

EoI workshop for a fixed-target programme at the LHC for heavy-ion, hadron, spin and astroparticle physics

Monday, 19 June 2017 - Friday, 23 June 2017

Orsay

Scientific Programme

AFTER@LHC is a proposal of a future multi-purpose fixed-target experiment using the multi-TeV proton or heavy-ion beams of the LHC. Such a proposal allows for an exceptional testing ground for QCD at unprecedented laboratory energies and momentum transfers. The objectives of performing fixed-target experiment with proton and lead LHC beams is threefold. First, one wishes to significantly advance our understanding of the large- x gluon, antiquark and heavy-quark content in the nucleon and nucleus. Second, one wishes to advance our understanding of the dynamics and the spin of gluons inside polarised and unpolarised nucleons. Finally, one wishes to make a decisive step forward in the study of heavy-ion collisions at ultra-relativistic energies with measurements towards large rapidities where one of the colliding nuclei is nearly at rest.

Several technological options are currently under investigation to make the highly energetic LHC beams colliding onto a target. Beam extraction by bent crystals offers a way to obtain a clean and very collimated high-energy beam, without decreasing the performances of the LHC. This technique is now becoming mature with successful tests at SPS and at the LHC. Another possibility is to use an internal gas target, following the success of the LHCb SMOG system, initially designed to monitor the LHC luminosity. A "Hermes" like storage cell gas target offers the possibility to have larger gas pressure, polarised gases, and was successfully used at COSY facility. Finally, a wire target or foil (as HERA-B or STAR) could be placed in the halo of the LHC beam.

The aim of this workshop is to complete the writing of an expression of interest for the AFTER@LHC programme, a fixed-target programme at the LHC for heavy-ion, hadron, spin and astroparticle physics.