

Lecture 23: Fermi Liquid Theory, Electron Spectral Function**Lecture 24: Landau Parameter**

The Fermi liquid theory is discussed starting from the electron spectral function, which was introduced when we discussed tunneling. The key assumption of Landau is that a sharp peak in the spectral function survives the effect of interaction, and this peak gets sharper and sharper as we approach the Fermi energy. We show that this assumption leads to the discontinuity in $n(\vec{k})$, the occupation in momentum space. This permits a definition of the Fermi surface. The Luttinger theorem states that the volume of the Fermi surface is unaffected by interactions.

The phenomenological formulation of the Landau Fermi liquid theory is discussed by the introduction of the Landau parameters. Its effect on compressibility and spin susceptibility are discussed. The Landau-Silin equation is derived.

Reading: Pines and Nozieres, *Quantum Liquid*, Chapters 1.1 to 1.5