

INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

INTERNSHIP SUBJECT FORM

Name of the Host Laboratory	Laboratoire Leprince-Ringuet (LLR)
Website of the Host Laboratory	llr.in2p3.fr
Research Group	CALICE / ILD
Internship Supervisor	Vincent Boudry
Internship Subject	5D models of electromagnetic showers
Student's level	MSc
Proposed Duration	3 months
Prerequisites	Good 3D visualization and functions handling, statistics, python and/or C++ programming,
Internship description (max. 15 lines)	<p>The next generation of calorimeters for future particle colliders (so-called "Higgs factories": ILC, CEPC, CLIC, FCC-ee) will be imaging devices, having a granularity 100 of 1000 times smaller than existing apparatus. They will record the deposit of energy from showers created by the interaction of secondary particles entering the calorimeters. the disentanglement of nearby showers and punch-through particles improves greatly the overall performance of the collision's measurement.</p> <p>Beside complex technical aspect, they will require a precise 4D modelling of the deposit of energy in each of their voxels (cells). Reading the time with a high precision (≤ 100 ps) adds an additional valuable information and a 5th dimension for the model, which has not yet been fully explored.</p> <p>For electrons, positrons and photons, the shape of the shower is rather smooth, and several 4D model exists.</p> <p>The student will work on the extension of these models, including the fluctuations, and compare them with simulations (GEANT4) and beam test data from the SiW-ECAL prototype.</p>

The boxes marked with cross implies eligible