Modeling of Momentum Correlations in Heavy Ion Collisions

CLAUDE PRUNEAU, MONIKA SHARMA, Wayne State University — Measurements of transverse momentum (p_t) correlations and fluctuations in heavy ion collisions (HIC) are of interest because they provide information on the collision dynamics not readily available from number correlations. For instance, p_t fluctuations are expected to diverge for a system near its tri-critical point [1]. Integral momentum correlations may also be used to estimate the shear viscosity of the quark gluon plasma produced in HIC [2]. Integral correlations measured over large fractions of the particle phase space average out several dynamical contributions and as such may be difficult to interpret. It is thus of interest to seek extensions of integral correlation variables that may provide more detailed information about the collision dynamics. We introduce a variety of differential momentum correlations and discuss their basic properties in the light of simple toy models. We also present theoretical predictions based on the PYTHIA, HIJING, AMPT, and EPOS models. Finally, we discuss the interplay of various dynamical effects that may play a role in the determination of the shear viscosity based on the broadening of momentum correlations measured as function of collision centrality. [1] L. Stodolsky, Phys. Rev. Lett. **75** (1995) 1044. [2] S. Gavin and M. A. Aziz, Phys. Rev. Lett. **97** (2006) 162302.

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