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Non-abelian Anomalous Hydrodynamics: A Dimensional Reduction Approach

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We report on our progress in implementing a new proposal for anomalous non-Abelian relativistic hydrodynamics in four and two spacetime dimensions. Models with continuous non-Abelian symmetries are ubiquitous in physics, arising in diverse settings ranging from the quark-gluon plasma to cold atomic gases and quantum spin chains.
The approach consists on the Kaluza-Klein compactification of a six-dimensional non-dissipative neutral fluid with a pure gravitational anomaly on a manifold with a non-Abelian isometry.We obtain the constitutive relations of a four-dimensional anomalous fluid charged under non-Abelian background gauge fields and identify the anomalous transport coefficients in the resulting colored fluid. Interestingly, these coefficients are defined in terms of the anomaly coefficient of the higher dimensional fluid and the parameters of the compactification ansatz. In order to test the robustness of the approach, we find the constitutive relations for the non-Abelian currents and the stress-energy tensor of a two dimensional field theory, as two dimensions is particularly simple from the point of view of anomalies

Presenter: SAURA BASTIDA, Pablo (UPCT and IFT-UAM/CSIC)

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