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Two-Body Relaxation of Fermions in 1D near a P-Wave Resonance[1] ARIF MAWARDI ISMAIL, ANDREW MARCUM, 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. Dilute ultracold gases were thought to be an ideal platform to study such phenomena as p-wave interactions can be strongly and controllably enhanced near a magnetically tunable p-wave Feshbach resonance. Unfortunately, the enhancement of the p-wave interaction strength near a Feshbach resonance has 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. Recently, however, it has been predicted that two-body and three-body decay can be significantly reduced as the dimension of the system is decreased (see Kurlov Shlyapnikov, PRA 95, 032710 (2017)). Indeed, a study of two-body decay near a p-wave resonance in 2D has already shown a significant reduction (Waseem et al, PRA 96, 062704 (2017)). Here, we study the two-body decay of the same two-component mixture of fermions but in one dimensions (1D). In 1D, the reduction in the two- and three-body decay rate is expected to be much more significant, perhaps so much so that it would allow for odd-wave superfluid pairing in a 1D Fermi gas.

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