

PhD Studentship in Particle Physics at the NExT Institute



The NExT Institute (<http://www.next-institute.ac.uk>), a partnership involving the University of Southampton, the STFC Rutherford Appleton Laboratory (RAL), Queen Mary University of London (QMUL), Royal Holloway University of London (RHUL) and the University of Sussex, is offering one 3.5 year PhD studentship in particle physics.

The Institute proposes a project on the 'HL-LHC upgrade of the CMS hardware trigger and searches for new physics'. The CMS experiment will upgrade its Level 1 trigger system for High Luminosity Large Hadron Collider (HL-LHC) operation. The upgraded system will, for the first time, be able to perform sophisticated particle reconstruction in hardware using complex algorithms implemented in firmware. The student will work on this challenging trigger, developing algorithms and realising them in hardware. The student will also perform an analysis searching for new particles predicted by beyond the Standard Model theories with the current data and evaluate the capabilities that the HL-LHC upgrade will enable. Machine learning techniques will be utilised throughout this work. The project combines hardware, physics analysis and theoretical aspects of particle physics.

1. The student will receive UK/EU fees (currently £4,260) plus a yearly stipend (currently £14,777). Financial support is through an STFC Postgraduate Studentship Award, provided by RAL, available to UK and EU/EEA nationals.
2. In addition, a Research Training Support Grant (RTSG) will be awarded for travel and subsistence within and outside the Institute.
3. The student will mostly be based in the Particle Physics Department (PPD) at RAL, co-supervised by PPD staff, and registered for a full-time PhD degree at the University of Southampton, wherein co-supervision will be provided by the Southampton High Energy Physics (SHEP) group. He/She will tentatively spend the first semester of the studentship at Southampton and the remainder at RAL (and CERN) but this will be defined in due course.
4. The main purpose of this studentship is to provide an opportunity to carry out research to PhD level on topics in experimental and theoretical particle physics in the area of collider phenomenology. The student will become a full member of CMS.
5. Training and research will be part of a novel PhD programme developed in the context of the NExT Institute. This will involve mixed (theoretical and experimental) training and joint/shared supervision, networking across all nodes, video-linked delivery of seminars and graduate lectures as well as an annual residential workshop plus regular scientific meetings. Attendance to the appropriate lectures at RAL is also foreseen.
6. The student will formally be enrolled with the University of Southampton, thus he/she will need to satisfy its entry requirements and eventually adopt the application procedure described at the following web page: <http://www.hep.phys.soton.ac.uk/opportunities/>. However, screening will initially be done by RAL PPD as described in this advert.
7. The application deadline is 15th February 2019 but early submissions are strongly encouraged and interviews will be arranged straight after so that the position will be filled as soon as a suitable candidate will be identified.
8. The studentship will start at the end of September 2019. The student will be issued with a single PhD award from the University of Southampton.

Informal contact can be established with Prof. S. Moretti (S.Moretti@soton.ac.uk), Prof Claire H Shepherd-Themistocleous (Claire.Shepherd@stfc.ac.uk) and Dr. Monika Wielers (Monika.Wielers@stfc.ac.uk).