FERMION BACK-TO-BACK CORRELATIONS

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Abstract

Bose-Einstein and Fermi-Dirac correlations produce opposed effects, as a result from quantum statistics: B-E enhances the the probability of observing pairs of identical bosons in similar momentum states, whereas, F-D suppresses it, when observing pairs of fermions with nearby momenta. Nevertheless, more recently, the so-called back-to-back correlations (BBC)[1] were predicted to appear between boson-antiboson pairs, if their masses were modified in a thermalized medium. We herewith show that a similar effect should manifest itself in the fermionic case. We find surprisingly large back-to-back correlations of observable fermion – anti-fermion pairs, similar in strength to the bosonic BBC found earlier. The back-to-back correlations of protons and anti-protons could be observed experimentally in ^{197}Au + ^{197}Au collisions with $\sqrt{s} = 200$ AGeV at the Relativistic Heavy Ion Collider (RHIC), at Brookhaven National Laboratory.

1. M. Asakawa and T. Csörgő, hep-ph/9612331, Heavy Ion Physics **4**, (1996) 233; M. Asakawa, T. Csörgő and M. Gyulassy, Phys. Rev. Lett. **83**, (1999) 4013.

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