Magnetic impurity induced states in superconducting $Bi_2Sr_2CaCuO_{8+\delta}$ PEAYUSH CHOUBEY, University of Florida, ANDREAS KREISEL, University of Copenhagen, TOM BERLIJN, Oak Ridge National Laboratory, BRIAN ANDERSEN, University of Copenhagen, PETER HIRSCHFELD, University of Florida — We revisit the Ni impurity problem in superconducting $Bi_2Sr_2CaCu_2O_{8+\delta}$ (BSCCO-2212) using the Bogoliubov- de Gennes (BdG)-Wannier approach [1, 2]. We solve the self-consistent BdG equations on a square lattice and use first principle-based Wannier function to compute the local density of states (LDOS) with sub-atomic resolution in the vicinity of a magnetic impurity. We find two spin-resolved virtual bound states localized around the impurity position. The spatial LDOS patterns at the resonance energies are found to be in excellent agreement with STM experiment [3], and can be understood by accounting for the tails of Cu Wannier function.

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