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Spin First vs. Position First instructional approaches to teaching introductory quantum mechanics[1] HOMEYRA SADAGHIANI, Cal Poly Pomona — As part of ongoing research in teaching and learning quantum mechanics, we are investigating student learning of basic introductory quantum concepts in two different paradigms. In one paradigm, students are introduced to the postulates of quantum mechanics by discrete bases of Spin-half (Spin First) before being introduced to Schrdinger's equation. In the second paradigm, continuous bases of position probability wave functions (Position First) are the context within which students first encounter quantum mechanical phenomena. In this paper, we compare student learning of basic introductory quantum ideas in two sections of a sophomore level modern physics course at Cal Poly Pomona that were taught using these two approaches by means of their performances on a research-based concept posttest. Based on our results, the students who were taught using Spin First outperformed their peers in Position First group with average score of 53 ± 3% vs. 34 ± 5% in Quantum Mechanics Concept Assessment (QMCA), suggesting that the Spin First approach might improve some aspects of student learning of quantum mechanics.

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