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A Fixed-Target Program at the LHC (AFTER@LHC): where do we stand ?

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We review the physics opportunities [1] which are offered by a next generation and multi-purpose fixed-target experiment exploiting the LHC beams in order to study pp, pd and pA collisions at $\sqrt{s_{NN}} \sim 115$ GeV as well as Pbp and PbA collisions at $\sqrt{s_{NN}} \sim 72$ GeV.

We propose two possible implementations, namely with an internal (polarised) gas target or with a "splitted" beam by a bent crystal which both provide typical instantaneous luminosities [1,2] for pp and pA collisions which surpass that of RHIC by more than 3 orders of magnitude and are comparable to those of the LHC collider mode.

We also discuss our most recent figures of merit [3,4,5] based on two already existing detector set-ups, the LHCb and the ALICE detectors.

References:

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