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Lambda Polarization in peripheral heavy ion collisions

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Due to the low viscosity and strongly interacting QGP at high LHC energies flow fluctuations were observed up to the 8th flow harmonics. Similarly rotation, turbulence and even Kelvin-Helmholtz Instability were predicted and these may be observable by different methods. Apart of the usual flow harmonics analysis, other methods like two particle correlations, or particle polarizations may arise as a consequence of these processes. The appearance of turbulent phenomena in these experiments would be additional direct proof of the low viscosity.

In particular we observed in 3+1D fluid dynamical calculations at LHC and RHIC energies that Lambda polarization arising from thermal and mechanical equilibrium, can provide measurable signal in given azimuthal directions. The signal is predicted to be somewhat stronger at RHIC energies because the higher temperature at LHC decreases thermal vorticity (polarization) even if the angular momentum is larger at LHC. This mechanism is considerably stronger than the polarization arising from the direct electro-magnetic effect of the strong and rapidly changing fields during the collision.

The talk is based on recent results and the following publications:

L.P. Csernai, V.K. Magas, H. Stoecker, and D.D. Strottman,

Phys. Rev. C 84, 024914 (2011).

L.P.Csernai, D.D.Strottman, C.Anderlik, Phys.Rev.C 85, 054901 (2012).

L.P. Csernai, V.K. Magas, D.J. Wang, Phys. Rev. C 87, 034906 (2013).

F. Becattini, L.P. Csernai, D.J. Wang, Phys.Rev. C 88, 034905 (2013).

On behalf of collaboration:

None

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