Mpemba Effect in Magnets

Source: PIB

Recently, a study by Scientists from Jawaharlal Nehru Centre for Advanced Scientific Research, an autonomous institute of the Department of Science and Technology, has observed the Mpemba effect in magnetic materials.

- It revealed that **hotter paramagnets** transition **faster** to their **ferromagnetic** phases compared to colder ones, even when they are initially at a **higher temperature.**
    - **Paramagnets** have a **temporary and weaker attraction** to magnetic fields due to the random alignment of atomic magnets, while **ferromagnets** exhibit a **permanent and stronger attraction** with ordered atomic magnets.
    - The transition from paramagnetic to ferromagnetic phases occurs as the temperature decreases, reaching a "**critical" point** known as the **Curie point.**
- **Mpemba Effect:** It is a **counterintuitive phenomenon** where a **hot liquid cools or freezes faster** than a cooler liquid.
    - It was first noted by Aristotle in his book ***Meteorologica*** and rediscovered in the 1960s by **Erasto Mpemba**, a Tanzanian schoolboy.
- **Implications:** It could lead to **diverse applications,** such as improved thermal control in devices, enhanced cooling strategies etc.

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