

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Modeling cell membrane action potentials with RC circuits in a general physics teaching laboratory M.S. RZCHOWSKI, Physics Dept., University of Wisconsin-Madison — Faculty in the physics department at the University of Wisconsin have been working in collaboration with colleagues in biological sciences to modify a large calculus-based general physics service course populated primarily by students pursuing a career in the biological sciences. Part of this effort involves introducing examples and laboratory experiments to illustrate basic physics ideas that are central to important topics in biology. We will discuss one modification that has worked well: a teaching laboratory experiment where students build an approximation of an axon cell membrane from resistors and capacitors, and measure the speed and shape of a pulse propagating along the membrane. It uses the same equipment, and teaches the same physics concepts, as a traditional RC circuits laboratory, but in a way that demonstrates connections to the students' major field. It also exemplifies a complex problem that illustrates the idea of a model, and teaches methods for applying basic physics concepts to systems that are not immediately solvable. We discuss an assessment of the students' interest level and understanding in relation to our general goal of developing in students the ability to approach complex problems using physical reasoning.

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Date submitted: 12 Dec 2007

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