φ and Ω Production in Relativistic Heavy-Ion Collision in a Dynamical Coalescence Model

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Based on the phase-space information obtained from a multi-phase transport (AMPT) model within the string melting scenario for strange and antistrange quarks, we have studied the yields and transverse momentum spectra of φ mesons and Ω baryons as well as their anisotropic flows in Au+Au collisions at RHIC using a dynamical quark coalescence model that includes the effect due to quark phase-space distributions inside hadrons [1]. With current quark masses and fixing the φ and Ω radii from fitting measured yields, we first studied the ratio of the yield of Ω baryons to that of φ mesons as well as their elliptic and fourth-order flows as functions of their transverse momentum (Fig.1). How the elliptic and fourth-order flows of φ mesons and Ω baryons are related to those of strange and antistrange quarks was then examined. The dependence of above results on φ and Ω radii as well as on the strange quark mass has also been studied.
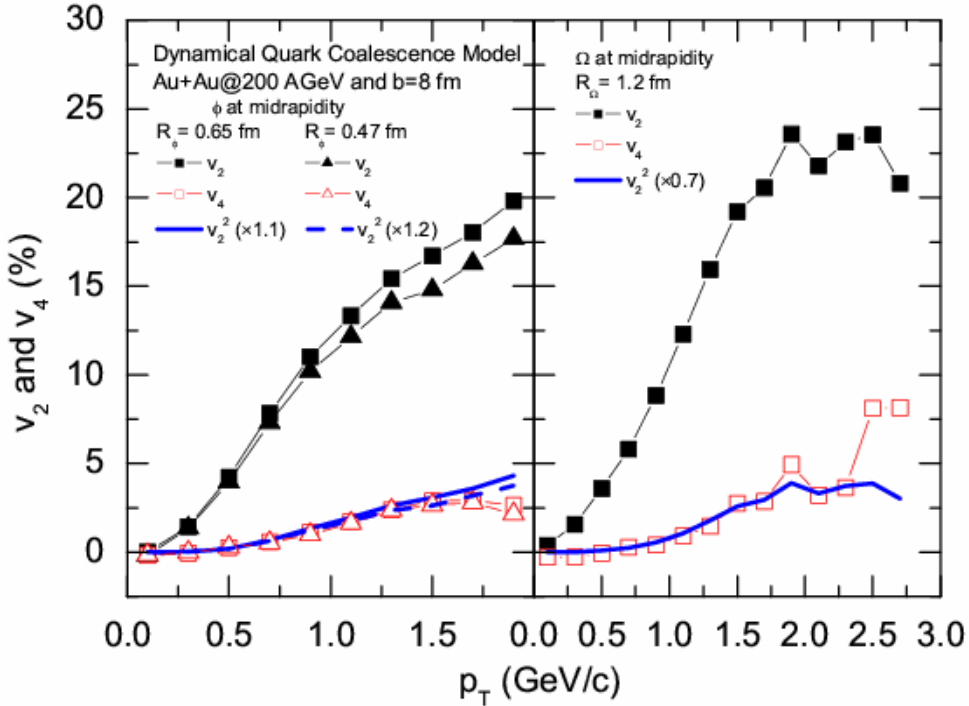

Figure 1. Transverse momentum dependence of anisotropic flows v_2 and v_4 of mid-rapidity φ mesons (left panel) and Ω baryons (right panel) produced in Au+Au collisions at $s^{1/2} = 200$ A GeV and impact parameter b=8 fm. Solid and dashed lines in left panel are, respectively, $1.1v_2^2$ and $1.2v_2^2$ for φ mesons, while solid line in right panel is $0.7v_2^2$ for Ω baryons.

[1] L.W. Chen and C.M. Ko, Phys. Rev. C **73**, 044903 (2006).