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Transport of Spin and Mass at Normal-Superfluid Interfaces in the Unitary Fermi Gas DING ZHANG, ARIEL SOMMER, Lehigh University — Strongly interacting Fermi gases provide a platform for studying non-equilibrium and transport properties of strongly correlated fermions. We consider the interface between a strongly polarized normal gas and a weakly polarized superfluid out of equilibrium, and examine the mass and spin current across the interface. To calculate the transport currents, we implement a mean-field framework in which the Hartree energy and superfluid gap are obtained from experimentally determined equations of state and excitation spectra. For any initial conditions of the densities, polarizations, and temperatures in both regions, our model provides a prediction of the instantaneous net and spin current across the interface. In our results, we show, for representative initial conditions, how spin current can be understood in terms of the threshold for creating excitations in the superfluid and the importance of Andreev reflection to the net (mass) current. Our work provides a comparison for future experimental measurements of transport at normal-superfluid interfaces. Finally, we provide an outlook on the calculation of shot noise on the transport current.

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