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Research-based Quantum Instruction: Paradigms and Tutorials

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We examine the instructional considerations that influenced the development of two comprehensive quantum mechanics curricula: *Paradigms in Physics* (the junior-level physics courses at Oregon State University) and *Tutorials in Physics: Quantum Mechanics* (supplementary worksheets designed at the University of Washington). We consider both theoretical commitments about teaching and learning and practical structures determined in part by the local instructional environments. We use these considerations as a lens to explore example activities from each curriculum and to highlight prominent differences between them, along with some underlying reasons for those differences. The *Paradigms* reflect a case where the theoretical commitments drove changes to the practical structures while the *Tutorials* reflect how theoretical commitments were incorporated into a course with a relatively fixed structure. Partially as a result of this large-scale difference, we find that each curriculum prioritizes different theoretical commitments about how to promote student understanding of quantum mechanics. We discuss both alignment and tension between the theoretical commitments of the two curricula and their impact on the instructional materials.