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Heat and spin transport in a cold atomic fermi gas[1] HYUNGWON KIM, DAVID HUSE, Princeton University — Motivated by recent experiments measuring the spin transport in ultracold unitary atomic Fermi gases [Sommer et al., Nature (London) 472, 201 (2011); Sommer et al., New J. Phys. 13, 055009 (2011)], we explore the theory of spin and heat transport in a three-dimensional spin-polarized atomic Fermi gas. We develop estimates of spin and thermal diffusivities and discuss magnetocaloric effects, namely the the spin Seebeck and spin Peltier effects. We estimate these transport coefficients using a Boltzmann kinetic equation in the classical regime and present experimentally accessible signatures of the spin Seebeck effect. We study an exactly solvable model that illustrates the role of momentum-dependent scattering in the magnetocaloric effects.

[1]DARPA OLE Program

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