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Theory of microwave spectra of Andreev levels in nanowire Josephson junctions BERNARD VAN HECK, JUKKA I. VAYRYNEN, LEONID I. GLAZMAN, Yale University, DAVID J. VAN WOERKOM, ALEX PROUTSKI, DANIEL BOUMAN , QuTech and Kavli Institute of Nanoscience Delft, PETER KROGSTRUP, JESPER NYGARD , Center of Quantum Devices, Niels Bohr Institute, Copenhagen, LEO P. KOUWENHOVEN, ATTILA GERESDI, QuTech and Kavli Institute of Nanoscience Delft — We find the energy spectrum and the electromagnetic response of Andreev bound states in Josephson junctions made of semiconducting nanowires. We focus on the joint effect of Zeeman and spin-orbit coupling on the Andreev level spectra. Our model incorporates the penetration of the magnetic field in the proximitized wires, which substantially modifies the spectra. We pay special attention to the occurrence of fermion parity switches at increasing values of the field, and to the repulsion of the Andreev levels from the quasiparticle continuum. These theoretical considerations are applied to the analysis of recent experimental results on the microwave spectroscopy of InAs/Al Josephson junctions (D. J. van Woerkom et al., arXiv:1609.00333), complementing the talk of A. Geresdi on the same work.

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