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(2+1)-d vs. (3+1)-d viscous hydrodynamics from RHIC and LHC[1] CHUN SHEN, The Ohio State University, BJOERN SCHENKE, Brookhaven National Laboratory, ULRICH HEINZ, The Ohio State University — Using (2+1)-d viscous hydrodynamics with a state-of-the-art equation of state (s95p-PCE), we present comparisons with recent ALICE measurements of the charged hadron spectra and elliptic flow, as well as successful predictions of the differential elliptic flow coefficient $v_2(p_T)$ for identified pions, kaons and protons from 2.76 A GeV Pb+Pb collisions at the Large Hadron Collider (LHC) [1]. We also study how the "universal" curves describing the dependence of the eccentricity-scaled charged elliptic flow $v^{\rm ch}/\bar{\epsilon}$ on the charged multiplicity density per unit area $(1/S)(dN_{\rm ch}/dy)$ change from RHIC to LHC energies. In (2+1)-d viscous hydrodynamics we find a tendency of producing less $v^{\rm ch}/\bar{\epsilon}$ at higher collision energies, which contradicts the opposite tendency found by Hirano *et al.*[2] for (3+1)-d ideal hydrodynamics coupled to a hadron cascade. By comparing (2+1)-d with (3+1)-d viscous hydrodynamics we explore to what extend these different tendencies may indicate a collision energy dependent gradual breakdown of longitudinal boost-invariance near midrapidity when going from higher to lower collision energies.

[1] C. Shen, U. Heinz, P. Huovinen, and H. Song, arXiv:1105.3226
[2] T. Hirano, P. Huovinen, Y. Nara, arXiv:1010.6222

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