



PHIL / HIST 199

From Potentiality to Actuality: Heisenberg's Rehabilitation of Aristotle in Quantum Mechanics

An Upper-Division Undergraduate Seminar / Colloquium – 3 Units

www.csus.edu/cpns

Fall 2026

Tuesday evenings, 90 minutes (time TBD)
LIB 3023, Nicholas Petris Room

Instructors

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This seminar investigates one of the most surprising convergences in intellectual history: the rehabilitation of Aristotelian metaphysics—specifically the doctrine of hylomorphism and the interdependent concepts of actuality (*energeia*) and potentiality (*dunamis*)—within the conceptual foundations of modern quantum mechanics. Working from both primary sources in ancient natural philosophy and current research in the philosophy of physics, we will trace a 2,400-year conceptual arc from Aristotle's *Metaphysics* Θ and *Physics* to event-ontological interpretations of quantum theory, including decoherent (consistent) histories and the topological Relational Realist frameworks.

A central aim of the seminar is to understand why the 17th-century mechanical-materialist revolution—rooted in ancient atomism and crystallized in Galileo, Boyle, and Newton—produced a scientific worldview in which abstract properties (forces, fields) are wholly derivative of concrete material particles and their motions. Quantum mechanics fundamentally overturns this picture: quantum potential states are irreducibly abstract yet causally (concretely) efficacious; they evolve to become actual measured (concrete) states yet are not themselves coherently reducible to these concrete actual states. The Aristotelian framework of hylomorphism, potentiality, and actuality—which holds that these are mutually implicative rather than mutually exclusive—provides the conceptual resources to make sense of this.

This is an interdisciplinary seminar so we are seeking advanced students interested in bringing their individual expertise in the sciences and humanities into conversation. Instructor permission is required, so if you're interested in joining us, please email Dr. Epperson at epperson@csus.edu