Parity and CP Violation Studies at RHIC

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Abstract

Parity and CP symmetry violations have never been observed in the strong interaction. However, Kharzeev et. al. (PRL 81, 512, 1998) have shown that an effective Lagrangian model which reflects the $U_A(1)$ anomaly of QCD, predicts, under certain circumstances, the appearance of metastable vacua in which P and CP symmetries are spontaneously broken. These authors have proposed that such symmetry violating states may be created briefly during relativistic heavy-ion collisions. At STAR we are looking for the experimental signatures of these possible symmetry violating vacuum states.

I will present a search for P and CP violation using the STAR detector at RHIC. This will include methods for analyzing the data as well as expected experimental sensitivities derived from simulations. Results from STAR year-one data will be presented which should test theory predictions at an interesting level.

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