

# Quark Matter 2019 - the XXVIIIth International Conference on Ultra-relativistic Nucleus-Nucleus Collisions



Contribution ID: 154

Type: Oral Presentation

## Magnetic Field in the Charged Subatomic Swirl

*Wednesday, 6 November 2019 14:20 (20 minutes)*

We suggest a novel link between rotation and magnetic field in a charged fluid system: a magnetic field naturally arises along the fluid vorticity direction from the currents associated with the swirling charges. This general connection is demonstrated both for a single particle and for a fluid vortex. Applying the idea for heavy ion collisions we propose it as a new mechanism for generating long-lived in-medium magnetic fields. We estimate the magnitude of this new magnetic field in the AuAu colliding systems across a wide span of collisional beam energy. Such a magnetic field is found to rapidly increase toward lower beam energy and could account for a significant amount of the experimentally observed global polarization difference between hyperons and anti-hyperons. Its time-integrated effect could make considerable contributions to the Chiral Magnetic Effect. Further predictions are discussed and experimental tests are suggested.

**Primary authors:** GUO, Xingyu (South China Normal University); Prof. LIAO, Jinfeng (Indiana University Bloomington); WANG, Enke (Central China Normal University)

**Presenter:** GUO, Xingyu (South China Normal University)

**Session Classification:** Parallel Session - Chirality III

**Track Classification:** Chirality, vorticity and spin polarization