

Abstract Submitted
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Effect of Extended Saddle Point Singularities in Cuprates and Evidences¹ GUANG-LIN ZHAO, Physics Department, Southern University and A M College — First-principles calculations and angle-resolved photoemission spectroscopy measurements showed extended saddle point singularities in the electron structures of some cuprates such as $\text{YBa}_2\text{Cu}_3\text{O}_7$ (YBCO). The extended saddle point singularities in the electronic structures of the materials can lead to anomalous physical properties. In this work, a new methodology is implemented by integrating first-principles calculations of electronic structures of the materials into the theory of many-body physics for superconductivity. The aim is to seek a unified methodology to calculate the electronic and superconducting properties of the materials. It is demonstrated from first-principles that the extended saddle point singularities in the materials such as YBCO strongly correlate to the anomalous isotope effect in the superconductors.

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