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# Thirty Years of Complex Thinking: A Celebration of Stuart Kauffman's Contributions to the Field of Complex Systems

Noyce Conference Room  
Workshop  
9:00 am – 5:00 pm  
August 21, 2019 – August 22, 2019

"Dipolar Duality: Actuality and Potentiality in Quantum Mechanics"

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## ABSTRACT

As argued by Kastner, Kauffman & Epperson ["Taking Heisenberg's Potentia Seriously" *International Journal of Quantum Foundations*, 4:2 (2018): 158-172], quantum theory is best understood as requiring an ontological dualism of *res extensa* and *res potentia*, where the latter is understood per Heisenberg's original proposal, and the former is roughly equivalent to Descartes' 'extended substance.' However, this is not a dualism of mutually exclusive substances in the classical Cartesian sense of mutually exclusive ontological extants. Rather, *res potentia* and *res extensa* are properly understood in the Whiteheadian sense of mutually implicative ontological extants, such that each requires reference to the other not only for its formal definition, but more important, for its coherent function in the definition and evolution of quantum mechanical systems. When understood as dipolar ontological relata, potentiality and actuality become foundational to the resolution of key conceptual challenges in quantum theory--in particular, nonlocality, entanglement, null measurements, and wave function collapse.

<https://www.santafe.edu/events/thirty-years-complex-thinking-celebration-stuart-k>