

[QMS2020 invited talk]

## **Emergent topological phenomena in strained pyrochlore iridate thin films**

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Pyrochlore iridate films, a family of cubic 5d transition metal oxides, can be mother compound, where various correlated topological phases can be studied by manipulating magnetism with lattice strain. However, in-situ epitaxial growth has been known to be notoriously difficult. In this talk, I am going to talk about the recent progress in the study of pyrochlore iridate thin films focusing on the emergent topological properties of in-situ grown fully strained Nd<sub>2</sub>Ir<sub>2</sub>O<sub>7</sub> thin films. A fully strained film with antiferromagnetism shows an anomalous Hall conductivity which is an order of magnitude larger than that in the bulk or the relaxed film. Moreover, the large spontaneous Hall conductivity is observed due to the strain-induced magnetic T<sub>1</sub>-octupole, which clearly demonstrates that topological properties can be engineered by manipulating magnetism with strain.

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[3] Woo Jin Kim, John H. Gruenewald, Taekoo Oh, Sangmo Cheon, Bongju Kim, Oleksandr B. Korneta, Hwanbeom Cho, Daesu Lee, Yoonkoo Kim, Miyoung Kim, Je-Geun Park, Bohm-Jung Yang, Ambrose Seo, Tae Won Noh, “Unconventional anomalous Hall effect from antiferromagnetic domain walls of Nd<sub>2</sub>Ir<sub>2</sub>O<sub>7</sub> thin films”, *Phys. Rev. B* 98, 125103 (2018)

[4] Woo Jin Kim, Taekoo Oh, B. -J. Yang, Taewon Noh et al., submitted (2019)