Exposing Bound States in the Continuum in InSb Nanowire Networks.

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Abstract

Bound states in the continuum (BICs) are exotic, localized states even though their energy lies in the continuum spectra. Since its discovery in 1929, the quest to unveil these exotic states in charge transport experiments remains an active pursuit in condensed matter physics. In this talk, I will show some proposals of experimental set-ups composed of InSb nanowire arrays that could be used to find BICs in conductance measurements while introducing a perpendicular magnetic field. We find that BICs reveal themselves as distinctive resonances or antiresonances in the conductance by varying the applied magnetic field and the Fermi energy. We systematically consider different lead connections in hashtag-like nanowire networks, finding the optimal configuration that enhances the features associated with the emergence of BICs. Finally, the talk focuses on the effect of the Rashba spin-orbit interaction of InSb on the occurrence of BICs in nanowire networks and its applicability in spintronics.

References

[1] J. von Neumann and E. Wigner, **30** (1929) 465
[2] M. L. L. d. Guevara, F. Claro, and P. A. Orellana *Phys. Rev. B* **67** (2003) 195335
[3] D. Martínez *et. al.* (coming soon at arxiv)

Figures

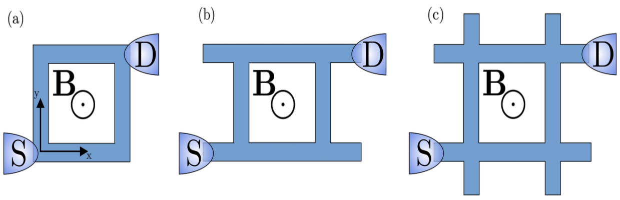

Figure 1: Sketch of the configurationally different geometries of the nanowire network.

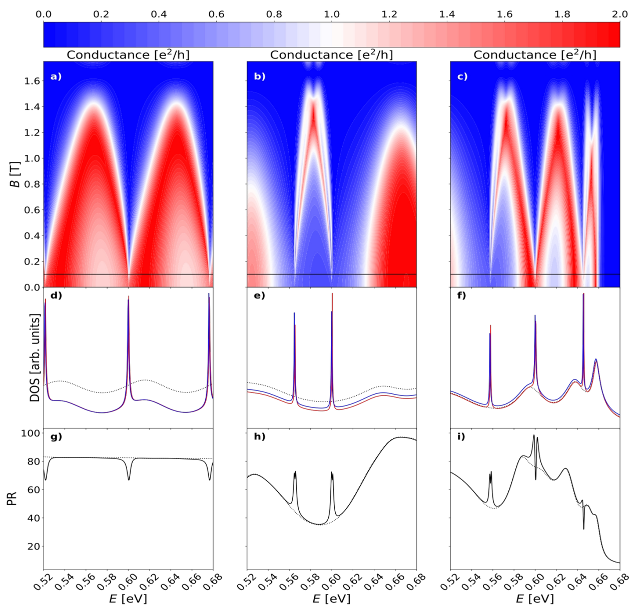

Figure 2: Panels (a), (b), and (c) display the conductance of the nanowire network against the magnetic field B and the Fermi energy E. Panels (d), (e) and (f) correspond to its density of states with and without magnetic field. Panels (g), (h), (i) represent its participation ratio with and without magnetic field.