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Abstract for an Invited Paper for the MAR08 Meeting of the American Physical Society

Use of clickers and sustainable reform in upper-division physics courses MICHAEL DUBSON, University of Colorado at Boulder

At the University of Colorado at Boulder, successful reforms of our freshmen and sophomore-level physics courses are now being extended to upper-division courses, including Mechanics, Math Methods, QM, E&M, and Thermal Physics. Our course reforms include clicker questions (ConcepTests) in lecture, peer instruction, and an added emphasis on conceptual understanding and qualitative reasoning on homework assignments and exams. Student feedback has been strongly positive, and I will argue that such conceptual training improves rather than dilutes, traditional, computationally-intensive problemsolving skills. In order for these reforms to be sustainable, reform efforts must begin with department-wide consensus and agreed-upon measures of success. I will discuss the design of good clicker questions and effective incorporation into upperlevel courses, including examples from materials science. Condensed matter physics, which by nature involve intelligent use of approximation, particularly lends itself to conceptual training. I will demonstrate the use of a clicker system (made by iClicker) with audience-participation questions. Come prepared to think and interact, rather than just sit there!