Nuclear Theory

The QGP shear viscosity -- elusive goal or just around the corner?

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With the new viscous hydrodynamic + hadron cascade hybrid code VISHNU, a rather precise (O(25%)) extraction of the QGP shear viscosity (eta/s)_QGP from heavy-ion elliptic flow data is possible if the initial eccentricity of the collision fireball is known with <5% accuracy. At this point, eccentricities from initial state models differ by up to 20%, leading to an O(100%) uncertainty for (eta/s)_QGP. It is shown that a simultaneous comparison of elliptic and triangular flow, v_2 and v_3, puts strong constraints on initial state models and can largely eliminate the present uncertainty in (eta/s)_QGP. The variation of the differential elliptic flow v_2(p_T) for identified hadrons between RHIC and LHC energies provides additional tests of the evolution model.

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