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## PHENIX study of the initial state with forward hadron measurements in 200 GeV p(d)+A and $^3\text{He}+\text{Au}$ collisions

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Forward hadron measurements in p(d)+A provide a signal to study nuclear shadowing, initial state energy loss and/or gluon saturation effects as a function of rapidity, centrality and energy. High  $p_T$  identified  $\pi^0$  measurements are also an essential first step toward measuring prompt photon production. The  $\pi^0$  measurements are enabled by the PHENIX MPC-EX detector, a Si-W preshower detector located in front of Muon Piston Calorimeter (MPC), expanding the neutral pion reconstruction capabilities in the rapidity range  $3.1 < \eta < 3.8$  out to high energies,  $E < 80$  GeV. Previous PHENIX measurements of punch-through charged hadrons in the muon arms in the rapidity range  $1.4 < |\eta| < 2.2$  were significantly improved through the capability of the forward silicon vertex detector (FVTX) to determine the transverse momentum and rapidity with high precision and reject background from secondary hadrons.

PHENIX collected d+Au data with the MPC-EX in the 2016 run at  $\sqrt{s_{NN}} = 200, 62, 39$  and  $19.6$  GeV; and p+p and p+Au(Al) data with the FVTX in 2015 at 200 GeV. In this talk we will present first results for high  $p_T$   $\pi^0$  production from the  $\sqrt{s_{NN}} = 200$  GeV dataset, the status of the prompt photon measurement, as well as charged hadron nuclear modification factors in p+Au(Al) and  $^3\text{He}+\text{Au}$ .

### Content type

Experiment

### Collaboration

PHENIX

### Centralised submission by Collaboration

Presenter name already specified

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