to reactor safeguards : Nucifer. The design of such a small neutrino detector (~ 1 ton of Gd doped liquid scintillator) has been focused on maintaining high detection efficiency ($\sim 50\%$), good energy resolution and background rejection. The detector response to reactor neutrinos has been simulated and I will present the Nucifer sensitivity to illicit retrieval of Pu from the core. The final detector will be tested at two research reactors and finally validated at a nuclear power plant. The Nucifer project and preliminary sensitivity studies have been presented in October at the International Atomic Energy Agency (IAEA) which has expressed its interest in the potentialities of this detector as a new safeguards tool.

Salle 166 du LAL - Bât. 200, Orsay

Thé et café seront servis 1/4 h avant le séminaire