

« Observation of neutrinos from supernova with the JUNO experiment »

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Mots clés : supernovæ, étoiles massives, neutrinos, détection neutrinos

Compétences nécessaires : good knowledge in subatomic physics and associated instrumentation ; good knowledge in programming and data analysis - Programming in C++ and ROOT and possibly python ; capability to work in a team and in international projects ; communication skills (presentation of work to the regular meetings of the JUNO collaboration, participation to national and international conferences, contribute to the writing of articles, ...) ; fluent in English (written/spoken)

Sujet scientifique de la thèse : JUNO (Jiangmen Underground Neutrino Observatory) is an international multi-purpose project, under construction in Southern China, which aims to determine the mass ordering of neutrinos, perform a precision measurement of the oscillation parameters and detect neutrinos from multiple sources (nuclear reactors, Sun, astrophysical objects, atmosphere, Earth mantle,...). The thesis will focus on the optimization of the algorithms for reconstructing the interaction point of Supernova neutrinos using the energy and time information provided by the two photodetection systems and on the identification of the different neutrino flavors. The precise measurement of the time spectrum and energy spectrum of different neutrino flavors is crucial to discriminate between different explosion models and can provide an independent measurement of the neutrino properties (oscillations and mass). The work will also focus on the fine characterization of the detector response thanks to energy and time calibrations and a comparison to simulations.

Informations complémentaires : La thèse sera dirigée par Mariangela Settimo (mariangela.settimo@subatech.in2p3.fr) (directrice) à Subatech Nantes, Frédéric Perrot (fperrot@lp2ib.in2p3.fr) (co-directeur) au LP2I de Bordeaux et avec comme co-encadrant "astro" Sylvain Bontemps (sylvain.bontemps@u-bordeaux.fr) au LAB de Bordeaux.