

Strangeness in Quark Matter 2019



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Spin alignment measurements of vector mesons in Pb-Pb collisions with ALICE at the LHC

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Spin alignment of vector mesons produced in non-central heavy-ion collisions could occur due to the large angular momentum and intense magnetic field expected in the initial stages of these collisions. This phenomenon leads to a non-uniform angular distribution of the decay products of the vector meson with respect to the quantization axis in the rest frame of vector meson. The quantization axis can be either the normal to the production plane (plane subtended by the momentum of vector meson and the beam axis) or the normal to the reaction plane of the system (defined by the impact parameter and the beam axis). The study of the angular distribution of the decay products leads to a measurement of the zeroth element of the spin density matrix element ρ_{00} . Any deviation of the value of ρ_{00} from $1/3$ would indicate the presence of spin alignment. We report on recent ALICE results from spin alignment studies of the $\phi(1020)$ vector meson at mid-rapidity in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ and 5.02 TeV and in pp collisions at $\sqrt{s} = 13$ TeV. The p_T and centrality dependence of ρ_{00} with production and event plane in Pb-Pb collisions will be presented and compared to the corresponding results for the $K^*(892)^0$ vector meson. The extracted ρ_{00} values are found to be slightly below $1/3$ at low transverse momentum for both $K^*(892)^0$ and $\phi(1020)$ and are consistent with $1/3$ (no spin alignment) at higher p_T .

Collaboration name

ALICE Collaboration

Track

Hydrodynamics, chirality and vorticity

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