Laboratório de Instrumentação e
Física Experimental de Partículas

Seminário LIP

Quinta Feira, 21 de Fevereiro 2019
11:30

AMBER: unravelling QCD mysteries

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AMBER is a newly proposed fixed-target experiment at CERN devoted to various fundamental QCD measurements, with a Letter of Intent recently made public.

The elastic muon-proton scattering process is proposed as a novel approach to the long-standing puzzle of the proton charge radius. This quantity was recently measured using two different but very accurate techniques, with results that differ by 5 sigma. The high energy muon scattering experiment now proposed may clarify the situation,thanks to the lower systematics involved.

The origin of hadron masses is deeply connected to the issue of gluon dynamics, and how it differs in protons or mesons. While the nucleon parton distributions are known with good precision already, the pion ones are very poorly known, the last measurements being more than 30 years old and suffering from very large uncertainties. The kaon parton dynamics, on the other hand, was never measured. A new high intensity beam line with hadron species separation using radio-frequency techniques offers a unique opportunity to study mesonic parton distributions, by exploring both Drell-Yan and direct photon production.

The antiproton production cross-section is a necessary input in the indirect searches of dark matter from the antiproton flux in galactic cosmic rays as measured by the AMS experiment. The proposed AMBER measurements in p+p and p+4He collisions cover a range from tens to few hundred GeV, complementary to those from LHCb which are in the TeV range.

These and many more measurements planned at the AMBER experiment will be presented. Feasibility, world competition and possible timelines will be discussed. AMBER is the challenging but natural extension of the COMPASS searches in QCD.

Local: Sala de Seminários (311)
LIP, Av. Prof. Gama Pinto, Nº 2, 1649-003 Lisboa
https://indico.lip.pt/event/520/
(Café e bolinhos 30 min antes)
O evento terá transmissão por streaming:
URL: https://videocast.fccn.pt/live/lip/seminarios
PIN: LIP-seminario-2019-02-21