



UNIWERSYTET SZCZECIŃSKI
INSTYTUT FIZYKI

Środowe seminarium w Instytucie Fizyki

April 21st – 12:00

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“Evidence of Odderon-exchange from scaling properties of elastic scattering at TeV energies”

We study the scaling properties of the differential cross section of elastic proton–proton (pp) and proton–antiproton ($p\bar{p}$) collisions at high energies. We introduce a new scaling function, that scales – within the experimental errors – all the ISR data on elastic pp scattering from $\sqrt{s} = 23.5 - 62.5$ GeV to the same universal curve. We explore the scaling properties of the differential cross-sections of the elastic pp and $p\bar{p}$ collisions in a limited TeV energy range. Rescaling the TOTEM pp data from $\sqrt{s} = 7$ TeV to 2.76 and 1.96 TeV, and comparing it to D0 $p\bar{p}$ data at 1.96 TeV, our results provide an evidence for a t –channel Odderon exchange at TeV energies, with a significance of at least 6.26σ . We complete this work with a model-dependent evaluation of the domain of validity of the new scaling and its violations. We find that the $H(x)$ scaling is valid, model dependently, within $200 \text{ GeV} \leq \sqrt{s} \leq 8 \text{ TeV}$, with a $-t$ range gradually narrowing with decreasing colliding energies.