System Size Dependence of Elliptic Flows in Relativistic Heavy-Ion Collisions

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We have studied in the framework of a multi-phase transport (AMPT) model the elliptic flows in both Cu+Cu and Au+Au collisions at the Relativistic Heavy Ion Collider [1]. For both collisions at same reduced impact parameter and minimum bias collisions, the elliptic flow of charged hadrons in Cu+Cu collisions is about a factor of three smaller than that in Au+Au collisions at same energy as shown in Fig.1. The reduction factor is similar to the ratio of the sizes of the two colliding systems and is also related to the combined effects of initial energy density and spatial elliptic deformation in the two reactions. Similar system size dependence is also seen in the elliptic flow of partons from minimum bias collisions.

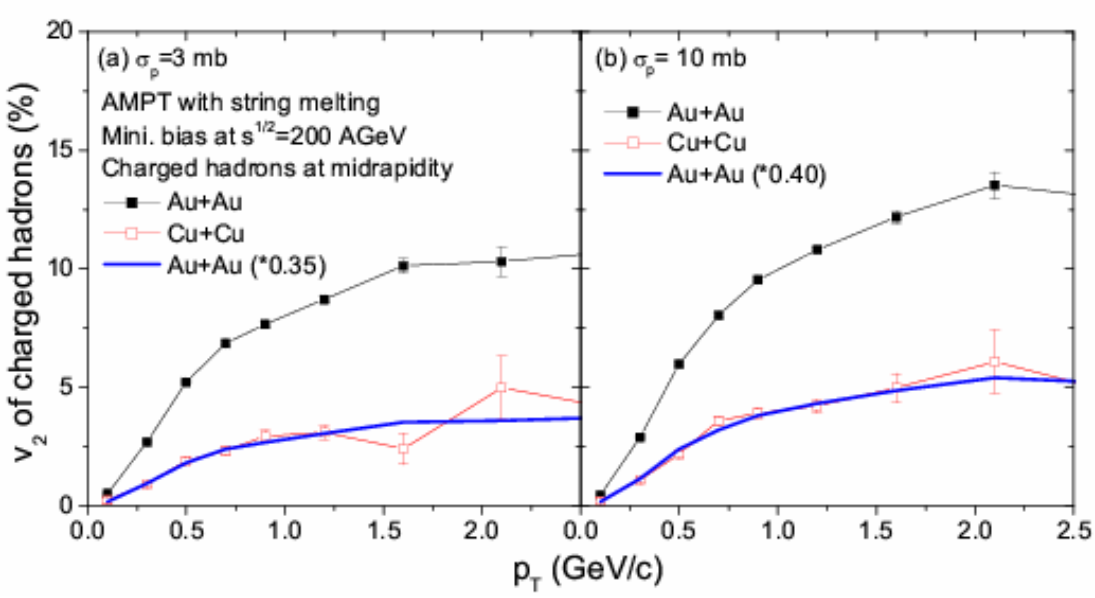

Figure 1. Transverse momentum dependence of v_2 of midrapidity charged hadrons from minimum bias events in Au+Au (solid squares) and Cu+Cu (open squares) collisions at $s^{1/2}$ = 200 A GeV for parton scattering cross sections of 3 mb (left panel) and 10 mb (right panel). The solid line is 0.35 (0.4) times of v_2 of Au+Au for parton cross section of 3 (10) mb.

[1] L.W. Chen and C.M. Ko, Phys. Lett. B **634**, 205 (2006).