

Hadron potential at large distances and fine structure of the diffraction peak at 13 TeV.

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O.V. Selyugin

BLTPh JINR, 141980 Dubna, Russia

Many models predict that soft interactions will enter a new regime at the LHC: given the huge energy, unitarization may play a crucial role as the central part of the protons becomes black [1]. In most part, this depends on the behaviour of the hadron potential at large distances. Our analysis of $d\sigma/dt$ of the TOTEM Collaboration data, carried out without model assumptions, shows the existence of a new effect (oscillations) in the behavior of the hadron scattering amplitude at a small momentum transfer at a high confidence level [2]. The quantitative description of the data in the framework of the high energy generalized structure (HEGS) model supports this phenomenon. The analysis of the new TOTEM data at 13 TeV in a wide momentum transfer region reveals an unusual phenomenon - the presence in the elastic scattering amplitude of a term with a very large slope [3] that is responsible for the behaviour of hadron scattering at a very small momentum transfer. These phenomena can be connected with hadron interactions at large distances.

References

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- [3] O. V. Selyugin, Mod.Phys.Lett., A 36, 2150148 (2021).

Primary author(s) : Prof. SELYUGIN, Oleg (BLTPh JINR)

Presenter(s) : Prof. SELYUGIN, Oleg (BLTPh JINR)

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