

Announcement for PhD position (deadline 28 August 2022)

The research group of Prof. Paweł Moskal invites applications for a PhD position in the project entitled „Development of three-photon emitting radiotracers for positronium imaging”.

The minimum requirements for candidates are:

- Experience in the work with radiation detectors, in data analysis, statistics and computer programming, and master's degree in the field of Natural Sciences, Engineering, Computer Science, Mathematics or related field of science.
- Good knowledge of English (spoken and written)

The successful applicant is expected to take part in the following research tasks:

Experiments: Commissioning of the modular J-PET scanner in view of three-gamma detection; Data taking with modular J-PET using e.g. point-like beta-plus isotopes arranged at various configurations and with various relative activities for validation of elaborated software procedures including 2γ MLEM and Time-of-Flight Filtered Back Projection, 3γ image reconstruction, and positronium imaging. Experimental tests for the evaluation of NEMA characteristics of the modular J-PET detector for the case of the separate and simultaneous 2γ and 3γ imaging; Data taking with linear, and NEMA phantoms filled with radiopharmaceuticals labeled with beta-plus isotopes for testing of multi-photon and positronium imaging reconstruction procedures. Data selection, analysis and simulations: Tuning of analysis procedures for events identification and selection; Detailed calibration of the modular J-PET tomograph; Development of methods for identification of de-excitation gamma quanta (prompt photon) as well as annihilation gamma quanta from 2γ and 3γ decays for the modular J-PET. Optimization of the selection criteria for each isotope separately. Simulation of physical and instrumental background. Elaboration of background suppression method. Image reconstruction: Computer implementation of methods for the reconstruction of time and position of annihilation into 2γ and 3γ . Preparation and computer implementation of procedures for fitting of life-time spectra and extraction of contributions from para-positronium, direct annihilation and ortho-positronium. Conceptual elaboration and computer implementation for prompt+ 2γ , and prompt+ 3γ positronium imaging; Elaboration of the method for simultaneous imaging with beta+gamma isotopes and ^{18}F . Reconstruction of positronium and 2γ images taken simultaneously for various configurations of simple phantoms. Tuning of the multi-isotope image reconstruction method.

The candidates should submit applications containing the following documents

1. Short application including motivation letter (maximum two pages),
2. Scientific CV including list of publications
3. At least one letter of recommendation (preferentially send directly to P. Moskal via e-mail)

All documents should be submitted in the pdf format to the address: p.moskal@uj.edu.pl

The position will start on 1st October 2022
and will be available for one year,
and it may be renewed later by mutual agreement.

The stipend amounts to 2500 PLN per month (brutto-brutto).

The deadline for submission of applications is 28 August 2022.

The candidates will be informed (by email) of the result of the selection by 3rd of September 2022.