

Macro Roundup Article

Headline: [Origin Of Correlated Isolated Flat Bands In Copper-Substituted Lead Phosphate Apatite](#)

Article Link: <https://arxiv.org/pdf/2307.16892.pdf>

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Summary: A recent report of room temperature superconductivity at ambient pressure in Cu-substituted apatite ('LK99') has invigorated interest in the understanding of what materials and mechanisms can allow for high-temperature superconductivity. Here I perform density functional theory calculations on Cu-substituted lead phosphate apatite, identifying correlated isolated flat bands at the Fermi level, a common signature of high transition temperatures in already established families of superconductors. I elucidate the origins of these isolated bands as arising from a structural distortion induced by the Cu ions and a chiral charge density wave from the Pb lone pairs. These results suggest that a minimal two-band model can encompass much of the low-energy physics in this system.

Related Articles: Korean Team Claims To Have Created The First Room-Temperature, Ambient-Pressure Superconductor

Primary Topic: Innovation/Research

Topics: Academic paper, Energy, Innovation/Research, Productivity

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