

**Students:**

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**Project idea:** Solve the Lindblad equation numerically for different states (single spin  $\frac{1}{2}$ , entangled state, coherent/thermal light state etc.) and visualise it.

**Why is this useful:** You can study the interaction of a quantum state with its environment and study for example spin relaxation and dephasing (useful in quantum computing, NMR etc).

**Aim (deliverables):** Relaxation times, animations of system evolution

**Goals/milestones:**

Week 1: Implement solving of the equation, prove it works for a simple NMR case (validate the code).

Week 2: Validate the code for the simplest scenario (single spin) and find T1 and T2 decay times, produce plots and/or animations.

Week 3: Produce plots and animations for more elaborate scenarios (eg. entangled states, superposition, coherent/thermal light etc).