Abstract Submitted
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Atomic, molecular and optical physics at Bethel[1] CHAD HOYT, DAN KLEMME, Bethel University — An example of the close connection between research and advanced labs at Bethel University is the recent realization of cold lithium atoms in a magneto-optical trap (MOT). Several aspects of the cooling and trapping research took root in the laboratory components of the Optics and Lasers upper-level courses. These included a wavelength meter with sub-picometer accuracy and precision, stabilized laser diodes and molecular and atomic spectroscopy. Work on the MOT began in 2008 and has involved students (a total of 12, including several post-General Physics sophomores) working during summers, course projects and senior research. Lithium MOTs offer challenges (e.g. low vapor pressure) and advantages in an undergraduate lab with respect to the more common rubidium systems. Lasers for lithium are at 671 nm, a more practical red color that can still take advantage of inexpensive laser diodes and broadband optical coatings. Its relatively simple atomic structure makes lithium amenable for stringent comparisons between theory and experiment. Recent high precision absolute frequency measurements using an atomic beam disagree. Cold-atom spectroscopy of lithium could help resolve questions about the atomic structure of lithium.

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