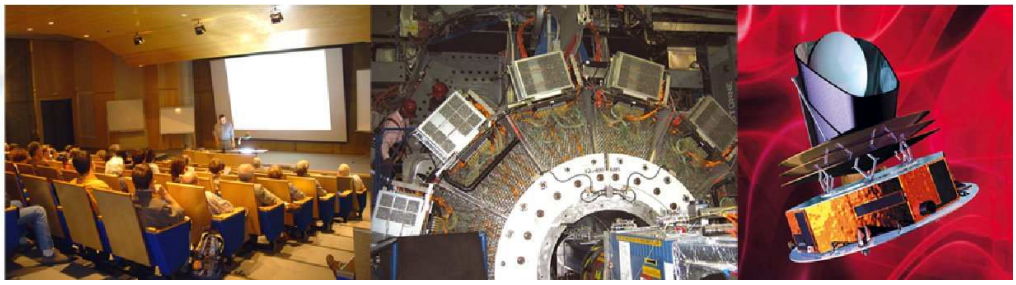
LABORATOIRE DE L'ACCÉLÉRATEUR LINÉAIRE



Séminaire du Laboratoire de l'Accélérateur Linéaire

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CSNSM

Mardi 10 Mars 2015 à 11 :00

Scintillating bolometers for double-beta decay search

A significant progress on the development of scintillating bolometers (cryogenic particle detectors) has been achieved over the past decade. A bolometer operates at very low temperatures, close to absolute zero, and records a small amount of a heat released by a particle interaction with a detector. A scintillating bolometer is a composite detector which consists of two independent bolometers : one of them is used as a particle detector based on a volumetric dielectric crystal, while the other one is based on a thin slab and dedicated to the detection of a small fraction of scintillation light emitted by the main detector. Simultaneous recording of the heat and the light signals provides powerful particle identification and therefore control (and selection) of the components of the background. This feature together with excellent spectrometric performance, typical for bolometers (high energy resolution and detection efficiency), and possibilities to develop radiopure crystal scintillators make these devices very promising for application in rare events searches, e.g. neutrinoless double-beta decay. The interest in this process (a very rare hypothetical nuclear transformation) is related with several fundamental problems, such as the lepton number non-conservation, the origin the absolute scale and the ordering of the neutrino masses and some other effects beyond the Standard Model of particle physics. This review summarizes the results of recent R&D activities on the development of materials suitable for high-sensitivity searches for double-beta decay with the scintillating bolometer technique. The main focus will be devoted to the LUMINEU (Luminescent Underground Molybdenum Investigation for NEUtrino mass and nature) program funded by Agence Nationale de la Recherche (France).

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Thé et café seront servis 5 mn avant le séminaire

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