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Incommensurate spin excitations stabilized multiferroic phase in CuO LIXIN HE, University of Science and Technology of China — Cupric oxide is a unique magnetoferroelectrics with transition temperature way above the boiling point of liquid nitrogen. However, the mechanism of high T_c multiferroicity in CuO is still puzzling. In this paper, we clarify the mechanism of high T_c multiferroicity in CuO using combined first-principles calculations and an effective Hamiltonian model. We find that CuO contains two magnetic sublattices, with strong intra-sublattice interactions and weakly frustrated inter-sublattice interactions, which might be one of the main reasons that the compound has a high ordering temperature. The weak spin frustration leads to incommensurate spin excitations that dramatically enhances the entropy of the multiferroic phase, and eventually stabilize the multiferroic phase in CuO.

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