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Parity crossings of Shiba states and Majorana-like zero bias anomalies in hybrid superconductor-normal nanowire systems with quantum dot behavior RAMON AGUADO, CSIC - Madrid, ROK ZITKO, Jozef Stefan Institute, Jamova 39, SI-1000 Ljubljana, Slovenia, ROSA LOPEZ, IFISC (UIB-CSIC), Palma de Mallorca, Spain, JONG SOO LIM, School of Physics, Korea Institute for Advanced Study, Seoul, Korea — Although recent experiments with semiconducting nanowires are partially consistent with the the existence of Majorana bound states (MBS) at normal-superconductor junctions, other mechanisms cannot be completely ruled out. In this talk, I will focus on short nanowires with quantum dot behavior and discuss the magnetic field dependence of Shiba states [1] as well as novel Kondo features induced by the weak coupling to a normal lead [2]. Our results are based on the phase diagram of an Anderson impurity in contact with superconducting and normal-state leads. This phase diagram is obtained by means of the numerical renormalization group technique and is valid for arbitrary ratio of the superconducting gap to the Kondo temperature. Overall, we find a very rich behavior of spectral functions with zero-bias anomalies which can emerge irrespective of whether the ground state is a doublet or a singlet. This phenomenology originates from crossings of the ground state fermionic parity and mimics that of MBS. [1] E. J. H. Lee, X. Jiang, M. Houzet, R. Aguado, C. M. Lieber, and S. De Franceschi, *Nature Nanotechnology*, 9, 79 (2014). [2]R. Zitko, J. S. Lim, R. Lopez and R. Aguado, arXiv:1405.6084 (2014).

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