Daniel M. Rubin

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Education

Northeastern University, Boston, MA
PhD in Physics 2012 - 2018 est.

University of California, Davis, CA
BSc in Physics, 2008 - 2012

Experience

Graduate Research Assistant, Laboratory for Graphene Research, NEU, 2013 - Present

- Designed, constructed, calibrated, and deployed optoelectronic characterization instrument used in material characterization with LabView and Python.
- Utilized quantitative computational models for optical spectroscopies of nanomaterials to validate and analyze experimental data.
- Modeled electronic structure and properties of semiconductor materials with DFT based simulation packages.
- Simulated nuclear processes in various materials using MCNP to model ionizing radiation in the design of radiation detection systems.
- Managed and maintained a Raman spectrometry user facility with users in the Physics, Chemistry, Mechanical Engineering, and Chemical Engineering departments.

Personal Projects

- Home-brew soil moisture monitoring station storing data from an external probe in a SQL database. A locally available website can request time series data and dynamically display previous soils moisture readings. All services running on a RaspberryPi.
- Magic: The Gathering thesaurus. User querriable database of the 15,000+ unique cards with similarity computed using natural language processing techniques.

Patents

Tunable and Reconfigurable Atomically Thin Heterostructures
Anthony Vargas, Fangze Liu, Christopher Lane, **Daniel Rubin**, Ismail Bilgin, Matthew DeCapua, Arun Bansil, Swastik Kar. *U.S. Patent Application No. 62/378,345* (August 2016)

Ion and Radiation detection Devices Based on Carbon Nanomaterials and Two-Dimensional Materials
Ji Hao, Swastik Kar, Yung Joon Jung. **Daniel Rubin** *Intl. Patent Application No. US 2017/051032* (September 2017)

Publications

Tunable and Laser-Reconfigurable 2D Heterocrystals Obtained by Epitaxial Stacking of Crystallographically Incommensurate Bi_2Se_3 and MoS_2
Anthony Vargas, Fangze Liu, Christopher Lane, **Daniel Rubin**, Ismail Bilgin, Matthew DeCapua, Arun Bansil, Swastik Kar. *Science Advances, 14 JUL 2017 : E1601741*

Excitonic processes in atomically-thin $MoSe_2$/MoS_2 vertical heterostructures
Victor Carozo, Kazunori Fujisawa, Rahul Rao, Ethan Kahn, Jose Cunha, Tianyi Zhang, **Daniel Rubin**, Andres de Luna Bugallo, Swastik Kar, Mauricio Terrones. 2D Materials *Awaiting Publication*

Widely-Tunable Neutral and Charged Excitons at the 2D Interface Between Metal Contacts and Monolayer Molybdenum Disulfide
Daniel Rubin, Ismail Bilgin, Swastik Kar. *Manuscript submitted, awaiting review.*

Characterization of Chalcogen Doping in Atomically thin MoS_2-$MoSe_2$ Hetero-Junctions
Ismail Bilgin and **Daniel Rubin**, Kazunori Fujisawa, Colin Casey, Aditya D. Mohite, Mauricio Terrones, Andres de Luna Bugall, Swastik Kar. *Manuscript in Preparation*

Presentations

Materials Research Society Fall Meeting 2017
Contributed Talk: Control of Room Temperature Exciton Dynamics in the Contact Region of MoS_2 Field Effect Devices.

Materials Research Society Fall Meeting 2014
Contributed Talk: Synthesis and Characterization of Few-Layered Black-Phosphorus

Expertise

Python, LabView/LabWindows, MATLAB, LaTeX, Arduino