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Surface tension and collective modes in population imbalanced Fermi gases in the BCS-BEC crossover regime

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Motivated by the striking experiments from MIT and Rice University, we study population imbalanced Fermi gases in the BCS-BEC crossover regime. We have calculated the surface tension in the boundary separating superfluid and polarized normal regions in a trap. We show how this surface tension can explain apparent inconsistencies between the two groups. Using several candidate equations of state, we calculate frequencies of the breathing mode, finding that collective mode measurements can distinguish between the various possibilities.