



Guest Speaker, Dr. Kai Liu
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11:00am -12:00pm

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Meeting Information

Meeting link:

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Center for Nanotechnology Research and Education Seminar **Magneto-Ionic Control of Heterostructures and Interfaces**

Dr. Kai Liu, Professor, Georgetown University

Abstract: Magneto-ionic approaches for modifying ion distributions in metal/ionic-reservoir heterostructures offer exciting potentials to control materials properties. Our recent studies show that such magneto-ionic effect, even though initiated at metal/reservoir interface, can extend deep into the rest of the reservoir layer. In this talk I will illustrate a number of functionalities that can be tuned via the magneto-ionic handle: In antiferromagnetic NiCoO systems, we have observed a strong exchange bias due to the magneto-ionic effect, which can be further enhanced by electric biasing. In studies of cuprates, a thin Gd layer (up to 20 nm) deposited on top of epitaxial YBCO films (100nm) is found to leach oxygen from deep within the YBCO and suppress the superconductivity. In ferromagnets chemisorbed with submonolayer oxygen, we have observed strong DMI induced by chemisorption at room temperature, which allows manipulations of magnetic skyrmions. Time permitting, results on nitride and hydroxide systems will also be presented. Our findings demonstrate an effective ionic approach to control interfaces in magnetic heterostructures. (Supported by the NSF (DMR-1610060, ECCS-1611424, DMR-1905468, ECCS-1933527) and the nCORE SMART center through SRC/NIST.)

BIOGRAPHY

Dr. Kai Liu received his Ph.D. in Physics from the Johns Hopkins University in 1998. He then carried out postdoctoral research at U.C. San Diego, before joining the U.C. Davis faculty in 2001. In 2018 he moved to the Georgetown University, where he is currently a Professor and McDevitt Chair in Physics. His research interest is in nanomagnetism and spintronics. Dr. Liu was recipient of an Alfred P. Sloan Research Fellowship and a UC Davis Chancellor's Fellowship. He is an elected Fellow of the Institute of Physics (UK), APS, IEEE, and American Association for the Advancement of Science. He served as the Program Co-Chair for the 2007 MMM Conference in Tampa and the 2011 Intermag in Taipei, and as the General Chair for the 2016 MMM in New Orleans. He is currently serving as Secretary for the IUPAP Commission on Magnetism.