

Theory and Computation for 2D Materials

Monday January 13, 2020

- 8:00–8:55 *Check-In/Light Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00–9:40 **Francisco Guinea** (IMDEA)
Electron-electron interactions in graphene systems with narrow bands: dependence on layer arrangement and coupling to the substrate
- 9:50–10:05 *Break*
- 10:05–10:45 **Andy Lucas** (University of Colorado Boulder)
Electron hydrodynamics with a polygon Fermi surface
- 10:55–11:10 *Break*
- 11:10–11:30 **Noa Marom** (Carnegie Mellon University)
First principles simulations of hybrid interfaces
- 12:00–2:00 *Lunch (on your own)*
- 2:00–2:40 **Mitchell Luskin** (University of Minnesota, Twin Cities)
Configuration Space Methods for Incommensurate 2D Heterostructures
- 2:50–3:10 *Break*
- 3:10–3:30 **Paul Cazeaux** (University of Kansas)
Relaxation of incommensurate bi- and trilayer heterostructures and networks of domain walls
- 3:35–3:50 *Break*
- 3:50–3:55 *Lightning Welcome from the Julian Schwinger Foundation for Physics Research (Seth Putterman)*
- 3:55–4:30 *Lightning Poster Presentations*
- 4:30–6:00 *Poster Session & Reception (Hosted by IPAM)*

Tuesday January 14, 2020

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:40 **Pilar Ariza** (University of Sevilla)
Dislocation accommodation mechanisms in monolayer and bilayer graphene.
- 9:50–10:10 *Break*

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- 10:10–10:50 **Michael Fogler** (University of California, San Diego (UCSD))
Effect of dislocations on collective modes of twisted 2D materials
- 11:00–11:20 *Break*
- 11:20–11:40 **Xiaojie Wu** (University of California, Berkeley (UC Berkeley))
Density matrix embedding theory for large-scale heterogeneous systems
- 12:00–2:00 *Lunch (on your own)*
- 2:00–2:20 **Xingjie Li** (University of North Carolina)
Bending admissible continuum approximation for monolayered 2D materials
- 2:25–2:35 *Break*
- 2:35–2:55 **Marko Petrovich** (University of Delaware)
First-principles theory of proximity spin-orbit torque on a two-dimensional magnet: Current-driven antiferromagnet-to-ferromagnet reversible transition in bilayer CrI₃
- 3:00–3:20 *Break*
- 3:20–3:40 **Pratibha Dev** (Howard University)
Effects of substrates on the intrinsic properties of 2D crystals
- 3:45–3:55 *Break*
- 3:55–4:15 **Nathan Finney** (Columbia University)
Tunable coexisting moiré superlattices with rotatable van der Waals heterostructures

Wednesday January 15, 2020

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:40 **Allan MacDonald** (University of Texas at Austin)
Electronic and optical properties of 2D moiré superlattices
- 9:50–10:10 *Break*
- 10:10–10:30 **Shiang Fang** (Rutgers University New Brunswick/Piscataway)
Wannier function based electronic structure modeling for layered materials
- 10:35–10:45 *Break*
- 10:45–11:05 **Stephen Carr** (Harvard University)
A band-free approach to twistrionics
- 11:10–11:20 *Break*

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- 11:20–11:40 **Daniel Massatt** (University of Chicago)
Momentum space in relaxed incommensurate bilayers
- 12:00–2:00 *Lunch (on your own)*
- 2:00–2:40 **Andrea Young** (University of California, Santa Barbara (UCSB))
Superconductivity and magnetism in clean twisted bilayer graphene
- 2:50–3:10 *Break*
- 3:10–3:50 **Ke Wang** (University of Minnesota, Twin Cities)
Correlated Superconducting and Insulating States in Twisted Trilayer Graphene Moire of Moire Superlattices
- 4:00–4:20 *Break*
- 4:20–4:40 **Ziyan Zhu** (Harvard University)
Modeling mechanical relaxation and electronic states of incommensurate trilayer van der Waals heterostructures

Thursday January 16, 2020

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:40 **Andrea Alu** (CUNY)
Metamaterials Based on Broken Symmetries
- 9:50–10:05 *Break*
- 10:05–10:45 **Moshe Goldstein** (Tel Aviv University)
Correlation induced band competition in oxide interfaces: (001) vs. (111) LAO/STO
- 10:55–11:10 *Break*
- 11:10–11:50 **Michael Weinstein** (Columbia University)
Dynamics of waves in continuum honeycomb structures
- 12:00–2:00 *Lunch (on your own)*
- 2:00–2:40 **Dionisios Margetis** (University of Maryland)
On the theory of edge plasmon-polaritons in anisotropic 2D materials
- 2:50–3:10 *Break*
- 3:10–3:30 **Alexis Drouot** (Columbia University)
Multiscale analysis of topological insulators
- 3:35–3:50 *Break*
- 3:50–4:10 **Alexander Watson** (Duke University)
Edge states beyond ribbon geometry

Friday January 17, 2020

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00–9:40 **Nader Engheta** (University of Pennsylvania)
Wave-Matter Interaction in Four-Dimensional (4D) Metamaterials
- 9:50–10:00 *Break*
- 10:00–10:40 **Prineha Narang** (Harvard University)
Hydrodynamics in Quantum Materials
- 10:50–11:00 *Break*
- 11:00–11:20 **Jacob Shapiro** (Princeton University)
Two-Dimensional Time-Reversal-Invariant Topological Insulators via Fredholm Theory
- 11:25–11:35 *Break*
- 11:35–11:55 **Matthias Maier** (Texas A&M University - College Station)
2D plasmonic computation of layered heterostructures
- 12:00–1:30 *Lunch (on your own)*
- 1:30–4:00 *Discussion and Collaboration*
- 4:00 *Conclusion*

