PhD position at GANIL (France) and KU Leuven (Belgium)

Subject : Study of resonant laser ionization in the REGLIS low energy branch of the S3 spectrometer at SPIRAL2-GANIL

Description :

The REGLIS (Rare Elements in-Gas Laser Ion Source and Spectroscopy) device will be installed at the Equipex project S^3 (Super Separator Spectrometer), currently under construction as part of the SPIRAL2 facility at the GANIL (Grand Accélérateur National d'Ions Lourds) laboratory in Caen, France. REGLIS will be a source for the production of new and pure radioactive ion beams at low energy as well as a laser spectroscopic tool to measure nuclear hyperfine interactions. It consists of a gas cell in which the reaction products from the S^3 spectrometer will be stopped and neutralized, coupled to a laser system that assures a selective re-ionization of the atoms of interest. Owing to the unique combination of such device with radioactive heavy ion beams from S^3, a new area of unknown isotopes at unusual isospin will become accessible. This device has been very recently selected by the French National Agency for the funding of the gas cell set up and will benefit from the international expertise of the group from KU Leuven, who obtained an ERC grant for their contribution to the project. REGLIS will provide the Equipex project S3 with a unique tool and will become a world leading facility in laser spectroscopy of radioactive isotopes providing essential results to validate contemporary nuclear and atomic physics models.

The purpose of the early stage position is to identify new and effective ionization schemes of the elements of interest, to improve and develop the laser system in order to fulfill the requirements for the spectroscopic studies at REGLIS and to study the integration of an existing all solid state Titanium:Sapphire laser system in the REGLIS set up. The solid state laser system used is developed in collaboration with the university of Mainz (Germany), the TRIUMF laboratory (Canada) and the ISOLDE group at CERN (Switzerland).
The candidate will design, build and test a tracking system for scanning frequency doubled light by synchronizing a remote controlled grating laser with a motorized SHG crystal. He/she will further investigate the feasibility of using difference frequency generation to extend the range of the existing Titanium:Sapphire cavities and the feasibility of producing narrow bandwidth laser beams with a TiSa cavity. Both axis of development are very challenging but would increase considerably the possibilities of such setup. In order to accomplish these challenges, the candidate will commission a new reference cell in order to develop and evaluate ionization schemes for elements requested at the low energy branch of S^3.
This project is supported by a large international collaboration (KU Leuven, Mainz University, TRIUMF laboratory, ISOLDE at CERN) and the candidate will have the opportunity to contribute to scientific experiments in these laboratories and to benefit from the expertise of the partners in this network Moreover, this work is embedded in the "In-Gas Laser Ionization and Spectroscopy NETwork – IGLIS-NET, an international network (http://kekrnb.kek.jp/iglis-net/) with partners from EU, Japan, China and Canada .

Required skills :

Good knowledge in nuclear and atomic physics, photonics, ion optics, instrumentation, and computing are desirable.

Position offered :

3 years PhD position at GANIL (France) and partly at KU Leuven (Belgium). Bi-national PhD diploma from Caen University and KU Leuven University. Part of the funding is a Marie Curie fellowship.

Contact persons :

Lecesne Nathalie (lecesne@ganil.fr)
GANIL, B.P. 55027, 14076 CAEN CEDEX 5, Phone : (33)2 31 45 44 72
Piet Van Duppen (piet.vanduppen@fys.kuleuven.be)
KU Leuven, IKS, Celestijnenlaan 200 D, B-3001 Leuven, Belgium, Phone : (32)16 32 72 72

Application procedure to the Marie Curie Early Stage Research Position:

Early Stage Researchers (ESRs) must be, at the time of recruitment, in the first four years (full-time equivalent) of their research careers and have not yet been awarded a doctoral degree. This is measured from the date when they obtained the degree which would formally entitle them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided, irrespective of whether or not a doctorate is envisaged.
At the time of recruitment by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date.

If you wish to apply, please find information under:
http://www.liv.ac.uk/la3net/vacancies/how-to-apply/, and send an email to lecesne@ganil.fr.