

Problem 9.1 Distribution function

For a weakly interacting Fermi gas calculate the correction to the wave function

$$|\Psi\rangle = |\Psi^{(0)}\rangle + |\Psi^{(1)}\rangle + \dots$$

Show that the momentum distribution function for particles $n_k = \langle c_{ks}^\dagger c_{ks} \rangle$ has a reduced jump at the Fermi surface

$$n_{k_{F-}} - n_{k_{F+}} = ?$$