

# Beam Energy Dependence of Baryon Directed Flow ( $v_1$ ) in Au + Au Collision at RHIC-STAR

Zhuo Wang  
(for the STAR Collaboration)

1 Anisotropic collective flow provides valuable information about the evolution of nuclear  
2 matter in the early stages of collisions and is one of the commonly used observables in  
3 high-energy heavy ion collisions. The first harmonic coefficient in the Fourier expansion  
4 of the final-state azimuthal anisotropy, relative to the reaction plane, is referred to as  
5 directed flow,  $v_1$ . The  $v_1$  slope with respect to the rapidity for net-baryons from the first  
6 phase of Beam Energy Scan (BES-I) exhibits a minimum around 10-20 GeV, a feature  
7 predicted to be sensitive to the softening of the equation of state near a first-order phase  
8 transition.

9 In this poster, we will present the rapidity dependence of  $p$ ,  $\bar{p}$ ,  $\Lambda$  and  $\bar{\Lambda}$   $v_1$  in  
10 Au + Au collisions at  $\sqrt{s_{NN}} = 7.7, 9.2, 11.5, 14.5, 17.3,$  and  $19.6$  GeV using the high  
11 statistics data from the Beam Energy Scan Phase II (BES-II) by STAR. We will compare  
12 our measurements with transport model calculations and discuss the implications for  
13 understanding the QCD phase structure.