

A search for the magnetic field in the QGP by STAR

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Abstract

1 Lambda polarization $P_{\Lambda/\bar{\Lambda}}$ was measured by the STAR collaboration,
2 confirming the existence of extremely large vorticities within the Quark-
3 Gluon Plasma (QGP). Additionally suggested is an enhanced $P_{\bar{\Lambda}}$ relative
4 to P_{Λ} across all beam energies; however, the statistics are too limited
5 to make a significant measurement. No such splitting is observed in the
6 high-statistics $\sqrt{s_{NN}} = 200$ GeV data set, but this splitting is expected
7 increase at lower beam energies. Such a splitting in polarization would
8 be consistent with the effects of hyperon magnetic moment coupling with
9 the magnetic field sustained in the QGP; it would have far-reaching con-
10 sequences important to magnetic-field-dependent observables such as the
11 chiral magnetic effect and would set the scale on the conductivity of the
12 QGP.

13 Recently, STAR has taken a high-statistics data set at $\sqrt{s_{NN}} = 27$ GeV
14 which is considered suitable to study the splitting between Λ and $\bar{\Lambda}$ since
15 it includes the recently installed Event-Plane Detector (EPD), leading
16 to a significantly increased event-plane resolution. We will present the
17 measurement of this splitting and discuss its implications.