



INTERNSHIP PROGRAM FOR INTERNATIONAL STUDENTS

INTERNSHIP SUBJECT FORM

Name of the Host Laboratory	Laboratoire Leprince-Ringuet (LLR)
Website of the Host Laboratory	http://llr.in2p3.fr
Research Group	LHCb group
Internship Supervisor	Vladislav Balagura
Internship Subject	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, good computing skills, interest to accurate measurements
Internship description (max. 15 lines)	<p>For any cross-section measurement in high energy physics experiment the knowledge of the luminosity is necessary. At the Large Hadron Collider (LHC) at CERN the luminosity is determined as $L=N/\sigma$ where N is the number of reference interactions continuously counted in all physics data while the reference cross-section σ is mainly measured in the so-called van der Meer scans performed once a year. At LHCb there are several luminometers, each with its corresponding reference interaction, which allows various cross-checks and helps in estimating the systematic errors. LHCb luminosity accumulated during the previous running in 2015-2018 is determined at LLR. In addition to this "offline" luminosity entering about 15% of the LHCb publications where various cross-sections are measured, the luminosity is determined in real time, "online" and send to LHC for optimizing the data taking conditions. LLR also participates in this task. The student will be able to select across various activities in the LHCb luminosity group, like contributing to the data analysis, studying LHCb luminometers systematics, coding the luminosity trigger or the online monitoring scripts.</p>

The boxes marked with cross implies eligible