



Physics Colloquium



Thursday, Nov 3rd at 3:30 pm in SC 234

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Student Difficulties with non-Cartesian Unit Vectors in Upper Level E&M

This is a physics education research talk. An junior-level E&M course (i.e. based on Griffiths) involves the extensive integration of vector calculus concepts and notation with abstract physics concepts like field and potential. We hope that students take what they have learned in their math classes and apply it to help represent and make sense of the physics. To assess how well students are able to do this integration and application I have developed several simple concept tests on position and unit vectors in non-Cartesian coordinate systems as they are used in upper level E&M. In this talk I describe these concept tests and present results that show students at different levels (pre-E&M course, post-E&M course, 1st year graduate students) and in different disciplines (physics, electrical engineering) have difficulty using non-Cartesian unit vectors appropriately. I also report on some initial work at helping students overcome the most challenging of these difficulties.

Refreshments at 3:00 pm in SC 123