Odderon results for discussion

cross-sections, slopes

T. Csörgő[1,2] and I. Szanyi[1,2,4]

[1] Wigner RCP, Budapest, Hungary
[2] MATE KRC, Gyöngyös, Hungary
[3] University of Lund, Lund, Sweden
[4] Eötvös University, Budapest, Hungary

Validation of the PHENIX method
Odderon cross-section
Odderon intercept

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VALIDATION OF THE PHENIX METHOD

which relies on a method developed by the PHENIX Collaboration and described in detail in Appendix A of Ref. [46]. This method is based on the diagonalization of the covariance matrix, if the experimental errors can be separated to the following types of uncertainties:

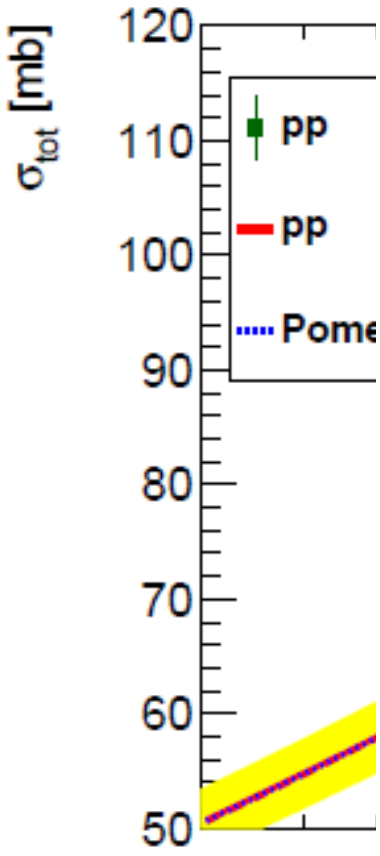
- Type A errors which are point-to-point fluctuating (uncorrelated) systematic and statistical errors;
- Type B errors which are point-to-point varying but correlated systematic uncertainties, for which the point-to-point correlation is 100%;
- Type C systematic errors which are point-indepen overall systematic uncertainties, that scale all the points up and down by exactly the same, point-to-p independent factor.

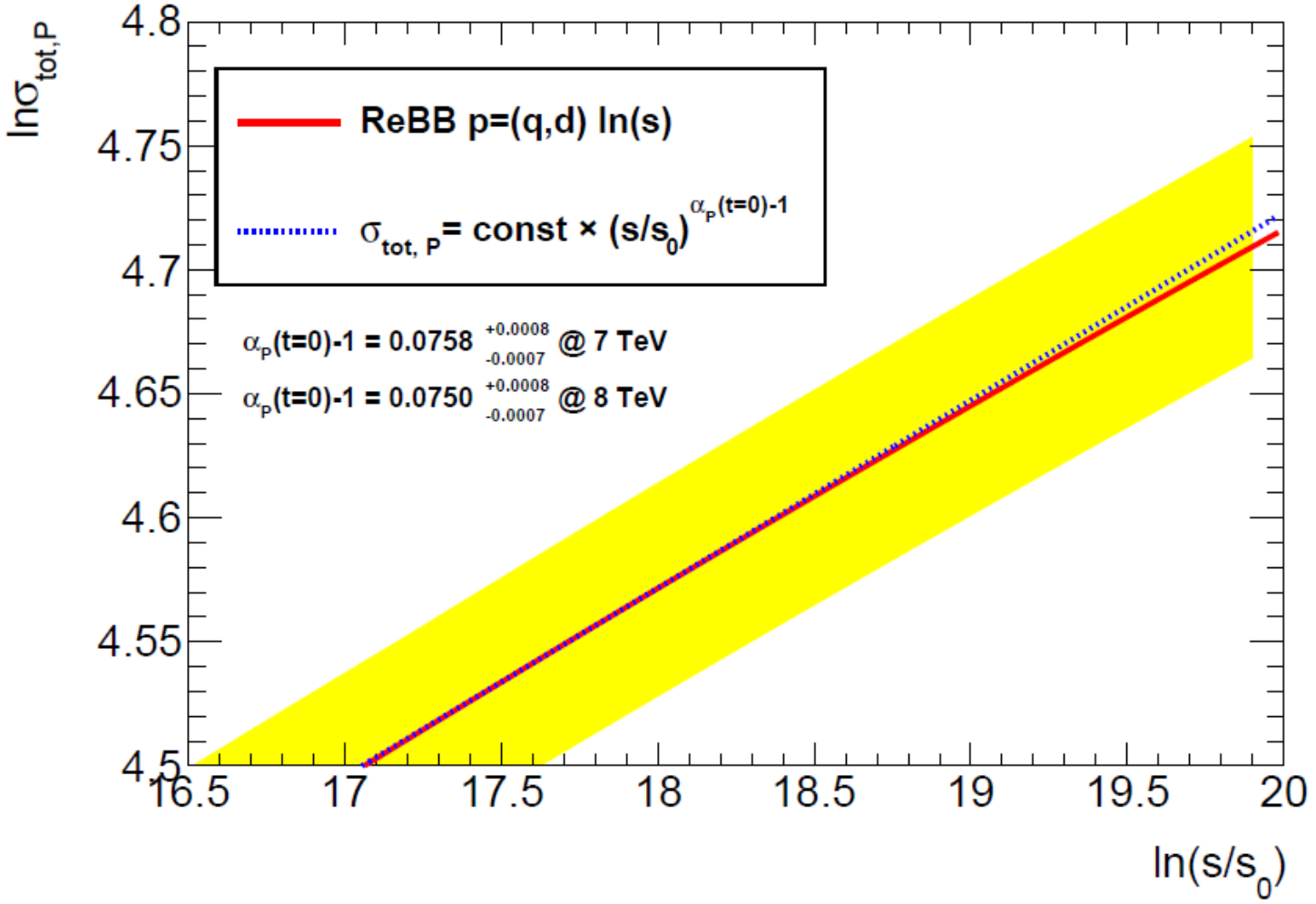
This scheme has been validated by evaluating the χ^2 from a full covariance matrix fit and from the PHENIX method of diagonalizing the covariance matrix of the differential cross-section of elastic pp scattering measured by TOTEM at $\sqrt{s} = 13$ TeV [6], using the Lévy expansion method of Ref. [12]. The fit with the full covariance matrix results in the same minimum within one standard deviation of the fit parameters [32], hence in the same significance, as the fit with the PHENIX method. Based on this validation, we apply the PHENIX method in the data analysis described in this manuscript.

POMERON PROPERTIES

MODEL RESULT BASED ON EPJC 81 (2021) 7, 611

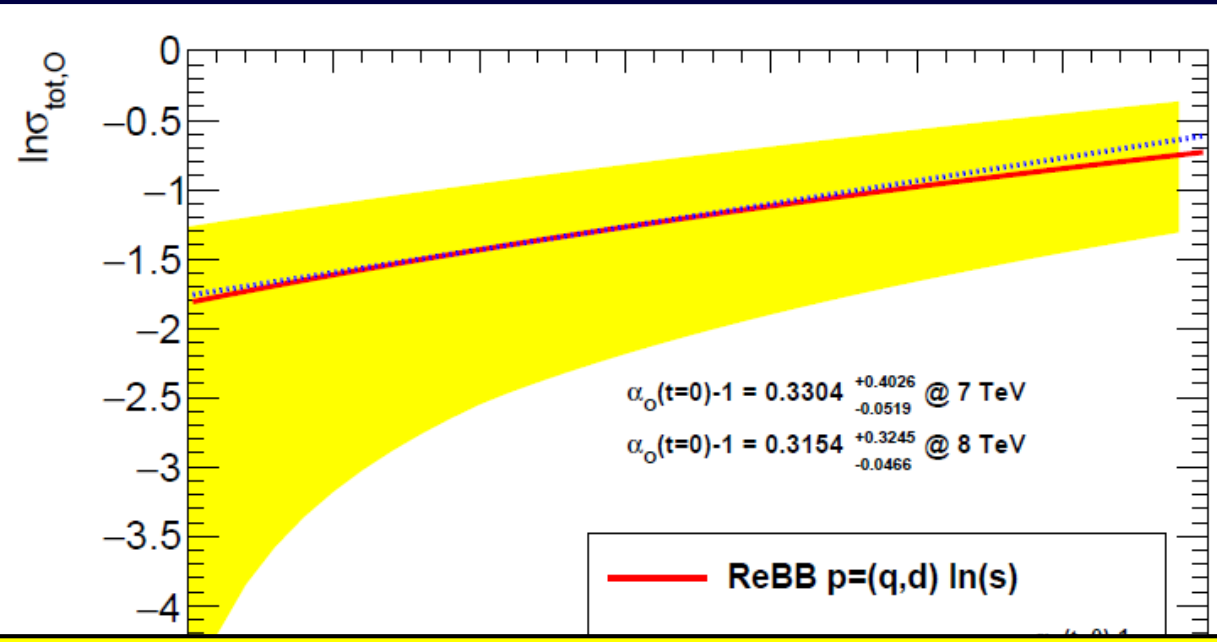
1st property:
Pomeron intercept normal: $\alpha_P(0)-1 = 0.075 \pm 0.001$

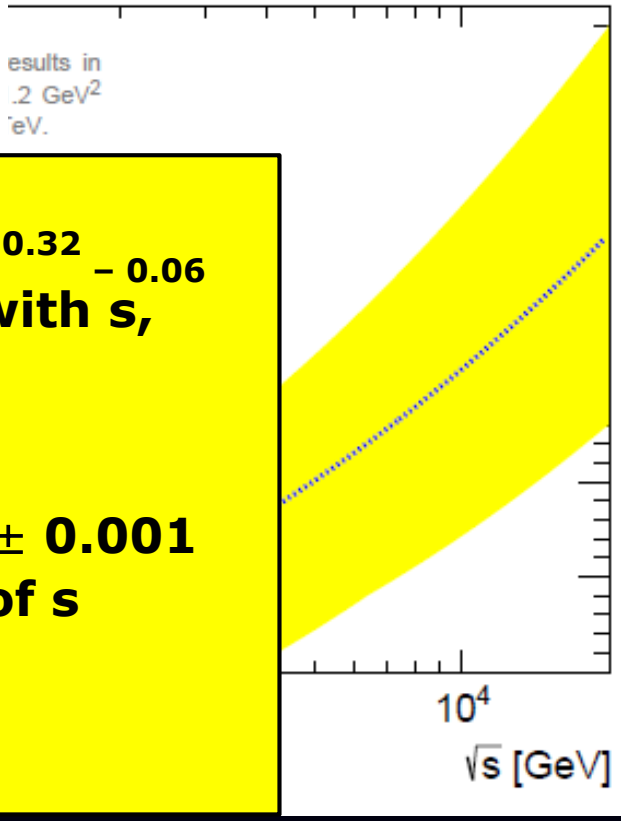




ODDERON PROPERTIES

EPJC 81 (2021) 7, 611





1st property:
Odderon intercept is large, $\alpha_O(0)-1 = 0.32\ ^{+0.32}_{-0.06}$
Threshold effect, $\alpha_O(0)$ slowly decreases with s,
far from pQCD expectations

2nd property:
Pomeron intercept normal: $\alpha_P(0)-1 = 0.075 \pm 0.001$
Pomeron intercept nearly independent of s

3rd property:
1 TeV ~ threshold energy