

Equilibration of the chiral asymmetry due to finite electron mass

Tuesday 23 June 2020 13:00 (1 hour)

Zoom meeting: <https://cern.zoom.us/j/7930190483> (password: see email)

Format: 40 minutes talk + 20 min discussion

Virtual Axion Institute: The discussion on this talk can be continued in Oleksandr's virtual guest office.

<https://mattermost.web.cern.ch/axions/channels/oleksandr-sobol>

Abstract: One of the possible ways to generate the cosmological magnetic fields is based on the chiral magnetic effect. In plasma with chiral imbalance, it drives the instability which leads to the enhancement of some long-range magnetic modes of one helicity. In this respect, a very important question for magnetogenesis is how does this chiral imbalance evolve in time. In particular, how fast does it decay due to the chirality flipping processes in plasma? We calculate this rate due to nonzero electron mass in hot electron-positron plasma at temperatures well below the electroweak crossover. We consider the electron mass as a perturbation and apply the linear response formalism in order to extract the leading (quadratic in mass) contribution to the chirality-flipping rate. We show that this rate appears already in the first order in EM coupling constant and the numerical result is three orders of magnitude greater than the previous naive estimates.

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Session Classification: Gauge fields