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## Forward Physics with light vector mesons and $\pi^0$ from the PHENIX Experiment

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Forward and backward rapidity regions are rich laboratories to explore several effects which happens to a probe before and after its hard scattering. The large rapidity region may also experiment a different dynamics for strangeness enhancement seen in heavy ion collisions at RHIC and LHC. The PHENIX experiment has a long history of large rapidity measurements with the muon spectrometers covering  $1.2 < |\eta| < 2.2$  and a forward calorimeter (MPC) covering  $3.1 < |\eta| < 3.8$ . The addition of a pre-shower detector, the MPC-ex in front of the MPC, allows the identification of  $\pi^0$  in a broad momentum range covering a Bjorken-x region between  $10^{-3} - 10^{-2}$ . This presentation will report two measurements: i)  $\phi$  meson nuclear modification using the muon spectrometer in  $d+Au$ ,  $Cu+Au$  and  $Au+Au$  which can explore how strangeness are affected by initial and final state effects and its behavior in QGP at large rapidity; ii)  $\pi^0$  nuclear modification factor in  $d+Au$  collisions which are sensitive to parton shadowing and gluon saturation.

### Category

Experiment

### Collaboration (if applicable)

PHENIX

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