

Abstract Submitted  
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**Selection rules for electromagnons in anharmonic cycloidal multiferroics**<sup>1</sup> MARKKU STENBERG, ROGERIO DE SOUSA, University of Victoria — The coexistence of magnetic and ferroelectric phases in multiferroic materials gives rise to hybrid excitations with mixed magnetic and electric character. These excitations, so-called electromagnons, have been observed in several oxide materials, but their origin and optical selection rules are central questions that are not yet understood. We present a theory of electromagnon excitation in magnets with anharmonic cycloidal ground state. In contrast to previous theories, we show that multiple electromagnons are excited by light polarized along the cycloid plane as well as perpendicular to it. Our results allow the distinction between different magnetoelectric couplings and have important implications for the interpretation of optical experiments in rare earth manganites as well as other materials with anharmonic spiral magnetic order.

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