LHC Seminar

SPEAKER: Bedangadas Mohanty

TITLE: **Spin alignment of vector mesons measured in Pb-Pb collisions with ALICE**

DATE: 28 Jan 2020, 11:00

PLACE: 500/1-001 - Main Auditorium

ABSTRACT

Large initial angular momentum created in non-central heavy-ion collisions could lead to spin alignment of produced vector mesons due to spin-orbital angular momentum interactions in the QCD matter. The first evidence of spin alignment of vector mesons (K^{*} and ϕ) in heavy-ion collisions at the Large Hadron Collider (LHC) will be presented. The second diagonal spin density matrix element (ρ_{00}) is measured from the angular distribution of the decay daughters of the vector meson in the decay rest frame, with respect to the normal of both the event plane and the production plane. The measurements are carried out at midrapidity ($|y|< 0.5$) in Pb-Pb collisions at a centre-of-mass energy of 2.76 TeV with the ALICE detector. The ρ_{00} values are found to be less than 1/3 (= 1/3 implies no spin alignment) at low transverse momentum ($p_{\rm T} < 2$ GeV/c) for K^{*} and ϕ mesons at a level of $3\,\sigma$ and $2\,\sigma$, respectively. No significant spin alignment is observed for the $K^{0}_{\rm S}$ meson (spin = 0) in Pb-Pb collisions and for the vector mesons in pp collisions. The measured spin alignment is surprisingly large compared to the polarization measured for Λ hyperons, but qualitatively consistent with the expectation from models which attribute the spin alignment to a polarization of quarks in the presence of large initial angular momentum in non-central heavy-ion collisions and a subsequent hadronization by the process of recombination. Reference: e-Print: arXiv:1910.14408, ALICE Collaboration

Organised by: M. Mangano, M. Pepe-Altarelli, G. Unal..........
Refreshments will be served at 10h30