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## Imaging a nucleus with $J/\psi$ photo-production in ultra-peripheral collisions at STAR

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In ultra-peripheral collisions (UPCs) where two relativistic nuclei pass one another at a distance more than twice the nuclear radius, quasi-real photons from one nucleus may interact via a virtual quark-antiquark pair with gluons from the other nucleus and form short-lived vector mesons (e.g.,  $\rho^0$ ,  $J/\psi$ ,  $\phi$ ). Lorentz-boosted electromagnetic field of a relativistic nucleus can be quantized as linearly polarized photons. Due to the photon polarization in the vector meson production processes, a unique diffractive or spin interference pattern can be observed. In order to study the interference pattern, we will present the  $\cos(2\Delta\phi)$  modulation, where  $\Delta\phi$  is the angle between the  $J/\psi$  and one of its daughters, in Au+Au UPCs at  $\sqrt{s_{NN}} = 200$  GeV recorded in 2014 and 2016 by STAR. This angular modulation is sensitive to the nuclear geometry and gluon distribution inside the colliding nuclei.

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