MAJORANA ZERO MODE IN NANOWIRE COUPLED TO QUANTUM DOT.

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An intensive search is ongoing in experimental realization of topological superconductor for topological quantum computing. The basic idea is to embed qubit in a nonlocal, intrinsically decoherence-free way. The prototype is a spinless *p*-wave superconductor The basic idea is to embeds qubit in a nonlocal, intrinsically decoherence-free way. The prototype is a spinless p-wave superconductor. The Majorana fermion is one of the most prominent fundamental research tasks in quantum computing. The signature of characterized by a zero-bias conductance peak (ZBP)has been reported in the tunneling experiments of the InSb nanowire. One purpose of this work is to analyze how the modes of zero energy Majorana emerge at the ends of nanowire, in the topological phase in case (*i*) $\mu = 0$, mas $\Delta = h$, making the tuning of system parameters. We know that in this case formed Majoranas unpaired two modes of [1]. These modes are strongly delocalized because they are at the ends of wire and has zero energy it does not appear in Hamiltonian of system. So is produced by the presence of these two modes Majorana a ground state doubly degenerate. In this situation the Majorana $\gamma A1$ is located on the site 1, while the mode Majorana γBN is located on the site N. We apply the technique of Keldysh Green function nonequilibrium and study a quantum dot connected to a Kitaev chain connected to superconducting surface following the Liu D.E and H.U Baranger model [2]. Found spectral function and a linear conductance G_o obtained by Landauer-Buttiker equation where the peak is reduced by a factor ½,we show that this zero bias peak (ZBP). And for the case (i), system Green's function is independent of the number of sites, N.

References

[1] **A.Y. Kitaev,** *Phys.Usp.*, **44**, 131 (2001); arXiv:cond-mat/0010440.
[2] **D. E. Liu and H. U. Baranger,** *Physical Review,* **B 84**, 201308 (R) (2011).