



Quantum Interactive Learning Tutorials (QuILTs)

Indicates a research-demonstrated benefit

Overview

Guided-inquiry worksheets to help students develop a good understanding of upper-level quantum mechanics, including contemporary topics such as quantum entanglement. They emphasize connecting quantitative formalism to qualitative understanding and building physical intuition using visualization tools from the [Open-Source Physics Project](#). They can be used in class or as homework. Graduate students can use them as a self-study tool.



Type of Method

Curriculum supplement, Tutorials



Level

Designed for: Advanced Undergraduate

Can be adapted for: Graduate , Intermediate Undergraduate



Setting

Designed for: Lecture - Small (<30 students) , Recitation/Discussion Session

Can be adapted for: Lecture - Large (30+ students), Homework, Studio



Coverage

Few topics with great depth



Topics

Modern / Quantum



Instructor Effort

Medium



Skills

Designed for: Conceptual understanding of physics content , Connecting conceptual and mathematical understanding , Enjoyment of physics , Coherent framework for physics, Understanding how physics relates to the real world, Think like a scientist, Reflecting on one's own learning, Self-confidence around physics, Representing knowledge in multiple ways



Research Validation

Based on research into: how students learn , student ideas about specific topics

Demonstrated to improve: scores on multiple choice conceptual tests , scores on written conceptual tests

Studied using: conceptual pre/post exams , student interviews , classroom observations , research conducted at multiple institutions



**Compatible
Methods**

[Peer Instruction](#), [PhET](#), [JiTT](#), [CGPS](#), [Physlets](#), [SCALE-UP](#), [OSP](#), [LA Program](#), [CAE TPS](#), [New Model Course](#), [TEFA](#), [CU Modern](#), [CU QM](#), [PI QM](#), [Tutorials](#), [Clickers](#), [Paradigms](#)



**Similar
Methods**

[UW Tutorials](#), [ABP Tutorials](#), [OST Tutorials](#), [CU QM](#), [Thermal Tutorials](#), [Mechanics Tutorials](#), [PI QM](#), [Tutorials](#), [Lecture-Tutorials](#)



Developer(s)

Chandralekha Singh and PER team at the University of Pittsburgh



Website

<http://www.phyast.pitt.edu/~cls/quantum/>