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Nature of Dynamic Magnetoelectric Coupling and Prediction of Room-Temperature Electromagnon Excitation PANSHUO WANG, Z. L. LI, J. H. YANG, Fudan University, C. L. JIA, Lanzhou University, H. J. XIANG, Fudan University — The dynamical magnetoelectric excitation i.e. electromagnon is essential not only for the intrinsic physical mechanism of magnetoelectric coupling but also to realize application in emerging fields such as magnonics. Here, on the basis of group theory and the general polarization model, we develop an approach to understand the electromagnon excitation in magnetoelectric systems. Both multiferroicity and electromagnon in delafossite CuFeO2 are revealed to originate from the general spin-current model, rather than the spin-dependent d-p hybridization model. Our model is general since it is independent on the specific spin Hamiltonian. Based on this dynamic magnetoelectric coupling model, we predict that the magnon in antiferromagnetic Cr2O3 (TN = 307 K) and ferrimagnetic yttrium iron garnet (Tc = 550 K) could be excited by the electric component of light at room temperature.

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