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Vortex rings and global hyperon polarization at the NICA energies

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The experimentally observed significant polarization of Λ and anti-Λ particles in heavy-ion collisions leads to speculations that rapidly rotating swirls of nuclear matter are created. We use the PHSD transport model to simulate the Au+Au collisions at the NICA energies and perform the fluidization procedure determining density, temperature, and velocity, and then calculating vorticity and hydrodynamic helicity fields. The velocity field looks dominantly as the Hubble-like profiles expanding in transverse and longitudinal directions (approximate cylindrical symmetry). The vorticity field is like a small perturbation on the top of the longitudinal and transverse flows. Then we investigate freeze-out conditions for different particle species and find the source of polarization. Finally, we calculate the global polarization of (anti-)hyperons on a dynamic freeze-out surface and compare the results with the experimental data.

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