



INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

INTERNSHIP SUBJECT FORM

Name of the Host Laboratory	Laboratoire Leprince-Ringet (LLR)
Website of the Host Laboratory	http://llr.in2p3.fr
Research Group	Lepton Colliders or LHCb
Internship Supervisor	Vladislav Balagura
Internship Subject	Imaging electromagnetic calorimeter at ILC or luminosity measurement at LHCb
Student's level	<input checked="" type="checkbox"/> Advanced Undergraduate Students (3 rd or 4 th year) <input checked="" type="checkbox"/> Master's students (1 st or 2 nd year) <input checked="" type="checkbox"/> PhD students
Proposed Duration	<input checked="" type="checkbox"/> 3 months <input checked="" type="checkbox"/> 4 months <input checked="" type="checkbox"/> 5 months <input checked="" type="checkbox"/> 6 months
Prerequisites	Basic knowledge of detectors for high-energy physics
Internship description (max. 15 lines)	<p>The next big particle accelerator after LHC will probably collide high energy electrons and positrons. Currently, there are 3 projects in the world: ILC in Japan, FCC-ee in CERN and CEPC in China. The accelerator will search for new physics and will precisely measure the properties of the Higgs boson and other known particles. To fully exploit the physics potential of the new accelerator, it will be equipped with the modern, state-of-the-art detector which, in particular, will have "imaging" calorimeters with the record pixelization to distinguish individual particles in the collimated jets of high energy. LLR laboratory in École polytechnique is one of the founders of this approach, called Particle Flow Algorithm (PFA). It develops highly granular electromagnetic calorimeter (ECAL) for ILD detector at ILC in collaboration with other French and Japanese laboratories. It is expected that the Japanese government will announce its decision on ILC in December 2018. If it will be positive, the student will be involved in the optimization of ILD silicon-tungsten ECAL using the simulation and the data from the existing prototypes.</p> <p>If the decision on ILC will be negative, the student will work instead in LHCb on the precise measurement of the luminosity. It is a completely different topic also developed at LLR in the interface between the LHCb detector and the LHC accelerator. This measurement is crucial for all production cross section measurements which constitute about 15% of all LHCb publications.</p>