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Polarised physics at LHC: the LHCspin project

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The goal of LHCspin is to develop innovative solutions and cutting-edge technologies to access the field of spin physics over the next few years by exploring a unique kinematic regime and exploiting new reaction processes.

To this end, a polarized gaseous target, operated in combination with high-energy, high-intensity LHC beams and the highly performing LHCb particle detector, has the potential to open new physics frontiers and deepen our understanding of the intricacies of the strong interaction in the non-perturbative regime of QCD.

This configuration, with center of mass energies up to 115 GeV, using both proton and heavy-ion beams, covers a wide backward rapidity region, including the poorly explored high Bjorken- x and high Feynman- x regimes. This ambitious task is based on the recent installation of an unpolarized gas target (SMOG2) in the LHCb spectrometer, making it not only a unique project, but also providing an invaluable playground for its polarized upgrade. Here, an overview of the physics potential, a description of the LHCspin experimental setup, and the first output of the SMOG2 system are presented.

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