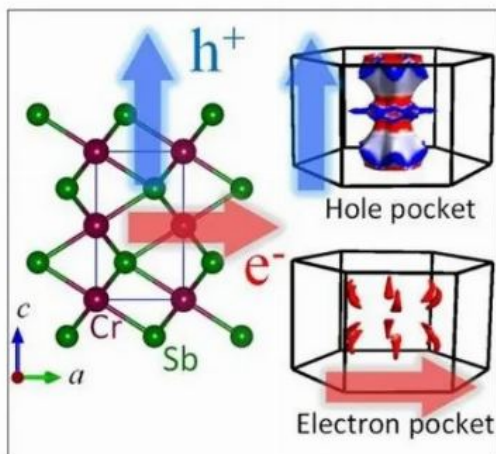


Altermagnets

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Altermagnets

Altermagnetism Latest News

The discovery of altermagnetism represents a step forward in physicists' understanding of the magnetic world.

What is Ferromagnetism and Antiferromagnetism?

- Magnetism has long been categorised into two primary types: ferromagnetism and antiferromagnetism.
- **Ferromagnetism** is responsible for the behaviour of materials like iron and nickel, where **all magnetic moments align in the same direction, producing strong magnetisation** – such as the force that makes fridge magnets stick.
- **Antiferromagnetism** occurs when **magnetic moments align in a regular pattern but point in opposite directions, cancelling each other out** and resulting in **no external magnetic field**.

About Altermagnetism

- Altermagnetism is a type of magnetism where **magnetic moments** (tiny magnetic fields created by electrons) **align in opposite directions but follow a distinct rotated pattern**.

- This **unique arrangement** creates properties that **combine key elements of both ferromagnets and antiferromagnets**.
- **Like antiferromagnets, altermagnets have magnetic moments that align in opposite directions, cancelling out any overall magnetisation.**
- However, **like ferromagnets**, altermagnets still **allow spin-polarised currents**. In ferromagnets, spin-polarised currents can only occur because all electron spins or moments align in one direction (producing a **magnetic field**).
- The **key distinction in altermagnets is that the larger, crystal-like structures holding these magnetic moments are rotated relative to each other, creating distinct electronic behaviours.**
- **It is the rotation of these larger structures that allows for spin-polarised currents** to still occur in altermagnets.
- This makes **altermagnets** potentially valuable for a **variety of applications, particularly in electronics and data storage.**
- They **eliminate the possibility of stray magnetic fields** while **still allowing for a spin-polarised current** - a highly useful combination for modern electronics.

Source: TH

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