

**Magnetism and Field Re-entrant Superconductivity in Doped Infinite-layer Samarium
Nickelates**

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Infinite-layer nickelates have opened a new avenue for investigating unconventional superconductivity beyond the cuprates [1]. In Eu-doped infinite-layer samarium nickelate thin films, we have recently observed field-induced re-entrant superconductivity, revealing a striking interplay between superconductivity in the NiO₂ planes and the magnetism of the Eu²⁺ sublattice [2]. These results establish doped samarium nickelates as a promising platform for studying how magnetism and superconductivity coexist and interact within a single material system. In this talk, I will present our recent progress in this direction, with particular emphasis on tuning the magnetism-superconductivity coupling through materials engineering and exploring the novel quantum states that emerge from this interplay.

References:

- [1] D. Li, K. Lee, B. Y. Wang, M. Osada *et al.*, *Nature* **572**, 624 (2019).
- [2] M. Yang, J. Tang, X. Wu, H. Wang *et al.*, *Nature* **653**, 1052 (2026).