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**Novel Magnetism from the Spin-Orbit-Coupling Strength Alternation**[1] WEIGUO YIN, X. LIU, A.M. TSVELIK, M.P.M. DEAN, Brookhaven National Laboratory, M.H. UPTON, JUNGHO KIM, D. CASA, A. SAID, T. GOG, Argonne National Laboratory, T.F. QI, G. CAO, University of Kentucky, J.P. HILL, Brookhaven National Laboratory — We show that bringing close two magnetic ions with strong and weak spin-orbit coupling, respectively, can yield strong ferromagnetic anisotropy from antiferromagnetic superexchange. We applied this novel exchange anisotropy generating mechanism to explain the unique magnetism of the copper-iridium oxide $Sr_3CuIrO_6$ containing chains of alternating Cu(II) and Ir(IV) ions. The calculated large-gap spin excitation spectrum agrees well with the Ir $L_3$ edge resonant inelastic x-ray scattering experiment. Our findings point to novel magnetic behavior to be expected in mixed $3d-5d$ transition-metal systems via exchange pathways that are absent in pure $3d$ or $5d$ systems. Reference: W.-G. Yin et al., PRL 111, 057202 (2013).

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Weiguo Yin
Brookhaven National Laboratory

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