Contribution ID: **18** Type: **not specified**

Single and double diffractive production of dilepton and photon at LHC

Wednesday 23 July 2025 15:45 (40 minutes)

(ONLINE)
This study investigates the single and double diffractive production of dileptons and photons in ultra-peripheral collisions at the Large Hadron Collider (LHC). Utilizing advanced theoretical models that integrate quantum electrodynamics (QED) and Quantum Chromodynamics (QCD) frameworks, we analyze the differential cross sections of these processes, with particular emphasis on the role of the Pomeron and resolved Pomeron structures. Our research employs semi-coherent two-photon production mechanisms to predict dilepton production rates under various LHC energy scenarios. Our results demonstrate distinct production patterns for single and double diffractive processes, highlighting their potential as probes for studying the electromagnetic structure of heavy ions and the dynamics of soft interactions in high-energy collisions. This paper provides new insights into the photon-mediated and Pomeron-mediated production mechanisms and sets the stage for future experimental investigations at collider facilities. Key words: Dileptons, Photon, Diffractive processes, Ultraperipheral collisions, LHC (Large Hadron Collider). PACS: 12.39.St, 13.85.Dz, 25.75.Cj

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Session Classification: Afternoon session 4