

**The Trouble with Quantum Physics, and Why It Matters**

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Quantum physics is arguably the most successful scientific theory ever devised. It explains an enormous variety of natural phenomena to an extraordinary degree of accuracy — everything from semiconductors to the Sun itself. Yet there is a problem: it's unclear what this immensely fruitful theory says about reality. What is going on in the world of quantum physics? Why does "measurement" play a special role in the theory? Is it really impossible to talk about what's happening to atoms and subatomic particles when we're not looking at them? For many years, the standard answer to questions like this was to "shut up and calculate," to ignore these issues and simply use quantum physics to predict the outcomes of experiments. There was also a historical myth that went along with this answer, a myth that said Einstein had once worried about these questions, but he was shown the error of his ways by the great Danish physicist Niels Bohr. Yet that myth is simply untrue, and these thorny quantum paradoxes are far more important than most physicists once believed. In this talk, I'll explain the puzzles at the heart of quantum physics, why they matter, and what really went down between Einstein and Bohr 90 years ago.

**Wilson Hall, One West**