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Macroscopic character of composite high temperature superconducting wires STEVEN KIVELSON, Stanford Univ, BORIS SPIVAK, University of Washington — The “d-wave” symmetry of the superconducting order in the cuprate high temperature superconductors is a well established fact, and one which identifies them as “unconventional.” However, in macroscopic contexts – including many potential applications (*i.e.* superconducting “wires”) – the material is a composite of randomly oriented superconducting grains in a metallic matrix, in which Josephson coupling between grains mediates the onset of long-range phase coherence. Here, we analyze the physics at length scales large compared to the size of such grains, and in particular the macroscopic character of the long-range order that emerges. While XY-superconducting glass order and macroscopic d-wave superconductivity may be possible, we show that under many circumstances – especially when the d-wave superconducting grains are embedded in a metallic matrix – the most likely order has global s-wave symmetry.

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