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Particle in a box: software for computer-assisted learning in introductory quantum mechanics courses.

Eur. J. Phys. 27, No. 6, 1425-1435 (2006).

Summary: *Particle in a Box* is a non-commercial program which was devised to help students to become familiar with typical quantum phenomena when they are introduced for the first time in a physical-chemistry course. Its name comes from the simple and well-known theoretical model on which it is based. The user can select three distinct potential wells, namely the one dimensional with two infinite walls, the one dimensional with one finite barrier and the two-dimensional infinite potential square box. In order to set the system conditions, the user may enter the values for different physical parameters, including the quantum level, mass of the particle, dimensions of the box and height of the finite potential barrier. Through a clear and attractive output, one can visualize and compare the wavefunctions and their squares for the chosen quantum levels, the corresponding energy diagrams and probabilities of tunneling. The program was tested as a pedagogical tool in tutorials of an introductory course in atomic and molecular structure. The use of this software in the classroom increased the receptivity of the students to non-intuitive topics such as, for instance, quantization, nodes and tunneling, which helped to improve their success in the course.

Classification: M55 N85 R35 U55

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