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From Shannon to Schrödinger: Quantum Information, PET and AI

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AI now rivals or surpasses humans on many well-defined tasks, sharpening the need to clarify what “information” means across disciplines. This talk frames information operationally: Shannon entropy for classical systems and von Neumann entropy for quantum states, and shows how these measures structure, analyze, and reduce uncertainty in machine learning and data-driven inference. We compare classical and quantum information—highlighting superposition, entanglement, measurement disturbance, and no-cloning—and connect these principles to technologies ranging from Positron Emission Tomography (PET), where information limits govern reconstruction quality and dose–time trade-offs, to quantum computing, where information is encoded, processed, and protected under fundamentally different constraints. We conclude with a speculative platform that illuminates the interface of gravity and quantum control: using the discrete gravitational bound states of a single neutron as a qudit. The discussion emphasizes the unifying role of information across disciplines.

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