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SMASH - A new hadronic transport approach

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Microscopic transport approaches are the tool to describe the non-equilibrium evolution in low energy collisions as well as in the late dilute stages of high energy collisions. In this talk, a newly developed hadronic transport approach, SMASH (Simulating Many Accelerated Strongly-interacting Hadrons) is introduced. After explaining all the components of this approach, e.g. initial conditions and resonance properties, the approach is validated by a comparison to an analytic solution of the Boltzmann equation. Light and strange particle production and collective flow are compared to experimental data from elementary and nucleus-nucleus collisions in the low energy regime accessible at GSI. The implications of this new approach for dilepton production are discussed including an outlook on the non-equilibrium hadronic production of electromagnetic probes at high beam energies at RHIC and LHC. In addition, the impact of resonance properties on transport coefficients of hadronic matter is pointed out. A detailed understanding of a hadron gas with vacuum properties is required to establish the baseline for the exploration of the transition to the quark-gluon plasma in heavy ion collisions at high net baryon densities.

References:
J. Weil et al, „Particle production and equilibrium properties within a new hadron transport approach for heavy-ion collisions“, Phys. Rev C 94 (2016) no. 5, 054905

J. Tindall et al, „Equilibration and freeze-out of an expanding gas in a transport approach in a Friedmann–Robertson–Walker metric“, Phys.Lett. B770 (2017) 532-538

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