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## First measurement of the double-differential cross section of coherent $J/\psi$ photoproduction to probe gluons in nuclei with ALICE

Theory predicts that the inner structure of hadrons changes with increasing energy, and that gluon saturation can occur in heavy nuclei at lower energies compared to protons. Additionally, phenomena such as gluon shadowing can exhibit similar experimental signatures to gluon saturation. ALICE has recently presented new results on coherent  $J/\psi$  mesons, where the photon probes the entire nucleus. These results span photon–nucleon center-of-mass energies from around 10 GeV to 1000 GeV, confirming previous ALICE measurements at lower energies and extending them to higher energies. The data at high energies can be described by both saturation-based and gluon shadowing models, though no current theoretical model fully captures the energy dependence observed. In this talk, we will present new ALICE studies on the energy dependence of coherent  $J/\psi$  production across various  $t$ -intervals using Run 3 data, providing the strongest test yet of theoretical predictions through the first double differential cross sections for this process.

### Category

Experiment

### Collaboration (if applicable)

ALICE

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