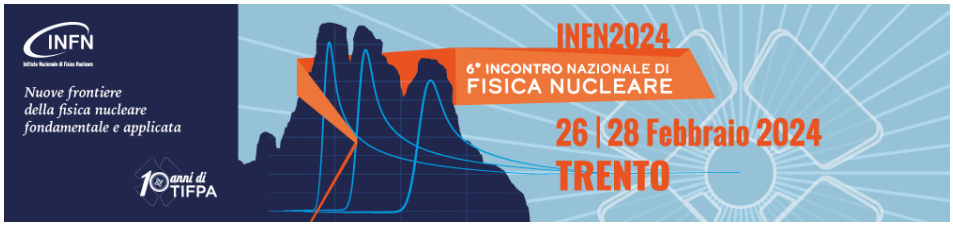


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# Measurement of azimuthal anisotropy in coherent ρ0 photoproduction in ultra-peripheral Pb–Pb collisions with ALICE

*Tuesday, 27 February 2024 10:05 (5 minutes)*

Ultra-peripheral heavy-ion collisions (UPCs) occur when the impact parameter of the collision is greater than the sum of the radii of the colliding nuclei. Given the short range of the strong force, these collisions allow one to study photoninduced reactions. Of particular interest is the photoproduction of a vector meson, that is a well-established tool to probe the gluon structure of the colliding nuclei. This talk will focus on the observation of spin interference in the $\rho^0$ meson photoproduction, in the form of angular anisotropy. Such an anisotropy appears due to two different factors: the first is that the photons involved in the process are linearly polarized along the impact parameter and the second is the quantum interference between the two amplitudes that contribute to the $\rho^0$ photoproduction cross section. Furthermore, the interference effect strongly depends on the impact parameter of the collision, which acts as the distance between the openings of a two-slit interferometer. In this talk, we present the first measurement of this anisotropy in coherent $\rho^0$ photoproduction from ultra-peripheral Pb–Pb collisions at a center-of-mass energy of 5.02 TeV per nucleon pair. This anisotropy is measured as a function of the impact parameter of the collision, estimated classifying the events in nuclearbreakup classes defined by neutron emission. The $\rho^0$ mesons are detected by the ALICE experiment through their decay into a pion pair. The anisotropy occurs as a function of $\phi$, defined as the azimuthal angle between the two vectors formed by the sum, and the difference, of the four-momentum of the pions, respectively. It results in a $\cos(2\phi)$ modulation of the photoproduced $\rho^0$; the amplitude of the modulation is found to increase by about one order of magnitude from large to small impact parameters. This trend has been found to be compatible with the available theoretical predictions.

**Primary author:** RIFFERO, Andrea Giovanni (Istituto Nazionale di Fisica Nucleare)

**Presenter:** RIFFERO, Andrea Giovanni (Istituto Nazionale di Fisica Nucleare)

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