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Automated Characterization of Fluxon Electrodynamics in a Superconducting Microwave Device ALEXANDER MEDEMA, STEPHEN REMILLARD, Hope College — Superconducting electronic resonators serve a wide variety of industrial and scientific applications such as MRI receiver coils and wireless transceiver filters. Characterization of fluxon electrodynamics in these devices allows for better understanding of the physical properties of superconductors and improvements to the design of cellular networking components by providing insight into how superconductors distort signals. Signal mixing through intermodulation distortion (IMD) is affected by the flow of supercurrent around fluxons modulated by the Meissner Effect. The Hope College Microwave Group has developed a method to measure the time relaxation of radio signal mixing in superconducting circuits upon the removal of an applied magnetic field. The automation in this project increased the measurement rate by two orders of magnitude revealing a previously undetectable fast process during the first second of relaxation. This work will contribute to the understanding of fluxon dynamics in superconductors and its role in signal distortion. This material is based upon work supported by the National Science Foundation under Grant Number DMR-1505617.

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