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The ReBB model at 8 TeV: Odderon exchange is a certainty

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The Real Extended Bialas-Bzdak (ReBB) model is shown here to describe, in the $0.37 \leq -t \leq 1.2$ GeV^2 region, the proton-proton elastic differential cross section data published by the TOTEM Collaboration at LHC at $\sqrt{s} = 8$ TeV center of mass energy. In this kinematic range, corresponding to the diffractive minimum-maximum region, a model-dependent Odderon signal higher than 18 σ is obtained by comparing the ReBB model prediction for the $p\bar{p}$ elastic differential cross section to this TOTEM measured pp elastic differential cross section data at 8 TeV. However, when combining this signal with the Odderon signals from the ReBB model in the $0.37 \leq -t \leq 1.2$ GeV^2 four-momentum-transfer range at $\sqrt{s} = 1.96$, 2.76 and 7 TeV, it turns out that the combined significance is dominated not by the new 8 TeV but by that of earlier 7 TeV TOTEM data, that carry an even larger Odderon effect. Thus, in any practical terms, within the framework of the ReBB model, the Odderon signal in the limited $0.37 \leq -t \leq 1.2$ GeV^2 and $1.96 \leq \sqrt{s} \leq 8$ TeV kinematic region is not a probability, but a certainty. We show also that the $H(x)$ version of the ReBB model works reasonably well at 8 TeV in the $0.37 \leq -t \leq 0.97$ GeV^2 region.

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