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Beam-energy dependence of the anisotropy scaling functions for identified particle species

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Anisotropy scaling functions can provide unique insights into the QCD phase diagram's structure and the transport properties of its respective phases. Scaling functions and scaling coefficients for unidentified and identified particle species spanning the beam energy range $0.007 \leq \sqrt{s}_{NN} \leq 5.44$ TeV will be presented and discussed. The scaling functions clarify the respective influence of initial-state eccentricity, expansion dynamics, and final-state viscous attenuation. They also indicate characteristic signatures for the specific viscosity's dependence on the temperature T and the baryon (μ_B), strangeness (μ_S), and isospin (μ_I) chemical potentials. The extracted scaling coefficients provide unique constraints for characterizing both the phase structure of the QCD phase diagram and the dependence of η/s on temperature and charged currents. Specific testable predictions (derived from the scaling functions) for future anisotropy measurements in O+O collisions at RHIC (0.20 TeV) and the LHC (7.0 TeV) will also be presented.

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