



High Energy Physics - Phenomenology

Plasma damping effects on the radiative energy loss of relativistic particles

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The energy loss of a relativistic charge undergoing multiple scatterings while traversing an infinite, polarizable and absorptive plasma is investigated. Polarization and damping mechanisms in the medium are phenomenologically modelled by a complex index of refraction. Apart from the known Ter-Mikaelian effect related to the dielectric polarization of matter, we find an additional, substantial reduction of the energy loss due to damping of radiation. The observed effect is more prominent for larger damping and/or larger energy of the charge. A conceivable analog of this phenomenon in QCD could influence the study of jet quenching phenomena in ultra-relativistic heavy-ion collisions at RHIC and LHC.

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