Next-to-leading order (NLO) quark self-energy and dispersion relation using HTL (hard thermal loop) approximation

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Flash Talk

- Using the HTL resummation in real-time formalism, we study the NLO quark self-energy and corresponding NLO dispersion laws.
- We calculate the usual quark self-energy diagram and the four-point vertex diagram separately, where we have used the effective propagators and effective vertices.
- Using those, we express the NLO quark self-energy in terms of the three- and four-point HTL effective vertex functions, which are further written in terms of the solid angles using the Feynman parametrization.
- After completing the solid angle integrals, we calculate the momentum integrals in the transverse part of the NLO quark self-energy numerically and plot them as a function of the ratio of momentum and energy.
- Using the NLO quark self-energy transverse part, we plot the transverse contribution of NLO dispersion laws.