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Two-Dimensional Mapping of Non-Linear Emission from Superconducting Devices[1] ANNA WORMMEESTER, STHEPHEN REMILLARD, Hope College — Superconducting devices distort signals because of the nonlinear response of the superconductors to the signal current. Multiple signals will mix, generating local intermodulation tones which enable a nondispersive investigation into superconductor nonlinearity. In this work, local points of signal distortion in a superconducting device are detected by a raster probe, which generates an image of the nonlinearity throughout the device, and highlights distortion hotspots. This gives engineers a better sense of the limitations in a device design and gives physicists insight into the intrinsic and extrinsic causes of nonlinearity. A distortion raster scan was made using a wide linewidth folded superconducting YBa_2Cu3O_7 structure. Refinements in the probe design improved the resolution to less than 250 μm allowing narrow linewidth devices to be imaged. Besides device characterization, this method is being used to investigate the superconducting device physics. As an example, the influence of magnetic fluxons on the nonlinear distortion will be described.

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