PhD opportunities in Kraków with the LHCb Experiment

Description of the first position:

The first position offers a unique opportunity to engage in cutting-edge R&D on novel sensor architectures, including highly segmented and radiation-hard designs, with potential for direct impact on the next generation of particle detectors, such as 4D silicon technologies. The selected candidate will be part of an international team, with access to state-of-the-art facilities (including a single photon TCT/edge-TCT scanner), cleanroom, and advanced characterization tools.

The ideal candidate should hold a Master's degree in physics, electrical engineering, or a closely related field, and demonstrate a strong interest in detector development, semiconductor technology, or experimental physics. Experience with silicon detectors, electronics, or simulation tools (e.g., TCAD) will be considered an asset.

The position is based at **AGH-University,** with collaborative ties to leading research centers including CERN. The successful candidate will be required to spend some of its time outside the AGH.

In case of further questions please contact: Tomasz Szumlak (szumlak@agh.edu.pl)

Description of the second position:

One of the main objectives of this PhD project is to develop and optimise reconstruction algorithms that incorporate timing information from the VELO detector. A particular emphasis will be placed on the development of VELO tracking and primary vertex reconstruction algorithms for both CPU and GPU architectures. An essential component of the work will involve benchmarking the performance of these algorithms, including studying the impact of different VELO design configurations. Special attention will be given to improving track-to-vertex association, as well as enhancing vertex resolution and reconstruction efficiencies.

In parallel, the candidate will contribute to ongoing physics analyses within the Beauty to Open Charm working group. The focus will be on the analysis of LHCb data involving B->DX decays, with the aim of investigating potential sensitivities to physics beyond the Standard Model in tree-level processes.

This PhD project offers a unique opportunity to work at the interface of cutting-edge detector development and high-impact physics analysis, within one of the most active experiments at the energy frontier. The candidate will collaborate closely with international teams in the LHCb collaboration and participate in CERN-based activities.

The ideal candidate should hold a Master's degree in physics and demonstrate programming skills in Python and C++. Experience with GPU programming, particularly using CUDA, is appreciated but not required.

The position is based at the **Institute of Nuclear Physics PAN** in Kraków, Poland and is aligned with participation in the Kraków School of Interdisciplinary PhD Studies**.** Admission to the programme requires passing the relevant entrance examinations. The successful candidate is also expected to spend part of their time outside IFJ PAN, in particular at CERN.

All relevant information and deadlines for applications can be found in: https://kisd.ifj.edu.pl/recruitment/general-recruitment/)

In case you are interested please contact: Agnieszka Dziurda (agnieszka.dziurda@cern.ch)