

It Ain't Necessarily So: Interpretations and Misinterpretations of Quantum Theory

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The *traditional view* is that a theory is a conceptual framework providing predictions, and the results of experiments or observations decide whether the theory is right or wrong. It will be contrasted with the *modern view* that one must incorporate the conditions of applicability of a concept into the very meaning of the concept (*measurability analysis*), and that only a series of theories (*scientific research program*) can be said to be scientific or unscientific. This modern view will be applied to a number of questions in quantum mechanics (*what is quantization?*, *states vs processes*, *open vs closed systems*) and quantum field theory (*particles and field quanta*, *bosons vs fermions*), and to the search for a theory of quantum gravity (*background independent vs fixed background theories*).

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