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## Studies of jet quenching and medium response using photon+jet events with ATLAS

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Partons traversing the hot and dense medium of deconfined color charges produced in collisions of heavy nuclei are expected to lose their energy primarily through medium-induced gluon bremsstrahlung. As a result, the amount of induced energy loss is expected to depend on the QCD color charge carried by the parton, i.e. depend on whether it is a quark- or a gluon-initiated jet. In this talk, photon+jet events taken with the ATLAS detector in Pb+Pb and pp are used to constrain the color-charge dependence of jet energy loss. First, ATLAS presents the finalized result on the nuclear modification factor RAA for photon-tagged jets. By comparing this measurement to the RAA for inclusive jets, one can exploit the known difference in the quark-/gluon-initiated jet fraction between these two samples and extract the QCD color-charge dependence. Second, ATLAS presents a new measurement of photon plus two jet production in Pb+Pb collisions as compared to  $pp$ , where the configuration of quark+gluon jet pair is expected to dominate. Measurements of the total jet-to-photon  $p_T$  ratio, the two-jet  $p_T$  asymmetry, and the jet opening angle are presented, providing novel information on the parton-QGP interaction. Finally, the study of photon+jet+hadron correlations in angular space, expected to be sensitive to medium response, is presented for the first time. All results are compared to a suite of theoretical calculations.

### Category

Experiment

### Collaboration (if applicable)

ATLAS Collaboration

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