

Colloquium

March 16, 2017

### **Engaging Students in Authentic Scientific Practices in Physics Lab Courses**

**Modeling, which includes developing, testing, and refining models, is a central activity in physics. Modeling is most fully represented in the laboratory where measurements of real phenomena intersect with theoretical models, leading to refinement of models and experimental apparatus. However, experimental physicists use models in complex ways and the process is often not made explicit in physics laboratory courses. We have developed a framework to describe the modeling process in physics laboratory activities. The framework has guided our course transformations, research into student learning, and our assessment of student outcomes. We measure one of the outcomes of lab courses using a validated tool called the E-CLASS, which measures students' understanding of the nature of experimental physics. National results from this assessment can help guide efforts to improve experimental physics education.**

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