BAND Science Highlight:

Bayesian calibration of the VAH model for heavy-ion collisions

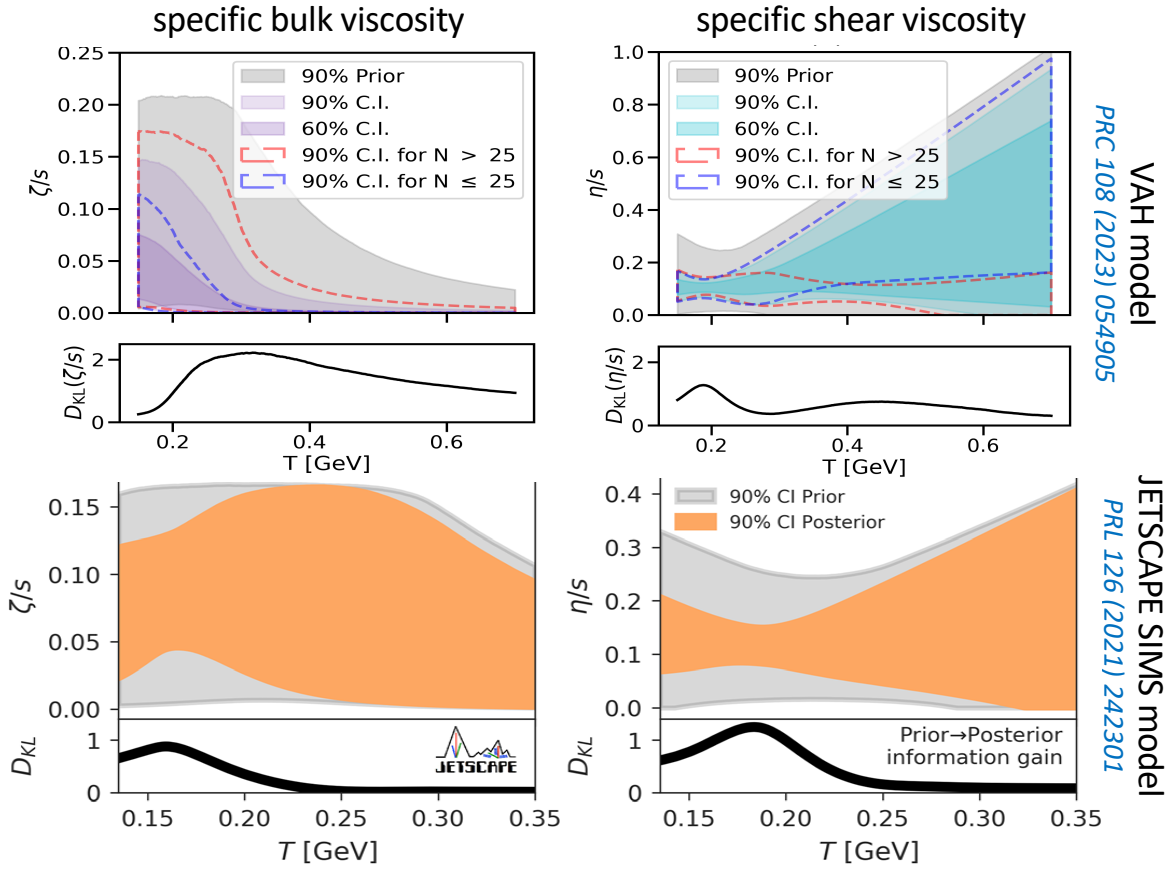

Figure: Prior (grey) and posterior (colored) credible intervals for the temperature-dependent specific bulk (left) and shear (right) viscosities in the new VAH model (top) and the JETSCAPE SIMS model (bottom). LHC data from Pb+Pb collisions at an energy of 2.76 TeV per nucleon pair were used for the calibration. The bottom panels show the information gain (Kullback-Leibler divergence) from the prior to the posterior probability distributions as a function of temperature. *Note the different temperature ranges explored by the two models.*

The novel Viscous Anisotropic Hydrodynamics (VAH) model can simulate relativistic heavy-ion collisions from very early times, eliminating the need for a separate far-off-equilibrium pre-hydrodynamic model. VAH was calibrated on LHC data using Bayesian tools in the BAND Software Framework. This calibration allowed us to constrain the specific shear and bulk viscosities of quark-gluon plasma up to tempera-tures of about 700 MeV, much higher than for any previous analysis.

Liyanage et al., PRC 108 (2023) 054905