Abstract Submitted
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The central question in superconductivity J. E. HIRSCH, university of california san diego — I will argue that the most basic and fundamental question in superconductivity is: when a superconductor in a magnetic field goes normal, how does the supercurrent stop? The supercurrent has to stop before the material becomes resistive because the transition is reversible in an ideal situation, with no Joule heat dissipated. I will argue that the conventional BCS-London theory of superconductivity cannot answer this question. I will propose an answer to this question that requires that there is flow and counterflow of charge across the normal-superconductor phase boundary, and requires that the normal state current carriers have hole-like character [1]. The conventional BCS-London theory of superconductivity does not have these physical elements, the theory of hole superconductivity does. [1] J. E. Hirsch, EPL 115, 57001 (2016).

jorge hirsch
university of california san diego

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