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Novel magnetic states in insulating d^4 oxides with strong spin-orbit coupling[1] CHRISTOPHER SVOBODA, NANDINI TRIVEDI, The Ohio State University — The comparable energy scales in $4d$ and $5d$ transition metal oxides, arising from Coulomb correlations, spin-orbit coupling and bandwidth, can lead to new phases and phenomena. With this motivation we examine an ion with d^4 electron configuration in the t_{2g} sector separated from the other states by crystal field splitting. Upon including spin-orbit coupling, the completely filled $j = 3/2$ manifold is nonmagnetic but with a nonzero magnetic susceptibility. Upon introducing hopping between two d^4 atoms, we find novel entangled ferromagnetism generated by the superexchange interaction in a significant part of the phase diagram [1]. We further present results for the temperature dependent susceptibility calculated using exact diagonalization to illustrate this novel magnetic behavior and the role Hund's coupling plays in producing these phases. We make predictions for resonant X-ray scattering and magnetic measurements in pyrochlore osmates.

[1] O. N. Meetei, W. S. Cole, M. Randeria, and N. Trivedi, arXiv:1311.2823.

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