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Exclusive Central $\pi^+\pi^-$ Production in Proton Antiproton Collisions at the CDF

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Exclusive central hadronic systems from hadron collisions result primarily from double pomeron exchange, and these have very restrictive quantum numbers: $I^G J^{PC}$ = $0^+(\text{even})^{++}$. This "quantum number filter" is a powerful tool for meson spectroscopy in the isoscalar sector, especially for glue-rich states. In addition it provides information on the nature of the pomeron.
We have measured exclusive $\pi^+\pi^-$ production in proton-antiproton collisions at $\sqrt{s} = 0.9$ and 1.96 TeV in the Collider Detector at Fermilab. We selected events with exactly two oppositely charged particles, assumed to be pions, in $|\eta| < 1.3$ with no other particles detected in $|\eta| < 5.9$. The central $\pi^+\pi^-$ was required to have rapidity $|y| < 1$. By requiring no other charged particles, these events are dominated
by double pomeron exchange.
The data is valuable for understanding the pomeron in a region of transition between non-perturbative and perturbative QCD.

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