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Visualizations of heavy-ion collisions based on a transport and a hybrid approach

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In most fields of science, visualizations help to understand concepts and to identify potential issues. For these reasons, animations of relativistic heavy-ion collisions provide interesting visual insights into the simulation software used as well as the time evolution of the collisions. In our work, we produce animations for collisions at several beam energies below 200 GeV for different impact parameters and collision systems. The underlying software for our animations are the relativistic transport approach SMASH (Simulating Many Accelerated Strongly-interacting Hadrons) and the SMASH-vHLLE-Hybrid approach. SMASH constitutes an effective solution of the relativistic Boltzmann equation and is suitable for the dynamical description of collisions at low beam energies. The SMASH-vHLLE-Hybrid approach mainly combines SMASH, which is used to describe the non-equilibrium phases of a collision, with vHLLE, a software for the simulation of relativistic hydrodynamics. The latter is employed to describe the fluid phase of the hot and dense fireball. This approach is suitable for collisions at higher beam energies. Each visualization is based on the output of a single event from SMASH or the SMASH-vHLLE-Hybrid and is animated using the open-source software ParaView.

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