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Ising exchange interaction in lanthanides and actinides NAOYA IWAHARA, LIVIU CHIBOTARU, Katholieke Universiteit Leuven — The Ising exchange interaction is a limiting case of strong exchange anisotropy and represents a key property of many magnetic materials. Here we find the necessary and sufficient conditions to achieve Ising exchange interaction for metal sites with unquenched orbital moments [1]. Contrary to current views, the rules established here narrow much the range of lanthanide and actinide ions that can exhibit Ising exchange interaction. It is shown that the Ising interaction can be of two types: (i) coaxial, with magnetic moments directed along the anisotropy axes on the metal sites and (ii) non-coaxial, with arbitrary orientation of one of the magnetic moments. These findings will contribute to purposeful design of lanthanide- and actinide-based materials. [1] L. F. Chibotaru and N. Iwahara, New. J. Phys. 17, 103028 (2015).

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