Contribution ID: **42** Type: **Contributed 2**

Global polarization measurements and their implications regarding the magnetic fields

Tuesday, 20 March 2018 11:45 (25 minutes)

Spectators in non-central heavy-ion collisions create dynamic magnetic fields with magnitudes as large as 10^{14} Tesla. The fields may cause a splitting between Λ and $\overline{\Lambda}$ polarization through magnetic moment coupling. A signal of such splitting could provide a quantitative estimate of the field strength at freeze-out. The dynamics of the magnetic field are expected to depend on the conductivity of the QGP. The field is of fundamental interest for heavy-ion physics, but is of particular interest to other novel phenomena, e.g. the Chiral Magnetic Effect (CME).

The STAR Collaboration observed global hyperon polarization in non-central Au+Au collisions in the energy range of 7.7 to 39 GeV [1]. In this analysis, a magnetic splitting is hinted at, but the improved statistics and resolution achievable with future runs are required to make a definitive measurement of the magnetic field. In 2018, RHIC will run an isobaric system (Zr+Zr and Ru+Ru) as well as 1B 27GeV Au+Au events. The 27GeV dataset will add an important point on the energy trend of the polarization, and may provide the earliest statistical evidence for magnetic splitting. If a measurable splitting existed at top RHIC energy for the isobar system, one would expect a difference in the splitting between the two species, due to a difference in the underlying magnetic field. Observing such a difference would provide robust evidence that the splitting between Λ and $\overline{\Lambda}$ polarization is driven by the magnetic field.

[1] Nature 548, 62 (2017)

Primary authors: Mr UPSAL, Isaac (Ohio State University); LISA, Michael (Ohio State University)

Presenter: LISA, Michael (Ohio State University)