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**Rapid optical characterization of epitaxial graphene with confocal laser scanning microscopy** YANFEI YANG, Nationao Institute of Standards and Technology, VISHAL PANCHAL, National Physical Laboratory, ALBERT RIGOSI, Nationao Institute of Standards and Technology, CHRISTOS MELIOS, National Physical Laboratory, JIUNING HU, National Institute of Standards and Technology, OLGA KAZAKOVA, National Physical Laboratory, RANDOLPH ELMQUIST, randolph.elmquist@nist.gov, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM, NATIONAL PHYSICAL LABORATORY COLLABORATION — Wafer-scale uniformity of graphene can provide a template for the integration of various 2D materials. Quality of large area graphene has been improved significantly over the last decade, either by epitaxial growth on SiC or chemical vapor deposition on Cu. Achievement of perfect single layer graphene over millimeter scales will largely depend on rapid optical characterization. For example, the multilayer regions can be rapidly assessed with a conventional optical microscope. However, the low optical resolution and the 2.3% absorption of single layer graphene makes it difficult to accurately map out sub-micron scale inhomogeneity in graphene. We demonstrate rapid characterization of epitaxial graphene using a confocal laser scanning microscope (CLSM), which can capture images with 12-bits of brightness and resolve features down to 120 nm, whilst maintaining the speed of an optical microscope. Furthermore, the CLSM captures 3-D information of the sample morphology with height resolution of sub-10 nm. Thus, CLSM is a useful technique for rapid characterization of large areas of graphene and other related 2D materials.

Yanfei Yang
Nationao Institute of Standards and Technology

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