

APR12-2012-000304

Abstract for an Invited Paper
for the APR12 Meeting of
the American Physical Society

Characteristics of the strongly Interacting Quark Gluon Plasma – implications of recent flow results

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Recent measurements of higher order flow coefficients offer a more complete understanding of how hot and dense QCD matter is created in relativistic heavy ion collisions and what its properties are. In addition to providing new constraints on the viscosity of the quark gluon plasma, anisotropic flow is sensitive to the structure of the initial state. As elliptic flow (v_2) is generated by the difference in pressure gradients that result from the initial almond shape of the reaction region in non-central collisions, higher order coefficients encode more detailed information about the event-by-event fluctuating initial state profile. In my talk, I will present an overview of theoretical work aimed at understanding the correlations between initial state structures and final state correlations and their origin and discuss the current status of initial state models. I will outline how the new experimental findings at RHIC and LHC can be used towards characterize the dynamical evolution of relativistic heavy ion collisions with special emphasis on the role of event-by-event approaches and sophisticated multi-parameter fits to achieve this goal.