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Is there dark radiation accompanying QGP Hadronization?

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The deconfined quark-gluon plasma has color and chiral symmetries. At hadron level pions express the breaking of chiral symmetry, color gauge symmetry is invisible – SU(3)_c is broken at boundary between deconfined and confined domains. Goldstone Bosons associated with a weak symmetry breaking are of extreme low mass and therefore today are invisible to lattice-QCD_T. It turns out that such very light particles introduced besides neutrinos, and photons, into the cosmic background\footnote{J. Birrell, J.Rafelski: Quark-Gluon Plasma as the Possible Source of Cosmological Dark Radiation, Phys. Lett. B {\bf 741}, 77, (2015)} are also nearly invisible. In this lecture we present a) the impact of darkness produced in cosmological QGP hadronization on cosmological evolution; b) strategies how presence of such 'darkness' can be recognized in RHI collisions in study of energy balance and matter flow, and c) we argue that presence of darkness can sharpen the hadronization criterion of QGP as function of temperature and density.

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