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Photon Physics Potential at ALICE

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The ALICE detector has been designed to study the strongly interacting matter created in nucleus-nucleus collisions at the Large Hadron Collider (LHC). In heavy-ion collisions, it is very critical to measure thermal photons, which are known to carry the temperature information of hot created matter. The thermal photon measurements at RHIC are suggesting the systematic study with better photon detectors at LHC. Furthermore, the suppression of high p_T hadrons has provided the first strong signature of hot and dense partonic matter created in heavy-ion collisions at RHIC. Therefore, the suppression behavior of various particle species, including photons, up to LHC energy, is a key observable for the study of the hot matter dynamics. The ALICE PHOton Spectrometer (PHOS) consists of 17920 PWO crystals and Avalanche Photo Diode (APD) covering a rapidity range of ± 0.3 and an azimuthal range of 100°. The fine segment structure and small Moliere radius allow to separate two photons from π^0 decay at pT=30GeV/c with about 100% efficiency and at even higher pT with smaller efficiency. The decay photons from lower pT π^0 is the largest background in measuring the thermal photons and can be tagged in a very efficient way with a good energy resolution ($3\%/\sqrt{E(GeV)}$). The ALICE EMCAL consists of shashlik lead-scintillator sampling units covering a rapidity range of ± 0.7 and an azimuthal range of 110° and sits in the opposite coverage azimuthally to PHOS. The jet measurements by EMCAL and other tracking detectors, especially when tagged by a direct photon in the opposite PHOS detector, represent a key probe for investigating jet quenching effects. In this presentation, physics potential with photon detectors at ALICE during the first physics run of LHC will be discussed. The construction and installation status of the photon detectors as well as their expected physics will be presented.