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Breathing mode of a BEC immersed in a Fermi sea PIOTR GROCHOWSKI, Center for Theoretical Physics, Polish Academy of Sciences, TOMASZ KARPIUK, MIROSŁAW BREWCZYK, Wydział Fizyki, Uniwersytet w Białymstoku, KAZIMIERZ RZĄŻEWSKI, Center for Theoretical Physics, Polish Academy of Sciences — By analyzing breathing mode of a Bose-Einstein condensate repulsively interacting with a polarized fermionic cloud, we further the understanding of a Bose-Fermi mixture recently realized by Lous et al. [*Phys. Rev. Lett.* **120**, 243403]. We show that a hydrodynamic description of a domain wall between bosonic and fermionic atoms reproduces experimental data of Huang et al. [*Phys. Rev. A* **99**, 041602(R)]. Two different types of interaction renormalization are explored, based on lowest order constrained variational and perturbation techniques. In order to replicate nonmonotonic behavior of the oscillation frequency observed in the experiment, temperature effects have to be included. We find that the frequency down-shift is caused by the fermion-induced compression and rethermalization of the bosonic species as the system is quenched into the strongly interacting regime.

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