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Accessing the gluonic structure of light nuclei at the Electron Ion Collider

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We show how exclusive vector meson production off light ions can be used to probe the spatial distribution of small- x gluons in the deuteron and ^3He wave functions. In particular, we demonstrate how short range repulsive nucleon-nucleon interactions affect the predicted coherent J/Ψ production spectra. Fluctuations of the nucleon substructure are shown to have a significant effect on the incoherent cross section above $|t| > 0.2 \text{ GeV}^2$. By explicitly performing the JIMWLK evolution, we predict the x -dependence of coherent and incoherent cross sections in the EIC energy range. Besides the increase of the average size of the nucleus with decreasing x , both the growth of the nucleons and subnucleonic hot spots are visible in the cross sections. The decreasing length scale of color charge fluctuations with decreasing x is also present, but may not be observable for $|t| < 1 \text{ GeV}^2$, if subnucleonic spatial fluctuations are present.

References

H. Mäntysaari, B. Schenke, e-Print: arXiv:1910.03297, accepted for publication in Phys. Rev. C

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