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Andreev states in 2D finite size systems LUCIAN COVACI, FRANK MARSIGLIO, University of Alberta — Andreev reflection occurs at the interface between a normal metal and a superconductor. An electron with energy lower than the superconducting gap is reflected back as a hole while a pair enters the superconductor. In 1D systems, for energies smaller than the superconducting gap, the allowed states in the normal metal layer are quantized. For 2D systems these energies become continuous due to the extra degree of freedom in the direction parallel to the interface. With the use of a mean field extended Hubbard Hamiltonian to describe s-wave and d-wave superconductors, we employ a Lanczos recursion method to calculate the local density of states in these systems. Different shapes are considered, such as squares, triangles and circles. We observe the finite size properties of the Andreev bound states and present the different modes of the localized states. We also consider the effect of rough surfaces on the formation of the bound states.

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