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Superconducting contacts for 2D materials BOSONG SUN, TAUNO PALOMAKI, University of Washington, YONGCHAO TANG, University of Waterloo, ZAIYAO FEI, PAUL NGUYEN, WENJIN ZHAO, University of Washington, GUOXING MIAO, University of Waterloo, XIAODONG XU, DAVID COBDEN, University of Washington — The incorporation of superconducting materials into 2D heterostructure devices is important for many purposes. For example, such devices might enable gating or other new ways of controlling the superconductivity, or proximitizing of 2D materials such as topologically nontrivial monolayers of WTe_2 or $ZrTe_5$ with helical edges that could harbor Majorana zero modes or other unusual excitations. Furthermore, the electronic properties of these structures could be amenable to surface spectroscopy techniques such as STS. The challenge is that both the 2D materials and most superconductors, including layered superconductors such as $NbSe_2$ easily oxidize, and hence creating the necessary high quality interface and maintaining it requires carefully avoiding oxidation and final encapsulation, for example with h-BN. We will report our results on a variety of approaches to incorporating superconducting contacts in encapsulated structures, including using graphene-protected exfoliated $NbSe_2$ and sputtered superconducting films.

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