

PHYSICS COLLOQUIUM

Tuesday, December 3 | 2:30 - 3:30 p.m. | RNS 210



Imaging Nanomagnetism: Using Scanning Probe Microscopy to Examine Cobalt Rings and Wires

As electronic devices continue to shrink, it is important to understand how physical properties change on the nanoscale in order to design better devices. In the case of magnetism, reducing the size of the material to the nanoscale can change the stability, strength, and magnetic ordering, all of which are properties we must understand for devices applications. I examine nanomagnetism using scanning probe microscopy (SPM). SPM brings a small, sharp tip close to the material I am examining in order to obtain information about the topographic structure, and it can also give information about other properties, including magnetism. In this way we can characterize small ferromagnetic rings and wires. Using the probe to create a circular magnetic field, I can examine how domain walls move. In the case of ferromagnetic rings, the rings switch between a clockwise (CW) and counterclockwise (CCW) rotation through the application of a circular magnetic field. When the ring is very thin ($\sim 5\text{nm}$) the switching mechanism changes. I also examine the stability and magnetization direction of small, quasi-1D self-assembled chains of Cobalt atoms on an Iridium surface. By characterizing these systems we can better understand how magnetic properties change on the nanoscale.



Jessica Bickel

Jessica Bickel earned her Bachelor of Science in Engineering, Materials Science and Engineering, at Johns Hopkins University as well as a Bachelor of Music in Oboe Performance at Peabody Conservatory of Music.

Dr. Bickel earned her Masters of Science in Engineering, Materials Science and Engineering as well as her Ph.D. at University of Michigan. Her dissertation title was: "The Role of Strain in the Surface Structures of III-V Alloyed Semiconductor Films".

Dr. Bickel currently teaches and researches at Mount Holyoke College in Massachusetts.