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Majorana Fermion and bound states in the continuum on a cross-shaped quantum dot hybrid structure[1] DAVID ZAMBRANO, JUAN PABLO RAMOS, PEDRO ORELLANA, Universidad Tecnica Federico Santa Maria — We show how transmission, differential conductance and density of states (DOS) behave when two superconductor/semiconductors topological nanowires are placed next to the ends of a quantum-dot (QD) chain, where the central QD is attached to normal conductors leads. Results in a single QD coupled to two Kitaev chains within the topological phase [1] and a T-shaped QD hybrid structure [2] suggest these kind of system are strong candidates for qubits. We show how bound states in the continuum (BICs) arise as zero energy modes on conductance and DOS for different sets of system parameters showing evidence of Majorana fermions, and we also study how they behave for different numbers (even/odd) of QD in the cross-shaped structure.

[1] L. S. Ricco, Y. Marques, F. A. Dessotti, R. S. Machado, M. de Souza, and A. C. Seridonio, Phys. Rev. B **93**, 165116 (2016).
[2] Wei-Jiang Gong, Shu-Feng Zhang, Zhi-Chao Li, Guangyu Yi, and Yi-Song Zheng, Phys. Rev. B **89**, 245413 (2014).

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