

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optical investigation of epitaxial silicene on Ag(111) EUGENIO CINQUANTA, CNR-IMM MDM Laboratory, FRANCESCO SCOTOGNELLA, Physics Department, Politecnico di Milano, DANIELE CHIAPPE, CNR-IMM MDM Laboratory, CARLO GRAZIANETTI, CNR-IMM MDM Laboratory and Department of Materials Science, University of Milan-Bicocca, EMILIO SCALISE, MICHEL HOUSSA, Semiconductor Physics Laboratory, Department of Physics and Astronomy, University of Leuven, MARCO FANCIULLI, CNR-IMM MDM Laboratory and Department of Materials Science, University of Milan-Bicocca, CATERINA VOZZI, CNR-IFN, ALESSANDRO MOLLE, CNR-IMM MDM Laboratory — Silicene keeps on attracting the attention of the scientific community due to both its expected fascinating physical properties and its integrability in the present Si-based industry. Despite huge efforts devoted to silicene characterization, a picture of its physical properties is still lacking. The presence of degenerate superstructures together with a local Si-Ag hybridization, makes the valence band structure non-trivial. We elucidate the nature of epitaxial silicene on Ag(111) by means of optical CW and time-resolved techniques supported by ab-initio modelling. Based on Raman spectroscopy we confirm the lattice hexagonal symmetry and determine the electronic character of the different superstructures. We study the ultrafast photophysical properties of silicene via differential transmission spectroscopy. An intense feature in the spectrum, followed by a decay of one picosecond, is observed in the UV spectral region. This feature evidences to the presence of the Si layer and can be ascribed to a Si-Ag coupling, resulting in an enhancement of the Ag surface plasmon.

Eugenio Cinquanta
CNR-IMM MDM Laboratory

Date submitted: 15 Nov 2013

Electronic form version 1.4