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Vector mesons photoproduction in ultra-peripheral ion-ion collisions

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The main goal in investigation of vector mesons production in
ultra-peripherall collisions (UPC) of relativistic ions is the possibility to constrain the nuclear and proton gluon distributions.
The strong electromagnetic fields accompanying heavy ions accelerated
at BNL or LHC may lead to huge vector mesons photoproduction in
ultra-peripheral collisions, where there is no overlap between the
colliding nuclei. Such experiments have been done in the last decade by STAR and ALICE collaborations.
From another hand considerable interest could be to study of vector mesons in UPC at future collider NICA with
the center-of-mass energies 5-11 GeV the region of Vector Meson Dominance
model. The possible performance of such investigations at NICA is under the way.
We point out a significance of ultra-peripheral photoproduction of vector mesons in the Coulomb field of nuclei as a means of measuring
the radius of the neutral vector meson . This contribution to the production amplitude is small compared to the conventional
diffractive amplitude, but because of large impact parameters inherent to the ultra-peripheral Coulomb mechanism its impact on
the diffraction slope is substantial. We predict appreciable
and strongly energy dependent increase of the diffraction slope towards
very small momentum transfer.The magnitude of the effect is proportional to
the mean radius squared of the vector meson and is within the reach of
high precision experiments in ultra-peripheral heavy ions collisions , which gives a unique experimental handle on the size of vector mesons.

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