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**Proximity-induced superconducting gap in low-dimensional materials** CHRISTOPHER REEG, DMITRII MASLOV, Univ of Florida - Gainesville — The ability to induce a sizable gap in the excitation spectrum of a metal placed in contact with a conventional superconductor has become increasingly important in recent years in the context of engineering a topological superconductor. Conventional studies of the proximity effect involving sufficiently bulky metals have shown that Andreev reflection processes at the superconductor/metal interface induce a nonzero pairing amplitude in the metal but do not endow it with a gap. Conversely, when the metal is an atomically thin layer, the tunneling of Cooper pairs can induce an excitation gap equal to the bulk gap of the superconductor (provided that the superconductor/metal interface is sufficiently transparent). We study how these two seemingly different views of the proximity effect evolve into one another as the thickness of the metal is changed. More specifically, we show that there is a thickness scale associated with the decrease of the induced gap, and that this scale is much larger than the Fermi wavelength. As a result, by proximity to most conventional superconductors, a sizable excitation gap can be induced in metals that are tens of atomic layers thick.

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