

Dependence of semi-inclusive jet and high- $p_T$  charged  
particle production on event activity at high  
backward-rapidity in  $\sqrt{s_{NN}} = 200$  GeV  $p$ +Au collisions  
at STAR

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1 Observations of flow-like signals in small-system collisions,  $pp$  and  $p/d+A$ , have  
2 led to a resurgence of interest and measurements, the results of which have perhaps  
3 permanently challenged the naive picture of initial geometry and subsequent early-  
4 time dynamics for these systems. In the wake of this renewed interest, jet and  
5 high- $p_T$  particle measurements in small systems are proving similarly fruitful and  
6 challenging. While no clear signal of jet quenching has been observed, inclusive  
7 measurements at both LHC and RHIC energies of  $p/d+A$  collisions show jet spectra  
8 enhancement/suppression at high Bjorken- $x$  when binned by event activity (EA) at  
9 high backward-rapidity (the A-going direction). In this talk we present the first semi-  
10 inclusive small-system jet spectra measurements at RHIC energies. The results show  
11 significant suppression of the jet spectra normalized per trigger in high-EA relative  
12 to low-EA collisions. PYTHIA 8 simulations verify that the modification of these  
13 spectra is not the result of trivial autocorrelations. Surprisingly, these simulations  
14 do show a qualitatively similar modification and studies to understand the cause  
15 will be presented. Finally, we present charged particle correlations with EA at high  
16 backward-rapidity, which hint at energy conservation or fluctuating proton effects.