MONTANA STATE UNIVERSITY

Physics Public Outreach Lecture on Atomic, Molecular, & Optical Physics

Thursday, March 9, 2017
3:10 – 4:00 PM
Procrastinator Theater
Strand Union Building

"Optical tractor beams: how light can be used to trap and manipulate matter"

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Summary:

In Star Trek and Star Wars, tractor beams are portrayed as beams of light and used to capture enemy spaceships. While these futuristic devices remain objects of science fiction, light indeed exerts force on matter and can be used to trap, manipulate and spin microscopic materials such as cells, nanoparticles, molecules and atoms. In 1970, this capability was first demonstrated by showing that light can trap particles. Since then, such "optical tweezers" have been used in a large variety of applications including trapping atoms, plucking individual cells for sorting, assembling microscopic structures and measuring ultra-small movements in molecular motors. In this presentation, I will explain how light can be used to mechanically manipulate microscopic matter and discuss several of these exciting applications. Although the technique has existed for nearly 50 years, modern developments in nanotechnology and continued research have improved our ability to control matter in this way, and I will review some these recent advances that enable technologies such as nanoscale manufacturing and demonstrate fascinating phenomena such as the levitation of individual nanostructures.

Host: Rufus Cone

Dr. Borys is a candidate for a Physics Faculty Position