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## Direct Photon Production and Correlations in Pb-Pb Collisions at $\sqrt{s_{NN}} = 5.02$ TeV

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Experimental studies in the recent decades have provided strong evidence for the formation of hot and dense nuclear matter in heavy-ion collisions. Such matter is predicted by Quantum Chromodynamics (QCD) to be a quark-gluon plasma (QGP) consisting of deconfined quarks and gluons. Direct photons, which are not originating from hadron decays, are one of the key experimental observables of QGP. At low transverse momenta ( $p_T$ ), an exponential spectrum of thermal direct photons ( $p_T \leq 2$  GeV/c) captures features of space-time evolution of the QGP expansion and the hadronic gas. Additionally, the thermal direct photon spectrum could be expanded down to lower  $p_T$  using correlations of soft photons. Hanbury Brown and Twiss (HBT) correlation of direct photons can shed light on the space-time properties of QGP. ALICE is capable to measure photons in wide range of  $p_T$ , exploiting detectors the tracking system for measurements of photon conversion into  $e^+e^-$  pairs. High- $p_T$  photons are measured with electromagnetic calorimeters EMCal and PHOS. In this talk, the direct photon production and HBT correlations in Pb-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV with ALICE are reported.

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