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Spontaneous synchronization of quantum systems

Spontaneous synchronization is a universal phenomenon which has been extensively studied in the context of self-organizing non-linear classical systems. This talk presents some possible approaches for the generalization of this collective effect to quantum mechanical systems. For continuous variable systems, characterized by position and momentum operators, we quantify synchronization using a phase-space approach and we show that quantum fluctuations introduce important limitations to this effect. We also study the emergence of spontaneous synchronization among discrete variable systems (e.g. qubits), using the quantum mutual information as an order parameter.

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