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Absorption of microwave radiation by an array of vortices in a p-wave superfluid of fermionic cold atoms EYTAN GROSFELD, NIGEL COOPER, ADY STERN, RONI ILAN, Weizmann Institute of Science — We propose an experiment to identify the weak-pairing ("non-abelian") phase of a two-dimensional p-wave superfluid of cold atoms by microwave absorption. We consider transitions between two atomic hyperfine states, where atoms in the ground state form a rotated p-wave superfluid, and atoms in the excited state are subject to a rotation and a periodic potential. We focus our calculations on absorption originating from zero energy Majorana states present in cores of vortices of the weakly- paired superfluid, and identify van-Hove type singularities in the absorption spectrum. The absorption peaks are unique to the weak-pairing phase, and their appearance in the spectrum may serve as a demonstration of the phase transition into the weak pairing phase. We discuss how these results can be extended to three dimensional superfluids, and explore extensions of non-abelian statistics to multiple two-dimensional layers.

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