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Electric-Field Control over Spin-Wave and Current Induced Domain Wall Motion and Magnonic Torques in Multiferroics IRYNA KULAGINA, JACOB LINDER, NTNU — We discover that the way spin-waves exert magnetic torques in multiferroic materials can cause not only domain wall motion, but also magnetization dynamics for homogeneous magnetization textures. Interestingly, the domain wall motion can be controlled via purely electrical means with the spin-waves being generated by an ac electric field E while the direction of the wall motion also is sensitive to an applied dc E field. Moreover, we determine the interaction between spin-transfer torque from an electric current and a magnetic domain wall in multiferroics and show that the Walker breakdown threshold scales with the magnitude of a perpendicular electric field, offering a way to control the properties of domain wall propagation via electric gating.

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