

1 Lecture 1

1.1 Exercise 1

Using the Vlasov equation discussed in the lecture, compute the electric field created by a static point-like charge inside of a medium. Show that it is related with the Yukawa potential.

1.2 Exercise 2

Compute the temporal component of the photon propagator in the HTL approximation using as a guide what we discussed in the lecture.

2 Lecture 2

2.1 Exercise 1

Compute $\langle n | r^i (E - h_o)^2 r^i | n \rangle$. You can use as example of $\langle n | r^i (E - h_o) r^i | n \rangle$ worked out in the lecture. The virial theorem might be useful.

2.2 Exercise 2

Consider the Lindblac equation obtained in the regime $\frac{1}{r} \gg T \gg E$ in the static limit, $M \rightarrow \infty$. Solve the equations for an arbitrary initial density of singlets and octets. Show that the entropy increases monotonically.