

Spring 2018 Colloquium

Department of Physics & Astronomy, TAMU-Commerce

Mar 8, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Physics Education

Problem solving in physics: Undergraduates' framing, procedures, and decision making

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Dr. Bahar Modir joined Kansas State University (KSU) in August 2013 to pursue her PhD in physics after receiving her Master's in Atomic molecular physics from Tehran University in 2011. After realizing that physics education research (PER) is a research-based field in teaching and learning physics, she joined the PER group at KSU. She first worked in a visual cueing project to understand student's reasoning in response to visual cues and feedbacks on the computer screen. She then joined Mathematization group, where her PhD dissertation work has focused on understanding how students use their knowledge of mathematics in upper division physics courses. She uses different methods and theories

to model students' problem solving practices. She received her PhD in August 2017. Currently, She is a remote adjunct faculty at Texas A&M University-Commerce.

Abstract

Problem solving is a crucial practice to learning physics. Exploring student's thinking is an efficient way to understand problem solving behaviors. However, thinking is not always an explicit state of mind. As students move to upper division physics, they continue to expand their skills and mathematical toolbox and are more likely to skip steps, apply shortcuts, or think implicitly. In this talk, video-based classroom data serve to demonstrate the methods and theories that are used to make sense of implicit and explicit moments in student problem solving processes in physics. Qualitative methods are employed to analyze student gestures, behaviors, and discourse. In this study, the theory family of Knowledge in Pieces (KiP) is used to explore how students activate and link their ideas to make arguments during problem solving situations. Results from this study can provide insights into how to include problem solving in physics instruction.