Peripheral Collisions with STAR

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\textbf{Abstract}

We present the first results on coherent peripheral collisions with STAR. Coherent peripheral collisions involve electromagnetic interactions at impact parameters $b > 2R_A$, where neither nucleus is disrupted. In $\text{AuAu} \rightarrow \text{AuAu}\rho^0$ a photon emitted by one nucleus fluctuates to a $q\overline{q}$ pair, which then scatters elastically from the other nucleus. The 2 nuclei act as a 2-source interferometer. Purely electromagnetic processes like $e^+e^-$ production also occur; these may be sensitive to non-perturbative QED since the coupling constant $Z\alpha \approx 0.6$.

We will present STAR data on 2 charged particle final states. We will show the contributions from $\rho^0 \rightarrow \pi^+\pi^- e^+e^-$ and $\mu^+\mu^-$, and discuss the invariant mass and $p_t$ spectra. The latter is peaked around $p_t = \hbar/R_A$, showing the coherent production process.