Helping students become Leaders of the Second Quantum Revolution

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We are in the midst of the second quantum revolution. To help improve student understanding of quantum concepts, we have been conducting investigations of the difficulties that students have in learning quantum mechanics and using research as a guide to develop Quantum Interactive Learning Tutorials (QuILTs) as well as tools for peer-instruction. The goal of QuILTs and peer-instruction tools is to actively engage students in the learning process and to help them build links between the formalism and the conceptual aspects of quantum mechanics. The QuILTs are based upon research in physics education and employ active-learning strategies and adapt visualization tools to help students take advantage of different representations of quantum concepts. These learning tools focus on helping students integrate qualitative and quantitative understanding without compromising technical content. This work is supported by the US National Science Foundation.