



Contribution ID: 262

Type: **Poster**

Neutrino photoproduction on pseudo Nambu-Goldstone bosons

Tuesday 9 September 2014 18:50 (1h 30m)

Production of single neutrinos as well as neutrino-antineutrino pairs by photons interacting with pseudo Nambu-Goldstone bosons is studied within the Standard Model. The corresponding cross sections are found analytically. The energy loss due to neutrino emission in a thermal plasma of photons and pions is calculated. It is shown that the obtained neutrino emissivity may be significantly enhanced in hot and dense matter due to in-medium modification of the pion decay constant. Phenomenological consequences for ultrarelativistic heavy-ion collisions and astrophysics are discussed.

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Session Classification: Poster Session

Track Classification: Poster Session