Andreev Reflection in hexagonal lattice

Keywords:

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The Hamiltonian reads

$$H = \sum_{\langle ij \rangle} \Psi_i^\dagger \left[-t\, \tau_z \otimes s_0\right] \Psi_j - (E_F + V) \sum_i \Psi_i^\dagger \left[\tau_z \otimes s_0\right] \Psi_i + \Delta \sum_i \Psi_i^\dagger \left[\tau_x \otimes s_0\right] \Psi_i, \tag{1}$$

where $\Psi_i = \left(c_{i\uparrow}, c_{i\downarrow}, c_{i\downarrow}^\dagger, -c_{i\uparrow}^\dagger\right)^T$, and the superscript T denotes the transpose. In the model t, Δ, E_F and V denotes the hopping, superconducing pairing potential, the Fermi energy, and the electrostatic potential respectively. The Pauli matrices τ_i and s_i with $i = 0, x, y, z$ denotes the Pauli matrices acting on the particle-hole space and spin-space respectively. In the normal metal we take $V = \Delta = 0$, in the superconductor $V = V_0 > 0$ and $\Delta = \Delta_0 > 0$. The lattice is hexagonal.

In the PhD thesis of Tibor Sekera titled "Quantum transport of fermions in honeycomb lattices and cold atomic systems" the following figure is produced using kwant:

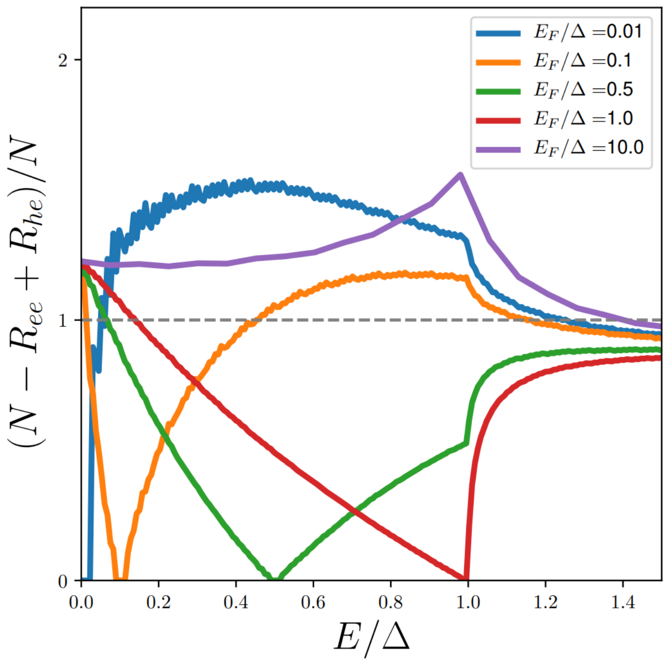

FIG. 1: Differential conductance of the NS interface normalized by the number of transverse modes N as a function of energy for $E_F/\Delta = 0.01, 0.1, 0.5, 1, 10$. The curves are smooth if $N \gg 1$. Doping of the superconductor is $V_0 = 0.5t$.

My goal is to reproduce this figure.