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How spinodal decomposition influences observables at FAIR energies

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The FAIR facility will make the region of high net-baryon densities experimentally accessible, where a first-order phase transition is conjectured. We investigate the dynamics of chiral symmetry breaking and the onset of confinement during a heavy-ion collision at large baryochemical potentials within a nonequilibrium chiral fluid dynamics model including effects of dissipation and noise. The order parameters are explicitly propagated and coupled to a fluid dynamically expanding medium of quarks. We demonstrate that the coupled system is strongly influenced by spinodal instabilities creating domains in the order parameters and large spatial fluctuations in the baryon density within single events. As a consequence we find a clear enhancement of higher flow harmonics at the first-order phase transition in comparison with transitions through the crossover or critical point.

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