SACRAMENTO STATE

Department of Physics and Astronomy

FALL 2026 Colloquium Series

# "Taking Potentiality Seriously: Aristotle, Heisenberg, and the Reality of Quantum States"


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Heisenberg, though he remained a defender of Bohr and the Copenhagen interpretation, ultimately argued that quantum mechanics *can* be interpreted realistically, though not in the classical 'dogmatic' sense. *The key was to avoid the assimilation of potential states to actual states.* To that end, Heisenberg suggested a rehabilitation of Aristotle's distinction between potentiality and actuality as mutually implicative categories of reality. Within this framework, one could interpret potential quantum states as real physical states mediating the initial actual state of a measured system and its final actual state, the measurement outcome. Hilbert space can then be understood as a kind of "potentiality space" in which a state vector represents a potential state encompassing many potential outcome states. Measurement then transforms these potential outcomes, which are not bound by Aristotle's principles of non-contradiction and excluded middle, into a definite set of mutually exclusive and exhaustive probable outcomes, which satisfy them. This talk will explore Heisenberg's proposal and its refinement.


**Thursday, Nov. 12, 2026**

**4:00 – 5:20PM**

**MND1015**

*Open & Free to all students, faculty and public*