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Abstract for an Invited Paper  
for the DAMOP19 Meeting of  
the American Physical Society

**Faculty Member for Research in an Undergraduate Institution Prize Talk: Theoretical AMO Physics  
at an Undergraduate Institution<sup>1</sup>**

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Theoretical physics research poses a challenge for engaging undergraduate student participation. Undergraduates usually have not developed the mathematical and computational skill sets needed to begin the research. At Penn State Berks, we get around this difficulty by treating quantum mechanical interactions and dynamics as a black box with input/output quantum numbers. The black box is typically a sophisticated close-coupling code which remains outside the scope of the student research project. Nevertheless, the students are often able to make valuable contributions through data collection, analysis, and modeling. In the process, they develop foundational skills for their future while helping to advance the larger goals of the theoretical research. Several recent examples in the context of molecular astrophysics will be reported in the talk.

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