Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Anisotropic ultrafast response of MoS_2 on rippled substrates EUGENIO CINQUANTA, ANDREA CAMELLINI, Politecnico di Milano, CHRISTIAN MARTELLA, CNR-IMM, unit of Agrate Brianza, CARLO MENNUCCI, Universit di Genova, ALESSIO LAMPERTI, CNR-IMM, unit of Agrate Brianza, GIUSEPPE DELLA VALLE, MARGHERITA ZAVELANI ROSSI, Politecnico di Milano, FRANCESCO BUATIER DE MONGEOT, Universit di Genova, ALESSANDRO MOLLE, CNR-IMM, unit of Agrate Brianza, SALVATORE STAGIRA, Politecnico di Milano — TMDs represent one of the most promising option for new devices characterized by high performances for opto- and nanoelectronics applications. Top-down schemes have been fruitfully exploited for the tuning of TMDs physics by stain engineering in exfoliated flakes. We propose an original bottom-up strategy based on the CVD growth of MoS_2 on anisotropic substrates and its characterization by means of pump-probe spectroscopy. The ultrafast response of the rippled MoS_2 reveals strongly anisotropic. While the transient absorption emerges as independent from the orientation of the pump beam polarization, the angle between the probe beam polarization and the ripples induces remarkable effects. Within an orthogonal geometry, both the overall intensity of the transient spectrum and the el-ph scattering decay time are halved while the photo-bleaching at 450 nm is blueshifted with respect to the parallel orientation case. Our results demonstrate that the coupling of TMDs with anisotropic substrates is a promising way for the integration of TMDs photonics devices.

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Date submitted: 15 Nov 2016 Electronic form version 1.4