Contribution ID: **3** Type: **not specified**

Universal scaling properties of proton-proton elastic scattering

Thursday 29 September 2022 15:10 (20 minutes)

he differential cross section of proton-proton elastic scattering ⊠⊠/⊠⊠, as a function of the magnitude of the four-momentum transfer squared |⊠|, evolves in a consistent way with ⊠√ at LHC energies, all the curves being translated in the (|⊠|, ⊠⊠/⊠⊠) plane for different center-of-mass energies. This means that the cross sections vary according to a scaling law in center-of-mass energy ⊠√ and on |⊠|.
These features suggest there are 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. The differential cross sections measured by TOTEM at ⊠√=2.76,7,8, and 13 TeV fall in a universal curve when they are mapped to the scaling variables ⊠⊠/⊠⊠|(⊠/TeV2)−0.305 versus (⊠/TeV2)0.065(|⊠|/GeV2)0.72. In addition, we explore the implications of this scaling law in the impact parameter picture of the scattering amplitudes.

Presenter: ROYON, Christophe (The University of Kansas (US))

Session Classification: Soft and low-mass diffraction

Track Classification: Soft and low-mass diffraction