

Unitarity effects in elastic scattering at the LHC

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We study the high-energy behavior of the elastic scattering amplitude using two distinct unitarization schemes: the eikonal and the U -matrix. Our analysis begins with a formalism involving solely Pomerons, incorporating pion-loop insertions in the Pomeron trajectory representing the nearest singularity generated by t -channel unitarity. Subsequently, we explore a scenario that includes the presence of an Odderon. In our analyses, we explore the tension between the TOTEM and the ATLAS measurements for σ_{tot} and $d\sigma/dt$ at 7, 8, and 13 TeV, and the subsequent implications for the properties of both the Pomeron and Odderon. Our results show that the Odderon phase factor $\xi_0 = -1$ is favored in both unitarization schemes. More interestingly, this specific phase factor stands as the sole one that aligns with results consistent with a non-zero Odderon coupling.

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