INSTYTUT FIZYKI
UNIWERSYTETU JAGIELLOŃSKIEGO

Kraków, 01.09.2022

NARODOWE CENTRUM NAUKI

SCHOLARSHIP OFFER

for a PhD student

to be hired for 2 years in the frame of a project financed by the Polish National Science Centre

In experiments investigating neutrino oscillations (Nobel Prize in 2015), it was confirmed that neutrinos have mass, however, its absolute value is still unknown. It is also unknown whether the neutrino is a Dirac or Majorana particle. In the latter case, the lepton number would not be conserved, which is not predicted by the Standard Model. Confirmation that neutrinos are Majorana particles (their own antiparticles, i.e. matter and antimatter would be the same entity) would mean that the neutrinoless double beta decay can take place. By measuring the half-life of this process, it would be possible to determine the effective neutrino mass and infer which neutrino (among the three lepton families) is the lightest and which is the heaviest. This would be very important, for example, for explaining the asymmetry in the amount of matter and antimatter observed in the Universe. Neutrinoless double beta decay is therefore of great importance for a full understanding of the properties of neutrinos, as described within the framework of various theoretical models, or unification theories.

The main scientific objective of the project is the search for the neutrinoless double beta decay of the ^{76}Ge isotope in the LEGEND-200 experiment (200 kg of germanium enriched to 86% in ^{76}Ge). In particular, the planned research tasks concern the development and implementation of new methods for background reduction. By background we mean any signal that can interfere with the expected signal. It is a critical parameter that essentially determines the success of an experiment. Other tasks are related to data analysis and to development of a new concept of a spectroscopic chain with significantly reduced electronic noise. A program to search for radio-pure materials will also be launched, which will be based on spectroscopic measurements of bulk and surface contaminants. Part of the measurements will be carried out at the underground laboratory in Gran Sasso (Italy), where the LEGEND-200 detector is in operation.

Candidates are expected to have some experience in experimental physics, especially in measurements with radiation detectors, and the ability to analyze data. We offer an attractive stipend.

CV with the motivation letter and documents confirming the status of a PhD student should be sent until 16.09.2022 to the address given below. PhD candidates are also encouraged to apply to the PhD school at the Faculty of Physics, Astronomy and Applied Computer Science under the address: https://science.phd.uj.edu.pl/recruitment/physics

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