Method to Tune Kinetic Magnetism

Prelims: *Current events of National and International Importance| Science and Technology*

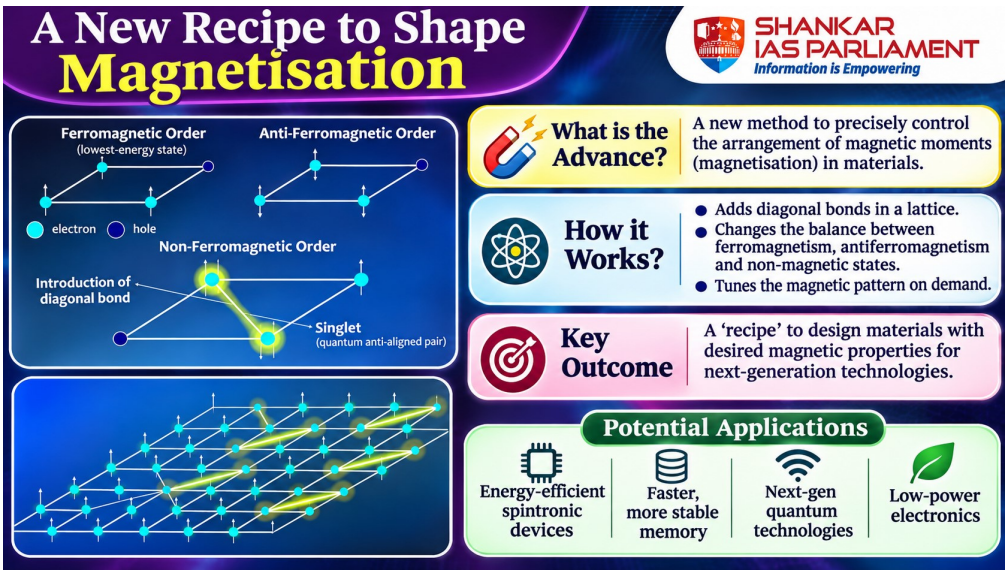
Why in News?

Researchers at the Raman Research Institute (RRI) in Bengaluru have developed a theoretical method to tune kinetic magnetism in a quantum network simply by altering how its sites are connected.

- **Kinetic vs. conventional magnetism-** Ordinary magnetism comes from direct interactions between electron spins. Kinetic magnetism arises purely from the quantum motion (hopping) of particles across sites.
- **Changing connectivity-** In a square lattice model, adding a single extra diagonal link between sites changes how the magnetic order arranges itself.
- **Forming spin singlets-** The added connection causes two electron spins to point in opposite directions, forming a **singlet**—an entangled state with zero total spin—while neighboring sites can keep ferromagnetic alignment.

Why It Matters for Quantum Storage?

- **Beyond classical magnetic bits-** Traditional hard drives store classical bits (0 or 1) using magnetic patterns.
- **Entangled states for quantum memory-** Because singlets are entangled quantum states, engineering them through network geometry offers a potential route to shape and store quantum information as experimental platforms advance.



Reference

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