

Strain Induced Electronic Properties of $\text{Re}_3\text{Ni}_2\text{O}_7$ ¹

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Superconductivity in a bilayer nickelates $\text{La}_3\text{Ni}_2\text{O}_7$ was recently discovered under high pressure (14 GPa) and above [1]. The discovery has raised interest in whether superconductivity can be achieved in other bilayer nickelates $\text{Re}_3\text{Ni}_2\text{O}_7$. In this work, we take an entire series of rare earth elements, and study its electronic properties through first principles through different values of compressive and tensile strain. We compare and contrast the properties of strained $\text{Re}_3\text{Ni}_2\text{O}_7$ with those of published $\text{La}_3\text{Ni}_2\text{O}_7$ and investigate whether strained $\text{Re}_3\text{Ni}_2\text{O}_7$ is a suitable candidate for high-temperature superconductivity.

References

- [1] Hualei Sun, Mengwu Huo, Xunwu Hu, Jingyuan Li, Zengjia Liu, Yifeng Han, Lingyun Tang, Zhongquan Mao, Pengtao Yang, Bosen Wang, and et al. Signatures of superconductivity near 80k in a nickelate under high pressure. *Nature*, 621(7979):493–498, 2023.

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