

Abstract Submitted  
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**Using a Magneto-Optical Trap (MOT) to teach Experimental and Computational Methods in Undergraduate Physics**<sup>1</sup> D. O. KASHINSKI<sup>2</sup>, L. E. HARRELL, K. INGOLD, M. CASSIDY, C. S. GERVING, United States Military Academy — Experimental physics programs at primarily undergraduate institutions are often unable to include experimental atomic physics—specifically cold atom experiments—as part of the curriculum. At the United States Military Academy we are using cold-atom physics as the motivation for our culminating senior-level “Experimental Methods in Physics” course. Students first learn computational methods to numerically solve a range of problems including the equations describing the motion of atoms in a MOT. After an extensive literature review and basic laboratory instruction the student-teams endeavor to create a basic MOT. Previous experimental and theoretical coursework is reinforced through the hands-on setup of the cooling and repump laser systems and use of saturated absorption spectroscopy to observe the hyperfine structure of Rb. The experiment culminates with the appropriate laser light being combined in a vacuum chamber forming a MOT of <sup>87</sup>Rb. If time permits, students then characterize the MOT of <sup>87</sup>Rb comparing their results to simulations. The outcome of this new course will be presented at the meeting.

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