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Measurements of elastic pp interactions and exclusive production with the ATLAS detector

The total pp cross section is a fundamental observable at the LHC. It can be derived from the measurement of the elastic cross section, using the optical theorem. Measurements of the elastic proton-proton cross section were performed at a center-of-mass energy of 8 TeV at various settings of the beam optics using the ALFA detector.

The ALFA detector is also used to tag forward protons in order to enrich the exclusive diffractive production of pion pairs for first cross section measurements of this process at center-of-mass energies of 7 and 8 TeV.

In the absence of forward proton tagging, exclusive processes can be distinguished in the central part of the ATLAS detector exploiting the absence of charged particles reconstructed in the inner tracking detector.

If available, the talk will also cover the study of the exclusive pion production at 7 and 8 TeV, the total cross section and rho determination from elastic scattering, as well as an inclusive single diffractive study at 8 TeV.

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Track Classification: Diffraction and photon physics in hadron-hadron and heavy-ion collisions