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# Electric and magnetic susceptibilities of a hot and dense medium of massive fermions

In this work we calculate the electric and magnetic susceptibilities of a hot and dense medium in equilibrium up to order $\mathcal{O}(\frac{m^4}{T^4})$ $\mathcal{O}(\frac{m^2}{T^2})$, respectively. These susceptibilities are associated with $\mathcal{O}(k^2)$ terms (power corrections) of the photon polarization tensor, which are computed here for a hot and dense medium of fermions with a small but nonzero mass, i.e., $0 < m \ll T, \mu$. Our calculations are performed within the hard thermal loop approximation in the real-time formalism. In the high temperature and small chemical potential limit, our results are compared with previous calculations.

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