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Observing Majorana Zero Modes in a $p_x + ip_y$ Superconductor at High Temperature by Tunneling Spectroscopy YAACOV E. KRAUS[1], ASSA AUERBACH, Physics Department, Technion, HERBERT A. FERTIG, Department of Physics, Indiana University, STEVEN H. SIMON, Alcatel-Lucent, Bell Labs — Directly observing a zero energy Majorana state in the vortex core of a chiral superconductor by tunneling spectroscopy requires energy resolution better than the spacing between core states Δ_0^2/ϵ_F. We show[2] that nevertheless, its existence can be clearly detected by comparing the temperature broadened tunneling conductance of a vortex with that of an antivortex even at temperatures $T \gg \Delta_0^2/\epsilon_F$. The Bogoliubov-de-Gennes (BdG) equation of a $p_x + ip_y$ superconductor is solved numerically on a sphere with vortex-antivortex pair at the poles. The robustness of the exponentially Majorana mode energy is verified by including a moderate white noise potential.

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[2]arXiv:0811.2557, Phys. Rev. Lett. in press

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