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Suppression of Inelastic Loss Near a P-Wave Resonance for Fermions in 1D[1] ANDREW MARCUM, ARIF MAWARDI ISMAIL, FRANCISCO FONTA, KENNETH O'HARA, The Pennsylvania State University — Degenerate Fermi gases with p-wave interactions hold many exciting prospects for observing novel quantum phases of matter. Unfortunately, the enhancement of the p-wave interaction strength near a Feshbach resonance has typically been accompanied by a corresponding strong enhancement of two-body and three-body inelastic collision rates which leads to significant atom loss on short time scales. Here we study two-body relaxation and three-body recombination in the vicinity of a p-wave Feshbach resonance when the fermionic atoms are confined to one dimension. In both cases we find that inelastic loss is significantly suppressed but by two quite distinct mechanisms. In the case of two-body relaxation, we find that the two-body decay rate constant for an uncorrelated gas is relatively unaffected by the 1D confinement. However, after an initial rapid decay, correlations in the gas develop that inhibit further loss from the 1D gas. In the case of three-body recombination, the inelastic decay rate constant itself is suppressed by over an order of magnitude when comparing the rate constant in 3D to that in 1D. Understanding and leveraging these mechanisms for suppression of inelastic loss may open the possibility of realizing odd-wave superfluid pairing in a dilute Fermi gas.

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