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Comparison for initial density fluctuations in relativistic heavy ion collisions

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We have compared four models of initial conditions of a fluid dynamic description of high energy heavy ion collisions, focusing on the expectation values and event-by-event fluctuations in the initial transverse energy density profiles from Pb-Pb collisions. Specifically, introducing a Fourier-Bessel mode expansion for fluctuations, we determine expectation values and two-mode correlation functions of the expansion corresponding coefficients. The analytically solveable independent point-sources model is compared to an initial state model based on Glauber theory and two models based on the Color Glass Condensate framework. We find that the large wavelength modes of all investigated models show universal properties for central collisions and also discuss to which extent general properties of initial conditions can be understood analytically.

Authors: GROSSI, Eduardo (Stony Brook University); FLOERCHINGER, Stefan (Heidelberg University); Mr YOUSEFNIA, Kianusch (University of Munich)

Presenters: GROSSI, Eduardo (Stony Brook University); FLOERCHINGER, Stefan (Heidelberg University); Mr YOUSEFNIA, Kianusch (University of Munich)

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