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THESEUS event generator for collisions at energies available at NICA and FAIR

In this work, we present results obtained with the new Three-fluid Hydrodynamics-based Event Simulator Extended by UrQMD final State interactions (THESEUS) and apply it to the description of heavy-ion collisions in the NICA/FAIR energy range. It presents the 3FH output in terms of a set of observed particles and the afterburner can be run starting from this output by means of the UrQMD model. Thus THESEUS as a new tool allows to discuss the multifaceted physics challenges at FAIR and NICA energies. The new simulation program has the unique feature that it can describe a hadron-to-quark matter transition of first order which proceeds in the baryon stopping regime that is not accessible to previous simulation programs designed for higher energies, like QGSM or PHSD.

The simulation proceeds in two steps: first, a numerical solution of the 3-fluid hydrodynamics is computed with the corresponding code. Based on the output of the hydrodynamic part, a Monte Carlo procedure is used to sample the ensemble of hadron distributions and the UrQMD code is engaged to calculate final state hadronic rescatterings.

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