PHYSICS AND ASTRONOMY COLLOQUIUM 11/07/2024

SPINTRONICS WITH 2D MAGNETIC AND TOPOLOGICAL MATERIALS: OUTSTANDING OPPORTUNITIES IN VAN DER WAALS HETEROSTRUCTURES

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Advances in quantum science and technology rely on ever-improving control over quantum degrees of freedom including electron spin, photons, and magnons, which can store, transmit, and exchange information. Understanding their mutual interactions, propagation, and non-equilibrium dynamics within solid-state systems is a crucial challenge at the forefront of this effort. Our research investigates the dynamics and effective couplings among these quantum degrees of freedom with two main themes: 1. developing multifunctional van der Waals heterostructures for spin-based quantum information processing; 2. accelerating next-generation spin-orbit torque MRAM devices based on 2D magnetic and topological materials. I will discuss how we harness the outstanding opportunities enabled by the pristine van der Waals interfaces by employing ultrafast optical scanning microscopy, Sagnac interferometry, and microwave electronics with unparalleled Kerr sensitivity, temporal, and spatial resolutions. We aim to bridge the urgent needs of the microelectronics industry by enabling new forms of nonvolatile magnetic memory, low-power computing, optical interconnects, and multifunctional hybrid materials with widespread societal impact.

GRAD 2:30 PM
STUDENT MEET N' GREET (PHYSICS 3051)

COFFEE: 3:00 PM
BARKAS LOUNGE (3049 PHYSICS)

COLLOQUIUM: 3:40 PM
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