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Hydrodynamics of vortical and polarized fluids

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The hydrodynamical model has by now become a paradigm for the study of the QCD plasma formed in nuclear collisions at ultra-relativistic energies. The possibility of new collective phenomena in heavy-ion collisions, such as vorticity and turbulence, have gained widespread attention in recent times. It was proposed that the rotation caused in the medium formed in non-central collisions may have possible observable consequences due to spin polarization of the hot and dense matter. Consequently, much effort has recently been invested in studies of polarization and spin dynamics of particles produced in high-energy nuclear collisions, both from the experimental and theoretical point of view. I review the important advancements on this topic and present our recent work on the formulation of relativistic fluid dynamics for a system of spin-1/2 particles [1].

[1] W. Florkowski, B. Friman, A. Jaiswal and E. Speranza, arXiv:1705.00587 [nucl-th].

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