Fred Florio

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Education

2011-2015: Stevens Institute of Technology
--Bachelors of Science: Physics
2015-Present: Rensselaer Polytechnic Institute

Research Experience

-**Plasmon Properties in 2D materials:** Plasmon lifetimes in graphene heterostructures are calculated from material properties such as electron-electron scattering, electron-phonon scattering, etc. calculated using JDFT.

-**Electronic Properties of Curved and Defective 2D BN Nanostructures:** The band structure and density of states of various 2D BN nanostructures (Schwarzites, a Haeckelite, and hBN) were determined from DFT calculations in Quantum Espresso.

-**Properties of ELDs in Monolayer hBN:** Various properties (band structure, formation energy, etc.) of Extended Line Defects embedded in hexagonal Boron Nitride monolayers were determined from DFT calculations in Quantum Espresso.

-**Designing High-accuracy Permanent Magnets for Low-Power Magnetic Resonance Imaging:** A family of dipole magnet designs suitable for high-resolution MRI was constructed from permanent magnets.

-**Effect of Static Disorder on Sensitivity of Coupled Resonator Optical Waveguide Gyroscopes**: Using MATLAB to write the code, transfer matrix based calculations were done to study the effects of static defects in Coupled Resonator Optical Waveguide devices. Random deviations from ideal device conditions were simulated to determine output signal's sensitivity to fabrication error.

Technical Skills

-Programming languages: C++, python, MATLAB
-DFT calculations using: JDFTx, Quantum Espresso

Teaching/Education Experience

2013-2015, Stevens Institute of Technology: Teaching Assistant for PEP 112 (Gen-Ed Electricity and Magnetism)
2015-Present, Rensselaer Polytechnic Institute: Teaching Assistant for PHYS 1100 (Physics 1), 1200 (Physics 2), 2120 (Earth and Sky), and 2350 (Experimental Physics)

Publications and Posters

-"Designing High-accuracy Permanent Magnets for Low-Power Magnetic Resonance Imaging" [Fred Florio, Gautam Sinha and Ravishankar Sundararaman ; IEEE Transactions on Magnetics (Publication Pending Review) 2017]
-"Electronic Properties of Curved and Defective 2D BN Nanostructures" [Kory Beach, Ross Siegel, Fred Florio, Aldo Raeliarijaona, Humberto Terrones; 2016 Poster]
-"Effect of Static Disorder on Sensitivity of Coupled Resonator Optical Waveguide Gyroscopes" [Fred Florio, Dmitriy Kalantarov, and Christopher P. Search ; Journal of Lightwave Technology, Vol. 32, Iss. 21, pp. **3418–3426** (2014)]