

Zero-bias conductance peak from weak antilocalization in a Majorana nanowire

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We show [1] that weak antilocalization by disorder coexists with resonant Andreev reflection by Majorana zero-mode, both producing zero-voltage conductance peak of order e^2/h in a superconducting nanowire. The peak is widely believed to be the smoking gun signature of the Majorana zero-mode [2], its observation has been reported [3]. We identify methods to distinguish the Majorana resonance from the weak antilocalization effect.

[1] D. I. Pikulin, J. P. Dahlhaus, M. Wimmer, H. Schomerus, and C. W. J. Beenakker, arXiv 1206.6687 (2012)

[2] K. T. Law, P. A. Lee, and T. K. Ng, Phys. Rev. Lett. **103**, 237001 (2009)

[3] V. Mourik, K. Zuo, S. M. Frolov, R. Plissard, E. P. A.M. Bakkers, and L. P. Kouwenhoven, Science **336**, 1003 (2012); M. T. Deng, C. L. Yu, G. Y. Huang, M. Larsson, P. Caroff, and H. Q. Xu, arXiv:1204.4130 (2012); A. Das, Y. Ronen, Y. Most, Y. Oreg, M. Heiblum, and H. Shtrikman, arXiv:1205.7073 (2012)