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## Vorticity evolution in hydrodynamical expansion of the fireball

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Relativistic Heavy Ion Collisions allow to create ultra hot and dense systems, where a phase transition from hadronic matter to quark-gluon matter is expected to occur. Nowadays the progress of experimental techniques allows to analyze these collisions on an event-by-event basis, and the most advanced theoretical simulations are performed within the so-called hybrid models, where different stages of the reaction are each simulated with the most suitable theoretical approach. Our group also uses such a hybrid approach –initial stages are simulated with Generalized Effective String Rope Model [1], then the system expansion is simulated using 3+1D Particle-in-Cell relativistic hydrodynamical module, which is later coupled to SMASH hadron cascade [2]. However, in this presentation I want to concentrate on the results of the first two modules related to the production and further evolution of the vorticity in relativistic flow. Results at different collision energies and reaction centralities will be presented, and we shall verify whether the helicity conservation law, recently propose in [3], is satisfied in our simulations.

[1] A. Reina Ramirez, et al., Phys. Rev. C107 (2023) no.3, 034915

[2] J. Weil, et al. Phys. Rev. C 94, 054905 (2016)

[3] C. Manuel and J.M. Torres-Rincon, Phys. Rev. D107 (2023) no.11, 116003

### session

G. Heavy Ion Physics

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