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# Examination of the directed flow excitation function in heavy-ion collisions

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Recent STAR data for the directed flow v1 obtained within the beam energy scan (BES) program has been analyzed within the Parton-Hadron-String-Dynamics (PHSD) transport model and a 3-Fluid Hydrodynamics (3FD) approach. The kinetic PHSD approach has been used to clarify the role of partonic degrees of freedom. The PHSD results, simulating a partonic phase and its coexistence with a hadronic one, are roughly consistent with data. The hydrodynamic results are obtained for two equations of state (EoS), a pure hadronic EoS and an EoS with a crossover type transition. The latter case is favored by the STAR experimental data. Special attention is paid to the description of antiproton directed flow based on the balance of p-pbar annihilation and the inverse processes for p-pbar pair creation from multi-meson interactions. Generally, the semiqualitative agreement between the measured data and the model results supports the idea of a crossover type of quark-hadron transition that softens the nuclear EoS but shows no indication of a first-order phase transition.

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