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Improving student understanding of quantum mechanics¹

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Learning quantum mechanics can be challenging, in part due to the non-intuitive nature of the subject matter. I will describe investigations of the difficulties that students have in learning quantum mechanics. We find that the patterns of reasoning difficulties in learning quantum mechanics are often universal similar to the universal nature of reasoning difficulties found in introductory physics. Moreover, students often fail to monitor their learning while learning quantum mechanics. To help improve student understanding of quantum concepts, we are developing 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 physics without compromising the technical content.

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