Elliptic flow of deuterons in relativistic heavy ion collisions

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Using a dynamical model based on the NN→dπ, NNN→dN, and NNπ→dπ reactions, we have studied the production of deuterons and their elliptic flow in heavy ion collisions at RHIC. Using measured nucleon transverse momentum spectrum and elliptic flow in minimum bias Au+Au collisions at center of mass energy $s^{1/2}_{NN}$=200 GeV, the production rate of deuterons at freeze out is evaluated and is found to be dominated by the reaction NN→dπ. The predicted scaled deuteron elliptic flow v_2/A is shown by solid lines in Fig.1 as a function of scaled transverse momentum p_T/A in the left panel and scaled transverse kinetic energy E_{KT}/A in the right panel. Also shown by dashed lines are the scaled deuteron v_2 from the coalescence model based on the overlap of the deuteron Wigner function with the nucleon distribution function. Compared to the nucleon v_2, given by dotted lines, the expected nucleon number scaling of deuteron v_2 is slightly violated in both the coalescence model and the dynamical model. Both models give a reasonable description of measured deuteron v_2 by the PHENIX and STAR collaborations, shown by filled circles and squares, respectively, except at low p_T and E_{KT}.

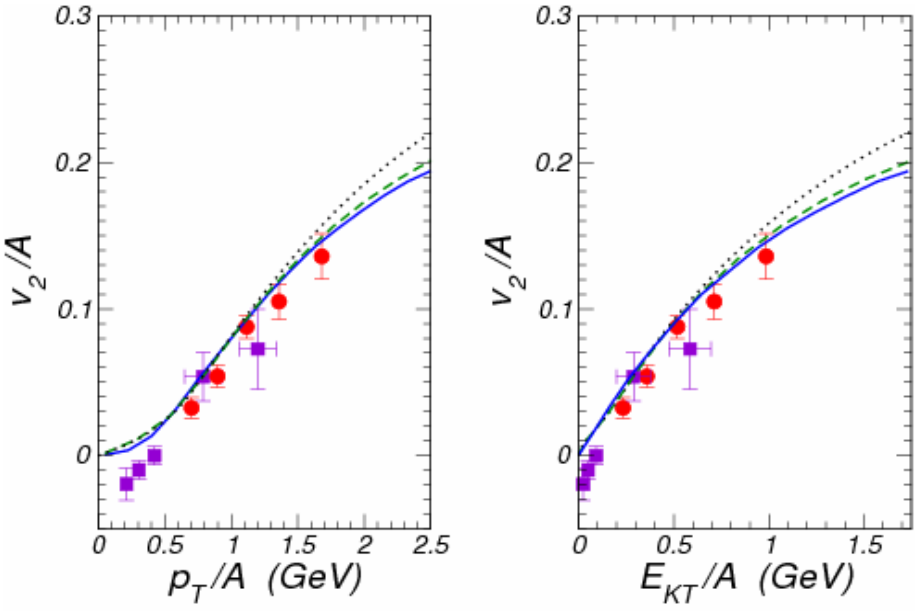

Figure 1. Scaled elliptic flow of deuterons as a function of (left panel) p_T/A and of (right panel) E_{KT}/A at midrapidity with the nucleon number A. The dotted line is the nucleon v_2, and the dashed and solid lines are the results of the coalescence model and the dynamical model. Experimental data are from PHENIX (filled circles) and STAR (filled squares) collaborations.