Nuclear Theory

Flow in heavy-ion collisions - Theory Perspective

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(Submitted on 29 Jun 2011)

I review recent developments in the field of relativistic hydrodynamics and its application to the bulk dynamics in heavy-ion collisions at the Relativistic Heavy- Ion Collider (RHIC) and the Large Hadron Collider (LHC). In particular, I report on progress in going beyond second order relativistic viscous hydrodynamics for conformal fluids, including temperature dependent shear viscosity to entropy density ratios, as well as coupling hydrodynamic calculations to microscopic hadronic rescattering models. I describe event-by-event hydrodynamic simulations and their ability to compute higher harmonic flow coefficients. Combined comparisons of all harmonics to recent experimental data from both RHIC and LHC will potentially allow to determine the desired details of the initial state and the medium properties of the quark-gluon plasma produced in heavy-ion collisions.

Comments:	8 pages, Invited plenary talk at the 22nd International Conference on Ultrarelativistic Nucleus-Nucleus Collisions (Quark Matter 2011), May 23-28 2011, Annecy, France
Subjects:	**Nuclear Theory (nucl-th)**; High Energy Physics - Phenomenology (hep-ph)
Cite as:	**arXiv:1106.6012 [nucl-th]**
	(or **arXiv:1106.6012v1 [nucl-th]** for this version)

Submission history

From: Björn Schenke [view email]

[v1] Wed, 29 Jun 2011 17:31:54 GMT (11kb)

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