Contribution ID: **381** Type: **Posters**

Scaling properties of elastic proton-proton scattering at LHC energies

The differential cross section of proton-proton elastic scattering, as a function of the magnitude of the four-momentum transfer squared |t|, evolves in a consistent manner with $\sqrt{s}$ at LHC energies. The "dip" and "bump" structures change their positions in $|t|$ as a function of $\sqrt{s}$ and the slope at low values of $|t|$ and integrated elastic cross section grow with $\sqrt{s}$. These features suggest there might be hidden universal properties of elastic scattering. Based on these empirical observations, and taking inspiration from saturation models, we propose a simple scaling law for proton-proton elastic scattering. We find that the differential cross sections measured by TOTEM at $\sqrt{s} = 2.76, 7, 8$, and 13 TeV fall in a universal curve when they are mapped to the scaling variables $d\sigma/d|t| \cdot (s/\text{TeV}^2)^{-0.305}$ versus $(s/\text{TeV}^2)^{0.065}(|t|/\text{GeV}^2)^{0.72}$. We explore the implications of this scaling law in the impact parameter picture of the scattering amplitudes.

Submitted on behalf of a Collaboration?

No

Authors: STASTO, Anna (Pennsylvania State University (US)); BALDENEGRO BARRERA, Cristian (Centre National de la Recherche Scientifique (FR)); ROYON, Christophe (The University of Kansas (US))

Presenter: BALDENEGRO BARRERA, Cristian (Centre National de la Recherche Scientifique (FR))

Session Classification: WG2: Small-x, Diffraction and Vector Mesons

Track Classification: WG2: Small-x, Diffraction and Vector Mesons