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Laser Scanning Microscopy for Quantitative Measurement of the Local Microwave-Photonic Properties of Advanced Materials and Devices[1] BEHNOOD GHAMSARI, JACOB TOSADO, MAHITO YAMAMOTO, JINGLEI PING, DANIEL LENSKI, MICHAEL FUHRER, STEVEN ANLAGE, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park — We present laser scanning microscopy (LSM) as a non-contact and non-invasive instrumentation technique for quantitative measurement of the local microwave, optoelectronic, and optical properties of advanced materials including superconductors and graphene. Since an LSM setup may be configured in different modes of operation, we will focus on the photoresponse and reflectivity imaging modes. It will be discussed how an LSM, in the photoresponse measurement mode, may be used to image the distribution of rf/microwave currents at the surface of a superconducting device, such as a resonator. In addition, relevant techniques for distinguishing the kinetic and resistive parts of the superconductor's photoresponse as well as imaging its possible anisotropic microwave properties are addressed. With regard to the reflectivity mode, we will present how this method enables precise measurement of the topological features and optical properties of non-opaque samples. As an example, we will show how the thickness of few-layer graphene flakes may be measured by this method.

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