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Spin alignment measurements using vector mesons with ALICE detector at the LHC

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Large magnetic field and large angular momentum are expected to be present in the initial stages of high-energy heavy-ion collisions. One of the physics interests of the heavy-ion program using the ALICE detector at the LHC is to look for signatures of these effects. This can be achieved by studying the angular distributions of the decay daughters of hyperons and vector mesons.

We present new measurements related to spin alignment of K^{*0} vector mesons at mid-rapidity for Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ and 5.02 TeV. The zeroth element of the spin density matrix element, ρ_{00} , is found to have values slightly below 1/3 at low transverse momentum (p_T) for K^{*0} mesons, while it is consistent with 1/3 (no spin alignment) at higher p_T . No spin alignment is observed for K^{*0} in pp collisions at $\sqrt{s} = 13$ TeV and for the spin zero hadron K_S^0 in 20-40% Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV.

The ρ_{00} values are not only sensitive to the angular momentum of the system but also to the production mechanism of the vector meson. The centrality dependence of the ρ_{00} results with production plane and event plane in Pb-Pb collisions at LHC energies will be discussed in detail.

Content type

Experiment

Collaboration

ALICE

Centralised submission by Collaboration

Presenter name already specified

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