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Physics prospects at the LHC luminosity upgrade of LHC with the ATLAS detector

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The physics prospects at the LHC luminosity upgrade of LHC, HL-LHC, with 300 and 3000 fb⁻¹ of data simulated in the ATLAS detector are presented and discussed.

The ultimate precision attainable on measurements of the couplings of the 125 GeV boson to elementary fermions and bosons is discussed, as well as perspectives on the searches for partners associated with it. The electroweak sector is further studied with the analysis of the vector boson scattering, testing the SM predictions.

Supersymmetry is one of the best motivated extensions of the Standard Model. The current searches at the LHC have yielded sensitivity to TeV scale gluinos and 1st and 2nd generation squarks, as well as to 3rd generation squarks and electro-weakinos in the hundreds of GeV mass range. Benchmark studies are presented to show how the sensitivity improves at the future LHC runs. The prospects of searches for new heavy bosons and dark matter candidates at 14 TeV are explored as well as the sensitivity of searches for anomalous top decays.

For all these studies, a parameterised simulation of the upgraded ATLAS detector is used, taking into account the expected pileup conditions.

Summary

Primary author: DOBOS, Daniel (CERN)

Presenter: DOBOS, Daniel (CERN)

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