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## Cold nuclear matter effects on $\Upsilon(1S + 2S + 3S)$ production

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$\Upsilon(1S + 2S + 3S)$  are measured in  $d + Au$  and  $p + p$  collisions at  $\sqrt{s_{NN}} = 200$  GeV by the PHENIX experiment in the di-muon decay channel at  $1.2 < |y| < 2.2$ . Compared to the  $J/\psi$ , the  $Upsilon$ 's heavier mass makes it possible to study the nuclear effects on the gluon distribution in different kinematic regions than those probed by the  $J/\psi$ . The measured results are compared to a nuclear shadowing model, EPS09 combined with a final state absorption cross section,  $\sigma_{br}$ , and contrasted with the PHENIX  $J/\psi$  results. We also will compare to lower energy  $p + A$  results. Conclusive findings on  $\sigma_{br}$  are difficult to obtain due to the large experimental uncertainties. However the degree of suppression is found to agree within uncertainties with the lower energy measurement as well as the  $J/\psi$ . In this poster, the details of the analysis procedure will be shown.

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