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Spin-thermal shear coupling in relativistic nuclear collisions

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The measurements of spin polarization of particles emitted in heavy-ion collisions has opened the possibility for new phenomenological investigations of spin physics in relativistic fluids. The theoretical predictions of global polarization are in agreement with the data, but consistent discrepancies stand out for the local polarization. In this talk, I will show that the covariant theory of quantum relativistic fluids at local equilibrium implies an additional, non-dissipative, contribution to the spin polarization vector which is proportional to the thermal shear which has been previously overlooked. This additional contribution together with an improved approximation in the expansion of the density operator at local equilibrium is able to restore the quantitative agreement between the theoretical predictions and the experimental data.

[F. Becattini, M. Buzzegoli and A. Palermo, Phys.Lett.B 820 (2021) 136519]

[F. Becattini, M. Buzzegoli, A. Palermo, G. Inghirami and I. Karpenko, arXiv:2103.14621]

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