Transport in Fermi Liquids Confined by Rough Walls

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I present theoretical calculations of transport coefficients of Fermi liquid ^{3}He confined to a slab of thickness of order $\sim$ 100nm. The effect of the roughness of the confining surfaces is included directly in terms of the surface roughness power spectrum which may be determined experimentally. Transport at low temperatures is limited by scattering off rough surfaces and evolves into the known high-temperature limit in bulk through an anomalous regime in which both inelastic quasiparticle scattering and elastic scattering off the rough surface coexist. I show preliminary calculations for the coefficients of thermal conductivity and viscosity. These studies are applicable in the context of electrical transport in metal nanowires as well as experiments that probe the superfluid phase diagram of liquid ^{3}He in a slab geometry.

Section: LD - Low dimensional and confined systems

Keywords: nanochannel, roughness, quantum size effects, transport, confinement