Spin-Wave Transmission in Ferromagnetic Thin Films: Flexoelectric Control and Spin-Wave Drag\textsuperscript{1} TIANYU LIU, GIOVANNI VIGNALE, University of Missouri, Columbia, MICHAEL FLATTE, University of Iowa — Spin waves in insulating ferromagnets have recently emerged as an effective low-dissipation carrier of spin currents. In this work we explore a novel form of control of spin waves by flexoelectric interactions, which couple an electric field to the spatial gradient of the magnetization. We show that not only the short-wavelength exchange spin waves, but also the long-wavelength magnetostatic spin waves in a thin-film of magnetic insulator can be effectively controlled by an electric field. In fact, the relative electric-field-induced phase shift is even larger for magnetostatic spin waves than for exchange spin waves. We further show that spin waves in an insulating ferromagnetic film can excite a spin current in an adjacent conducting or insulating film, by way of long-ranged dipole-dipole interaction between the layers, in a magnetic analogue of the electronic Coulomb drag.

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