

## Post-doctoral Position

**Subject:** Measurement of beta decay properties of nuclei of interest for nuclear structure and astrophysics, antineutrino spectra and reactor physics.

**Team:** Nuclear Structure and Energy (SEN team), SUBATECH laboratory, Nantes, France.

**Number of months:** 12+6 months    **Contact :** M. Fallot [muriel.fallot@subatech.in2p3.fr](mailto:muriel.fallot@subatech.in2p3.fr)

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### Detailed Description:

The Nuclear Structure and Energy group of the SUBATECH laboratory has experimental activities devoted to the study of beta decay properties of nuclei of interest nuclear structure and astrophysics, antineutrino spectra and reactor physics, in close collaboration with the team of IFIC Valencia in Spain. These measurements are performed using the TAGS (Total Absorption Gamma-ray Spectroscopy) technique, based on the detection of the gamma rays de-exciting the daughter nucleus with a calorimeter. This technique gives access to the beta strength distribution, directly comparable to theoretical microscopic models. It allows in addition to avoid the Pandemonium effect.

The main tasks of the postdoctoral researcher will be related to the experiments described below. An experiment, proposed by SUBATECH, IFIC and Surrey, is planned at the Jyväskylä facility in 2019 aiming at measuring with a new electron detector beta energy spectra from first forbidden decays of fission products which are important contributors to the reactor antineutrino spectrum. The study of forbidden decays is also of interest for nucleosynthesis processus such as the r-process. In addition, new TAGS experiments proposed by the SUBATECH team in collaboration with the team from IFIC of Valencia are planned to occur in 2019-2020 at the JYFL in Jyväskylä, Finland and at the ALTO facility in Orsay. The physics cases propose, on the one hand, to study the Gamow-Teller strength accessible through beta decay in the vicinity of  $^{132}\text{Sn}$  and to illustrate a recent idea proposed by the team to study low-lying collective modes through beta decay. Moreover some of the proposed nuclei are beta-delayed neutron emitters and are of importance for the r-process. On the other hand, another proposal focusses on cases that are relevant for reactor antineutrinos and decay heat.

The postdoctoral researcher will participate to the above experimental activities depending on the timing of the experiments in 2019-2020. The work will be composed of instrumental developments and data analysis. **Applicants should have defended successfully their PhD (in nuclear physics) at the time of the starting date and have a postdoctoral experience of less than two years.** A good experience in experimental nuclear structure and in C++ programming, in particular with ROOT and GEANT4, would be an advantage. The candidates should demonstrate the ability to work in a research environment, prepare research results for publication and for presentation at scientific meetings.

The review of applications is starting now and will continue until the position is filled. The job can start from now on (+ an administrative delay of one to two months) or at latest from December 2019. Applicants should apply through the official CNRS web-site corresponding to the offer that we will provide.

Applicants need also to arrange for two letters of reference to be sent directly to the following email address: [muriel.fallot@subatech.in2p3.fr](mailto:muriel.fallot@subatech.in2p3.fr)