

Abstract Submitted  
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**On correlation between zero bias conductance peaks and topological invariants in semiconductor Rashba nanowires**<sup>1</sup> AMIT NAG, Condensed Matter Theory Center, Department of Physics, Univ of Maryland-College Park, JAY SAU, Condensed Matter Theory Center and Joint Quantum Institute, Department of Physics, Univ of Maryland-College Park — The observed zero bias peak in tunneling conductance experiments on semiconductor Rashba nanowire is a signature of presence of Majorana zero modes. Characteristics of zero bias conductance peak (ZBCP) namely, height, width and peak splitting, are a function of microscopic parameters. Zero modes have finite splitting as a result of finiteness of the nanowire rendering the ground state only approximately topological i.e. zero modes are only approximately Majoranas. We calculate the scattering matrix topological invariant to quantify the quality of approximate Majorana modes and study its relation to observed characteristics of ZBCP. Furthermore we study the effect of dephasing on the topological invariant. Finally, we draw connection between the characteristics of the ZBCP and probability of observing non-Abelian statistics in proposed future experiments involving braiding of Majorana modes.

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