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***Are there*
*Mereological Quantum Phase
Transitions?***

ABSTRACT:

We will speculate on the novel concept of mereological quantum phase transition (m-QPTs). Our framework is based on generalized tensor product structures (g-TPS), a parameter-dependent Hamiltonian, and a quantum scrambling functional. By minimizing the scrambling functional, one selects a g-TPS, enabling a pullback of the natural information-geometric metric on the g-TPS manifold to the parameter space. The singularities of this induced metric in the thermodynamic limit characterize the m-QPTs. We will illustrate this framework through analytical examples involving quantum coherence and operator entanglement
Ref: <https://arxiv.org/abs/2510.06389> <<https://arxiv.org/abs/2510.06389>>