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Rescattering effect on the measurement of K* spin alignment in heavy-ion collisions with UrQMD mode

Summary

In non-central relativistic heavy ion collisions, the created matter possesses a large initial orbital angular momentum. Particles produced in the collisions could be polarized globally in the direction of the orbital angular momentum due to spin-orbit coupling. The measurement of vector mesons K^* and ϕ can provide information of the large vorticity of the hot, dense medium created in non-central heavy-ion collisions. Due to short lifetime of K^* which is comparable to the time between chemical freeze-out and kinetic freeze-out, the reconstructed K^* suffers from the rescattering effect (A K^* can not be reconstructed experimentally via the invariant mass method if the K^* decays in the medium and one or more daughters is scattered in the medium). Because of the anisotropy of the medium in coordination space, the rescattering effect on K^* could depend on cos θ^* thus result in non-uniform cos θ^* distribution for reconstructed K^*. It could be a very important background for the study of global polarization via the K^* spin alignment measurements in non-central heavy-ion collisions.

In this talk, we will present the study of measurement of K^* spin alignment in heavy-ion collisions using the UrQMD model. We use the history file to identify K^* decays and select the reconstructable K^*. The cos θ^* distribution is studied and the spin alignment parameter ρ_{00} is exacted and plot against transverse moment and centrality.

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