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ALICE results on ultra-peripheral collisions and their impact on the EIC

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Ultra-peripheral collisions are collisions between two nuclei (or protons) without overlap - the impact parameter is larger than the sum of the nuclear radii. Strong interactions are thus heavily suppressed but electromagnetic interactions are allowed. The electromagnetic fields can be treated as an equivalent flux of photons (Fermi-Weizsacker-Williams), and these photons may interact with the other, target nucleus in a variety of ways.

Ultra-peripheral collisions have attracted an increased interest in recent years, both at the Relativistic Heavy-Ion Collider (RHIC) and the Large Hadron Collider (LHC). Initially, the focus was on exclusive and coherent Vector Meson production. These interactions are valuable as probes of the nuclear gluon content. In recent years, more general inclusive photonuclear interactions (gamma+A –> X) have also gained attention.

Owing to the upgrade of the ALICE readout system before LHC Run 3, ALICE has been able to study the latter type of photonuclear interactions starting with the heavy-ion run in 2023. Photoproduction of several particle species have been investigated. These include charged pions, kaons, protons; strange particles K0, Lambda; and open charm D0. In this talk, the ALICE results on ultra-peripheral collisions will be reviewed with a focus on the most recent inclusive photoproduction results. These results will provide an important baseline for the EIC, for example by constraining theoretical calculations and Monte Carlo models before the first results arrive.

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