Measuring the in-medium pion dispersion relation through back-to-back correlation at RHIC

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Abstract

In high energy heavy ion collisions, hot and dense hadronic matter is expected to be in conditions similar to the ones in the early Universe about the few μsec after the Big Bang. Under these conditions, strongly interacting particles may propagate with a mass that differs from the mass in the assymptotic vacuum. Here, we consider $\pi - \pi$ interactions in the presense of hot and dense pion gas. We study the pion dispersion relation at finite temperature. Back-to-back correlations of observable $\pi - \pi$ pairs are predicted to appear if the mass of the pions modified in a thermlized medium. This may be an observable effect at the Relativistic Heavy Ion Collider.

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