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【614】 Magnetic spiral order and multiferroism through impurity-induced frustration

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Multiferroism can originate from the breaking of inversion symmetry caused by magnetic-spiral order. It usually arises due to competing magnetic exchange interactions that differ by their range and sign, and thus occurs at low temperatures. I present a mechanism that works at much higher temperatures. It relies on frustrating bonds randomly introduced along a single crystallographic direction, as found in a realistic model of YBaCuFeO_5 , where spiral order at high temperatures was indeed reported. We predict a correlation between the ordering temperature and the spiral wavevector. We show that spin orbit coupling at impurities induces a tilting of the easy plane, which ensures that spiral order couples to electric polarization.

Primary authors: MÜLLER, Markus (PSI - Paul Scherrer Institut); Dr SCARAMUCCI, Andrea (ETHZ); Dr MUDRY, Christopher (PSI); Prof. MOSTOVOY, Maxim (Groningen); Dr SHINAOKA, Hiroshi (Tokyo); Prof. TROYER, Matthias (ETHZ); Prof. SPALDIN, Nicola (ETHZ)

Presenter: MÜLLER, Markus (PSI - Paul Scherrer Institut)

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