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Near-field study in graphene/hBN heterostructures GUANGXIN NI, Department of Physics, University of California, San Diego, La Jolla, California 92093, USA, LEI WANG, Department of Mechanical Engineering, Columbia University, New York, NY 10027, USA, MICHAEL GOLDFLAM, MARTIN WAGNER, ZHE FEI, ALEX SWINTON MCLEOD, MENGKUN LIU, Department of Physics, University of California, San Diego, La Jolla, California 92093, USA, FRITZ KEILMANN, Ludwig-Maximilians-Universität and Center for Nanoscience, 80539 München, Germany, BARBAROS ÖZYILMAZ, ANTONIO H. CASTRO-NETO, Graphene Research Centre and Department of Physics, National University of Singapore, 117542, Singapore, PHILIP KIM, Department of Physics, Columbia University, New York, NY 10027, USA, JAMES HONE, Department of Mechanical Engineering, Columbia University, New York, NY 10027, USA, MICHAEL FOGLER, DIMITRI N. BASOV, Department of Physics, University of California, San Diego, La Jolla, California 92093, USA — Graphene is proposed as one of the most promising candidates for novel plasmonic devices, owning to its versatile tunability and ultrafast operation speed. Although exciting results of graphene plasmonics have been obtained, there is keen interest in improving device quality to explore additional plasmon physics and functionalities. Here we present studies of surface plasmons in graphene/hBN devices using scanning near-field optical microscopy. We find that by using these high quality devices, plasmon dissipation rate can be greatly reduced. Moreover, we demonstrated ultrafast hot carriers induced plasmon dispersion in real space. Our study would be important for novel graphene plasmonic applications.

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