



Jet measurements in proton-nucleus collisions at LHCb

LLR has an open position for a Master student to work on jet measurements in proton-nucleus collisions with the LHCb experiment. Jets are sprays of particles formed when a high-energy quark or gluon undergoes hadronization, the process of forming color-neutral bound states in quantum chromodynamics (QCD). Due to their ability to serve as a proxy for the individual quarks and gluons produced in a hard scattering interaction, jets are excellent tools for studying fundamental QCD and probing nuclear matter. Jet measurements in proton-nucleus collisions provide an extra probe for studying and constraining cold nuclear matter effects, which provide an important baseline for better understanding the hot nuclear matter (quark-gluon plasma) that is formed in nucleus-nucleus collisions.

The LHCb experiment at CERN has an established jet reconstruction algorithm that has been used to measure jets in proton-proton collisions. The successful candidate will study the performance of LHCb's jet reconstruction algorithm in proton-lead collision data collected by LHCb and implement an underlying event subtraction algorithm to remove background contamination in the jets from the nuclear collision. The candidate will also perform simulations to study jet reconstruction in proton-argon collisions with LHCb's novel fixed-target system, SMOG2. The work performed by the student would constitute the first jet study in proton-nucleus collisions at LHCb, and will enable a novel jet physics program in heavy ion collisions at LHCb with the ability to perform jet measurements in a variety of proton-nucleus collision systems.

The candidate will benefit from the broad expertise of the LHCb LLR group in experimental heavy ion physics and in LHCb's fixed-target program. The main research focuses of the group include charmonia production and multiplicity-dependent measurements in proton-nucleus collisions with the SMOG2 fixed-target program. The group also has a leading role in luminosity measurements at LHCb and the preparation of the first Run 3 data-taking with SMOG2.

Interested candidates should send an email to Kara Mattioli (kara.mattioli@llr.in2p3.fr).