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Measurement of Total and Elastic Cross Sections at $\sqrt{s} = 200 \text{ GeV}$ with the STAR Detector at RHIC

We present results of the measurement of the total and elastic cross sections in proton-proton collisions at $\sqrt{s} = 200 \text{ GeV}$ with the Roman Pot setup in Run 2015 of the STAR experiment at the Relativistic Heavy Ion Collider (RHIC). The Roman Pots were operated during standard data collection at STAR at the distance of about $8\sigma_y$ from the beam, where σ_y is the beam gaussian width in the vertical coordinate. The obtained data sample is in the useful range of the square of four-momentum transfer (t) $0.05 \leq -t \leq 0.135 \text{ (GeV/c)}^2$. The results include the value of the exponential slope parameter B of the elastic differential cross section $d\sigma/dt$ in the measured small $-t$ range and the total cross section σ_{tot} obtained from the extrapolation of the $d\sigma/dt$ to the optical point at $-t = 0 \text{ (GeV/c)}^2$. We also present the value of elastic cross section σ_{el} . All results are compared with the world data.

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