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Medium effects on Y yields in p–Pb and Pb–Pb collisions

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The respective contributions of cold-matter and hot-medium effects to the suppression of Y(1S) and Y(2S) mesons in p-Pb collisions at energies reached at the Large Hadron Collider (LHC) are investigated. Whereas known alterations of the parton density functions in the lead nucleus and coherent parton energy loss account for the leading fraction of the modifications in cold nuclear matter (CNM), the hot-medium (quark-gluon plasma, QGP) effects turn out to be relevant in spite of the small initial spatial extent of the quark-gluon droplet. Transverse-momentum-, rapidity-, and centrality-dependent theoretical results for the Y(1S) suppression in p-Pb collisions at a center-of-mass energy of √ s_NN = 8.16 TeV are compared with recent LHCb and ALICE data from the Large Hadron Collider (LHC). Both cold-matter and hot-medium effects are needed to account for the data, lending support to a transient QGP formation in small systems. The initial central temperature of the quark-gluon-droplet in p-Pb at √ s_NN =8.16 TeV is found to be T_0=460 MeV. The results for the asymmetric p-Pb system are compared to the hot-medium effects on Y-suppression in symmetric Pb-Pb-collisions at LHC energies, where the spatially extended fireball is mostly responsible for the dissociation of quarkonia, and cold-matter effects are less relevant. Here our hot-medium model yields excellent agreement with CMS data at 2.76 and 5.02 TeV, a comparison with recent Au-Au data from STAR is shown.

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