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Development of a Thermal and Statistical Physics Assessment[1]

JAMES LAVERTY, Kansas State University, BETHANY WILCOX, University of Colorado Boulder, AMALI JAMBUGE, Kansas State University, KATHERINE RAINEY, University of Colorado Boulder, AMOGH SIRNOORKAR, Kansas State University — Thermal and Statistical Mechanics courses are a core part of every physics degree. The topics covered in this course can also vary substantially from institution to institution or even instructor to instructor. This makes it difficult to develop an assessment that allows for comparisons of student understanding within and between institutions. In this talk, I will introduce our work to develop an assessment for upper level thermal and statistical physics courses. We use Evidence-Centered Design to insure that questions assess not just conceptual ideas, but also whether students can engage in doing physics with those concepts. Due to the variation in content coverage across instructors and institutions, this assessment will allow instructors to choose what is on the assessment based on their learning goals for the course. Additionally, we are developing a system that provides actionable feedback to instructors (not just a score) on how to modify their courses to help students learn. Finally, this assessment will allow researchers to make comparisons of student learning between semesters and across institutions. The development of this system will establish a new approach to assessment design for undergraduate physics courses.

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