

A solvable model for spin polarizations with flow-momentum correspondence

We present an analytically solvable model based on the blast-wave picture of heavy-ion collisions with flow-momentum correspondence. It can describe the key features of spin polarizations in heavy-ion collisions. With the analytical solution, we can clearly show that the spin polarization with respect to the reaction plane is governed by the directed flow, while the spin polarization along the beam direction is governed by the ellipticity in flow and in transverse emission area. We also give an analytical expression for the last component of the spin polarization P^x the in-plane polarization, in heavy-ion collisions that has, to our knowledge, not been discussed in theories nor measured in heavy-ion collision experiments. The prediction of P^x can be tested in experiments and will contribute to provide a complete and consistent picture of spin phenomena in heavy-ion collisions.

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Session Classification: Spin in heavy ion collisions

Track Classification: Spin in heavy ion collisions