

# Measurement of Neutral Mesons and Direct Photons with ALICE at the LHC

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The ALICE experiment is dedicated to the study of the so-called Quark-Gluon Plasma (QGP) which is created in highly energetic heavy-ion collisions. To investigate and understand the properties of this hot and dense partonic medium, the analysis of pp and p-Pb collisions also plays an important role. In this context, one point of general interest is the measurement of direct photons. They can be regarded as an ideal probe to study the QGP since they do not participate in the strong interaction. Hence, they are able to escape the medium unaffected. As photons are created in early partonic collisions and throughout the evolution of the QGP, they provide insights into the different stages of the system.

In total, there are two different methods to measure photons in ALICE. One way is to make use of electromagnetic calorimeters and the other possibility is to look for photon conversions which occur within the detector material. Light neutral mesons, namely  $\pi^0$  and  $\eta$ , are reconstructed via their two photon decay channels, for which both methods are used individually as well as in combination, the so-called “hybrid methods”, which exploit in different ways the respective advantages of the detectors, i.e. the excellent momentum resolution of the conversion photons down to very low transverse momenta and the high reconstruction efficiency of a calorimeter. Therefore, precise measurements of neutral meson production cross sections up to highest transverse momenta of 40 GeV/c can be obtained. They are of high importance for the identification of the decay photons in the context of direct photon measurements. These include not only prompt photons, which are created in early partonic collisions, but also fragmentation as well as thermal photons, which are used to study important aspects of heavy-ion collisions. Moreover, the pp measurements of neutral meson cross sections are used as a reference for p-Pb and Pb-Pb collisions to study parton energy loss mechanisms in the medium.

The talk will summarize recent ALICE results of neutral meson and direct photon measurements for pp, p-Pb and Pb-Pb collisions, put them into context and conclude with an overview about the latest status and prospects.

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