

# International Conference on Physics and Astrophysics of Quark Gluon Plasma (ICPAQGP-2023)



Contribution ID : 24

Type : **Oral Presentation**

## Relativistic spin-magnetohydrodynamics

*Tuesday, 7 February 2023 15:45 (15)*

Strong magnetic field and large global angular momentum are expected to be generated in relativistic heavy-ion collision experiments. Hydrodynamic simulations for the evolution of hot and dense QCD matter formed in heavy ion collisions would have to rely on either magnetohydrodynamics or spin-hydrodynamics formulations for calculation of observables pertaining to magnetic field or global angular momentum, respectively. However, these two effects are not entirely separable due to the possible spin alignment of medium constituents in the presence of magnetic fields and magnetization of the medium due to rotation, similar to the Einstein-de Haas effect and Barnett effect. Therefore a unified framework of “spin-magnetohydrodynamics” needs to be developed for precise calculation of experimental observables. Here we present the first formulation of this unified framework in a relativistic context.

Based on: Phys.Rev.Lett. 129 (2022) 19, 192301.

**Primary author(s)** : BHADURY, Samapan; FLORKOWSKI, Wojciech; JAISWAL, Amaresh; KUMAR, Avdhesh; RYBLEWSKI, Radoslaw

**Presenter(s)** : JAISWAL, Amaresh

**Session Classification** : Parallel Session IB (Chair : Prof. Abhijit Bhattacharyya)

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