Fermionic sound in Bose-Fermi mixtures ANDREY GROMOV, Stony Brook University, BARRY BRADLYN, Yale University — Sound waves emerge as a result of spontaneously broken symmetry- translational in the case of solids and normal fluids and U(1) phase symmetry in the case of superfluids. Collective modes like these, which result from the breaking of conventional symmetries, usually have bosonic statistics. We explore the consequences of a subtle fermionic symmetry that appears in Bose-Fermi mixtures when both species have equal mass. In particular, we predict the existence of a novel fermionic collective excitation and comment on its properties. We show that this mode persists in the presence of a trapping potential and contact interaction. We describe the fate of these excitations when there is a small mass difference between the two particle species. Lastly, we discuss the possibility of observing this mode in experiments, for example in trapped $^{174}$Yb – $^{173}$Yb Bose-Fermi mixtures.

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