

## QUANTUM SEMINAR



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### Decoherence in qubit systems coupled to spin baths

I will discuss decoherence in systems of qubit coupled to spin baths. Building functional qubits is key to the construction of a quantum computer. In many realistic qubit systems, the environment coupled is best modeled as a spin bath. I will first explain how the state of the many-body system consisting of the qubit and spin bath can be decomposed in terms of its different subsystems and derive a hierarchy of equations describing the motion of these different parts. I then show that the central objects in this hierarchy are correlators between different components of different qubits/spins, which encode the different possible many-partite entanglements. Then I will discuss in detail the dynamics of some simple models of qubits coupled to spin bath and describe how information lost by the central qubit is transferred via a cascade to higher and higher order correlations with the environment. Then I will discuss this process in the realistic example of an Fe8 magnetic molecule qubit

Date: Thursday 21 November  
Time: 3pm  
Venue: L1, Seminar Room 107, 10 College Walk, Clayton