

Internal Seminar

Lanthanide/Transition Metal Molecular Assemblies: Design, Structures, and Magnetism

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The field of molecular magnetism, especially Single-Molecule Magnets (SMMs) of Lanthanide/Transition Metal complexes, has witnessed considerable development in recent decades for their potential applications in high-density data storage devices, spintronics, and magnetocaloric materials.¹⁻³ Lanthanide/Transition Metal complexes, particularly those of Co(II), Dy(III), Tb(III), and Er(III), have been extensively studied for single-molecule magnet (SMM) behaviour in diverse nuclearities and structural topologies.¹ The magnetic properties of these SMMs can be finely tuned by controlling the metal centre environment through careful selection of metal ions and thoughtful ligand design. In our work, we have synthesised and structurally characterised a series of lanthanide and transition metal complexes using flexible Schiff base ligands.^{4,5} By investigating their magnetic properties, we have gained insights into the structure-property relationships that govern their behaviour. These aspects will be presented in this talk.

References:

- (1) Zabala-Lekuona, A.; Seco, J. M.; Colacio, E. *Coord. Chem. Rev.* 2021, 441, 213984.
- (2) Coronado, E. *Nature Rev. Mater.* **2020**, 5 (2), 87-104.
- (3) Dey, A.; Kalita, P.; Chandrasekhar, V. *ACS Omega* **2018**, 3 (8), 9462-9475.
- (4) Kalita, P.; Kumar, P.; Mar Quesada-Moreno, M.; Colacio, E.; Chandrasekhar, V. *Chemistry – An Asian Journal* **2025**, 20 (10), e202500062.
- (5) Kumar, P.; Flores Gonzalez, J.; Flichot, H.; Sharma, N.; Ali, J.; Vignesh, K. R.; Pointillart, F.; Chandrasekhar, V. *Inorg. Chem.* **2025**, 64 (46), 22802-22818.

Tuesday, Dec 9th 2025

14:30 Hrs

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