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Collaborative Research: Research on the Learning and Teaching of Thermal Physics

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Abstract

Groups at Iowa State University and the University of Maine will collaborate in a coordinated program of research and research-based curriculum development in thermal physics, targeting both introductory general physics courses and advanced-level undergraduate courses. The research component involves one-on-one student interviews, written pre- and post-test questions, and multiple-choice surveys. This research is then applied to the development of curricular materials intended to improve student understanding in a manner consistent with active-learning methods previously shown to be effective in physics instruction. The curriculum will in turn be evaluated for its effectiveness at addressing the student difficulties previously identified through research. This project will provide insight into student learning of fundamental concepts in thermal physics. Instructional materials will be designed specifically to address student difficulties found in the research, and will utilize proven pedagogical techniques to increase their effectiveness. The dissemination of both the research results and of the curricular materials will improve instruction in thermal physics nationally and internationally.
