




## PI/Ψ Peer Instruction for Quantum Mechanics

 Indicates a research-demonstrated benefit

### Overview

A collection of approximately 500 research-based concept-tests (clicker questions) for a full semester upper-level undergraduate quantum mechanics. Also includes reflective questions (conceptual questions which are not in the multiple-choice format) which can be used for "Just in Time Teaching" and/or class discussions in upper-level quantum mechanics.



Type of Method

Instructional strategy, Curriculum supplement




Level

**Designed for:** Advanced Undergraduate 

**Can be adapted for:** Graduate  , Intermediate Undergraduate



Setting

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



Coverage

Few topics with great depth, Many topics with less depth



Topics

Modern / Quantum



Instructor Effort

Low







Resource Needs

Projector in class





Skills





**Designed for:** Conceptual understanding of physics content  , Connecting conceptual and mathematical understanding  , Coherent framework for physics, Understanding how physics relates to the real world, Reflecting on one's own learning, Self-confidence around physics, Enjoyment of physics

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



Research Validation




**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](#), [CAE TPS](#), [New Model Course](#), [TEFA](#), [CU Modern](#), [CU QM](#), [QuILTs](#), [Clickers](#), [Paradigms](#)

-  **Similar Methods** [Peer Instruction](#), [Workbook for Introductory Physics](#), [CAE TPS](#), [TEFA](#), [CU QM](#), [QuILTs](#), [Clickers](#)
-  **Developer(s)** Chandralekha Singh and PER team at the University of Pittsburgh
-  **Website** <http://www.phyast.pitt.edu/~cls/peer/>