# Article information:

Phys. Rev. Lett. 128, 096601 (2022) - Flat-Band-Induced Anomalous Anisotropic Charge Transport and Orbital Magnetism in Kagome Metal CoSn  
<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.128.096601>

# Article summary:

1. This article discusses the emergence of flat-band-dominated anomalous transport and magnetic behaviors in CoSn, a paramagnetic kagome-lattice compound.

2. The resistivity within the kagome lattice plane is more than one order of magnitude larger than the interplane one, and the magnetic susceptibility under the out-of-plane magnetic field is found to be much smaller as compared with the in-plane case.

3. These anomalous and giant anisotropies can be reasonably attributed to the unique properties of flat-band electrons, including large effective mass and self-localization of wave functions.

# Article rating:

May be slightly imbalanced: The article presents the information in a generally reliable way, but there are minor points of consideration that could be explored further or claims that are not fully backed by appropriate evidence. Some perspectives may also be omitted, and you are encouraged to use the research topics section to explore the topic further.

# Article analysis:

This article provides a detailed analysis of flat-band physics in CoSn, a paramagnetic kagome-lattice compound. The authors combine angle-resolved photoemission spectroscopy measurements and first-principles calculations to reveal the existence of a kagome-lattice derived flat band right around the Fermi level. They also demonstrate that this leads to anomalous transport and magnetic behaviors, such as a resistivity within the kagome lattice plane that is more than one order of magnitude larger than the interplane one, as well as a magnetic susceptibility under an out-of-plane magnetic field that is much smaller than for an in-plane field. The authors attribute these effects to unique properties of flat band electrons, such as their large effective mass and self localization of wave functions.

The article appears to be reliable overall; it provides evidence for its claims through both experimental measurements and theoretical calculations, which are supported by references from other studies on related topics. Furthermore, it does not appear to contain any promotional content or partiality towards any particular viewpoint or conclusion; instead it presents both sides equally by exploring possible counterarguments and noting potential risks associated with its findings. However, there are some missing points of consideration that could have been explored further; for example, how do these effects vary depending on temperature? Additionally, while this article focuses mainly on CoSn specifically, it would have been beneficial if it had discussed how its findings may apply more generally to other materials with similar structures or properties.

# Topics for further research:

* Flat band physics
* Kagome lattice compounds
* Angle-resolved photoemission spectroscopy
* Anomalous transport behavior
* Magnetic susceptibility
* Temperature dependence of flat band effects

# Report location:

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