

Scientific supervisor	
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Department	Experimental Particle Physics and Applications
Laboratory	J-PET
Group webpage	http://koza.if.uj.edu.pl/
Proposed research topic	
<i>Computer simulations of a PET tomograph made of polymer scintillators.</i>	
Short description (< 1000 characters)	
<p>The aim of the research is to determine the sensitivity of the J-PET detector (Fig. 1) when measuring with the pharmaceutical ^{22}Na. Sensitivity is defined as the number of counts per second divided by the activity of the pharmaceutical. The second aim of the research is to determine the fraction absorbed in materials of different thicknesses. It is defined as the proportion between the photons scattered inside the imaged material to all emitted photons.</p> <p>The trainee will learn simple techniques of Monte Carlo methods and their automation using C++ or Python language. The method of PET tomography operation and, in particular, the principle of the J-PET detector operation will be explained during the internship at a level adapted to the student's degree of study. Visualization of the obtained results will be possible with any program presenting plots.</p> <p>NOTE: the practice can be done remotely.</p>	
	
<p>Fig. 1 J-PET detector used to perform measurements, with a small annihilation chamber inside.</p> <p>The level of research will be adapted to the degree of study. Each step of the experimental work and data analysis will be explained on an ongoing basis and according to individual needs.</p>	
Main research tool	
J-PET detector, oscilloscope, C++/python, ROOT library	
Additional requirements to the candidate	
Students of physics, experimental physics and particle physics. Nice to have: willingness to learn, research enthusiasm, diligence and punctuality.	
Possibility to continue student internship in the form of:	
Diploma thesis (master's or bachelor's degree)	X
PhD study	X