## **Initial Stages 2021**



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## Charged- and neutral-particle production in proton-lead collisions at 5.02 and 8.16 TeV with ALICE

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Particle production at LHC energies results from the interplay of hard- and soft-QCD processes and is sensitive to non-linear QCD evolution in the initial state. In particular, for p-Pb collisions, one can use the proton to probe the low-x dense gluonic fields of the Pb nuclei. The multiplicity and rapidity dependence of charged- and neutral-particle production, therefore, provides important constraints for initial state models and calculations describing the particle production mechanisms.

ALICE has unique coverage at forward rapidity. The Photon Multiplicity Detector can measure neutralparticle production over a kinematic range of  $2.3 < \eta < 3.9$ . The Forward Multiplicity and the Silicon Pixel Detectors can measure charged particles over a wide range of  $-3.4 < \eta < 5.0$ . For the first time, results at forward rapidity will be presented for both charged and neutral particles in p-Pb collisions at 5.02 TeV and 8.16 TeV. The multiplicity and centrality dependence will be discussed. In this case, the centrality of the collisions is determined using the energy deposited in the Zero-Degree Calorimeters. Finally, the results will be compared to model calculations based on different particle-production mechanisms and initial conditions in the forward soft-QCD regime, in which perturbative-QCD calculations are impossible.

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