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Microwave microscopy of few-layer graphene[1]

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Graphene has emerged as a promising material for high speed nano-electronics applications due to the relatively high carrier mobility that can be achieved. To further investigate electronic transport in graphene and reveal its potential for microwave applications [1], a near-field scanning microwave microscope with the probe formed by an electrically open end of a 4 GHz half-lambda parallel-strip transmission line resonator has been employed [2]. We find that the microwave response of mono- and few-layer graphene flakes is determined by the local sheet impedance, which is found to be predominantly active. From fitting a quantitative electrodynamic model (relating the probe resonant frequency shift to 2D conductivity of single- and few-layer graphene) to the experimental data we evaluate graphene sheet resistance as a function of thickness. Near-field scanning microwave microscopy can simultaneously image location, geometry, thickness, and distribution of electrical properties of graphene without a need for device fabrication.

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