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Novel spin transport under chirality, vorticity and magnetic fields

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Spin is an intrinsic quantum degree of freedom for various elementary particles that together make all of matter in our Universe. A salient feature of spin is its polarizability when subject to external conditions such as chirality, vorticity and magnetic fields. In recent years, there have been significant interests and considerable progress in understanding novel transport effects arising from the interplay between spin and these conditions in the environment of heavy ion collisions. Notable examples include e.g. the chiral magnetic effect as well as the global and local spin polarization of hyperons and vector mesons. In this talk, we will discuss some of the latest theoretical developments in light of the fresh experimental data. In the case of chiral magnetic effect, emphasis will be put on the interpretation of the STAR isobar experimental results based on the state-of-the-art phenomenological simulations. Regarding the spin polarization phenomenon, the implications of the latest STAR and HADES measurements in the few-GeV collision energy region will be analyzed and a possible construction of hydrodynamic framework with finite angular momentum will be presented.

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