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Qubits vs Waves - what works better for introductory quantum mechanics?

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Introductory Quantum Mechanics has traditionally been taught in Modern Physics courses, starting with the wave formalism. This approach requires students to learn new physics content, which is quite abstract and sometimes counterintuitive, while applying mathematical techniques most of them have not mastered yet. To avoid this unnecessary complication, we have redesigned our introductory quantum course and start with qubits, two-level systems, using several physical systems for illustration. I will report on the design process, observations and results from the first four years of implementation, and feedback from students in the course, grad students, and faculty members.

Keyword-1

quantum education

Keyword-2

course design

Keyword-3

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