

## The ratio of $\Psi(2s)$ and $J/\Psi$ exclusive photoproduction cross-sections as a tool to detect non-linear QCD evolution

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We study the proposal that the ratio of  $\Psi(2s)$  and  $J/\Psi$  exclusive photoproduction cross-sections might serve as an indicator of the presence of non-linear QCD evolution, related to the presence of high and potentially saturated gluon densities in both the proton and a lead nucleus. Our study employs recent fits of the GBW and BGK dipole model and provides predictions for both exclusive photoproduction on a proton and on a lead nucleus. While the cross-sections for photoproduction on a proton depend only weakly on non-linear low  $x$  corrections, we find an increased sensitivity for the cross-section ratio, which is directly related to the node in the  $\Psi(2s)$  wave function. We further give a description of recent ALICE data for exclusive  $J/\Psi$  photoproduction on a lead nucleus and provide predictions for  $\Psi(2s)$  photoproduction on a lead nucleus as well as for the corresponding cross-section ratio.

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