Using a Magneto-Optical Trap (MOT) to teach Experimental and Computational Methods in Undergraduate Physics.[1] D. O. KASHINSKI[2], L. E. HARRELL, K. INGOLD, C. S. GERVING, US Military Academy — We are using cold-atom physics to motivate our culminating undergraduate senior-level "Experimental Methods in Physics" course. Students continue to develop upon and refine previously-introduced computational methods by numerically solving a host of non-analytical problems, including a semi-classical simulation of atomic motion in a MOT. After an extensive literature review and basic laboratory instruction the student-teams endeavor to create a 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. Finally, to form the MOT of ^{87}Rb, students combine the light into a stand-alone vacuum cell that includes a Rb source and coils to establish an appropriate magnetic field gradient (manufactured by ColdQuanta). Time permitting, students then characterize the MOT by comparing their results to simulations. Updates and results from the second iteration of this new course will be presented at the meeting.

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