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Anisotropic hydrodynamics

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Anisotropic hydrodynamics is a reformulation of relativistic viscous hydrodynamics which allows one to more reliably describe non-equilibrium fluid dynamics. This is accomplished by taking into account inherent local-rest-frame momentum-space anisotropies at leading order. Through comparisons with recently obtained exact solutions to the Boltzmann equation, it has been shown that anisotropic hydrodynamics is the most accurate approach to modeling relativistic dissipative fluid dynamics. The main application area for anisotropic hydrodynamics has historically been in modeling the quark-gluon plasma generated in relativistic heavy-ion collisions, however, there have also been applications to cold atomic gases. In this talk, I will review recent progress in anisotropic hydrodynamics which have included: development of realistic (3+1)d codes with fluctuating initial conditions, implementation of lattice-based equation of state, inclusion of multiple anisotropy parameters and NLO corrections, anisotropic Cooper-Frye freeze-out, and bulk viscous effects. Finally, I will present preliminary phenomenological results together with comparisons to LHC data for particle spectra and collective flow.

Summary

In this talk I review recent progress in anisotropic hydrodynamics.

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