## Phase transition and electronic structure of the antimonene/Bi2Se3 van der Waals heterostructure

Conor Hogan1, Kris Holtgrewe2, Fabio Ronci1, Stefano Colonna1, Simone Sanna2, Paolo Moras3, Polina M. Sheverdyaeva3, Sanjoy Mahatha3, Marco Papagno4, Ziya S. Aliev5, Mahammad Babanly6, Evgeni V. Chulkov7, Carlo Carbone3, and Roberto Flammini1

*1Istituto di Struttura della Materia-CNR (ISM-CNR), Via del Fosso del Cavaliere 100, 00133 Roma*

*2 Institut für Theoretische Physik and Center for Materials Research, Justus-Liebig-Universität Gießen, Heinrich-Buff-Ring 16, 35392 Gießen, Germany*

*3Istituto di Struttura della Materia-CNR (ISM-CNR), S.S. 14, km 163.5, I-34149 Trieste,*

*4Dipartimento di Fisica, Università della Calabria, Via P.Bucci, 87036 Arcavacata di Rende (CS)*

*5Azerbaijan State Oil and Industry University, AZ1010 Baku, Azerbaijan*

*6Institute of Catalysis and Inorganic Chemistry, Azerbaijan National Academy of Science, AZ1143 Baku, Azerbaijan*

*7Departamento de Física de Materiales, Facultad de Ciencias Químicas, UPV/EHU, and Centro de Física de Materiales, CFM-MPC, CSIC-UPV/EHU, Apdo. 1072, 20080 San Sebástian/Donostia, Basque Country, Spain*

Abstract

The van der Waals heterostructure [1] formed between the 2D trivial semiconductor antimonene (Sb-ene) and the 3D topological insulator bismuth selenide (Bi2Se3) offers a fascinating route for exploring unconventional interfacial phenomena.

In this talk I report on a joint theoretical-experimental study of the growth [2] and electronic properties of single and multilayered Sb-ene on Bi2Se3. STM and ARPES measurements provide evidence for a temperature driven 2D phase transition on the surface, resulting in ordered domains displaying a perfect lattice match with bismuth selenide that can be attributed to stacks of single or double bilayers of buckled antimonene sheets [3]. DFT calculations of the stability and phase transition pathway provide insight into all stages of growth. A delicate interplay between cohesive and van der Waals forces, spin-orbit coupling, strain, and kinetic limiting, emerges. Analysis of the electronic structure yields a clear interpretation of measured spectra in terms of topological surface states induced by proximity effects.

**References:**

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