Postdoctoral position in experimental nuclear or particle physics

The Nuclear Physics Department (DPhN) of Irfu/CEA at Saclay (France) is looking for an experimental nuclear or particle physicist in order to participate to the neutrino detection activities of the LEARN laboratory. The post-doctoral contract is for one year, renewable once by common agreement.

The LEARN laboratory has launched some years ago the STEREO project with the objective of performing the most precise measurement of the U-235 thermal-fission antineutrino spectrum with a segmented detector placed at short distance from the research nuclear reactor of Grenoble in order to understand an observed anomaly in the reactor anti-neutrino rate. More recently, the laboratory entered the emerging NUCLEUS collaboration that aims for the detection of coherent elastic neutrino-nucleus scattering using ultra-low-threshold cryogenic detectors.

The candidate is expected to take a significant part in the simulation of the STEREO and NUCLEUS detection systems by extending our collaboration with the LEPh laboratory - Reactor and Cycle Physics Group (SPRC) of CEA. The STEREO detector is based on Gd-loaded liquid scintillator technology and a key element of the control of its response is the accurate simulation of the gamma-ray de-excitation cascade of Gd after neutron capture. The FIFRELIN code, under development at LEPh and aiming to simulate the de-excitation of fission fragments in the context of reactor applications, was found to be well adapted to process the de-excitation of Gd in STEREO. A first collaborative work already showed to improve significantly the simulation of the response in STEREO.

The candidate will be in charge of the implementation of two new functionalities in FIFRELIN with the aim of improving the gamma-ray cascade description: the inclusion of the angular correlations between the successive gamma-rays, and the adaptation of the code to the most recent spectroscopic database. He/She will evaluate the impact of these improvements on the control of the response of the STEREO detector. The candidate will then apply FIFRELIN to a novel calibration technique proposed for the NUCLEUS bolometer.

The successful candidate must have a Ph.D. in nuclear or particle physics and should have demonstrated expertise in simulation and data analysis. Programming skill in C++ is mandatory. As the candidate will have to work in collaboration with scientists from other labs, good communication skills and a proactive behavior are required.

Candidates should send a cover letter describing their research activities, a Curriculum Vitae including a list of publications and two letters of recommendations. All application materials should be submitted to Thomas Materna (thomas.materna@cea.fr). Applications will be reviewed on an ongoing basis until the position is filled.