**Rough structure plan**

**Rydberg Atom Arrays with tuneable interactions**

* Rydberg atoms and encoding into a qubit
* Interaction
* Combining to get the Hamiltonian
* Forming crystals with Blockade

Diagrams:

Graphs:

**EE**

* Introduction to entanglement
* Brief mention of information theory
* Combining the two concepts together: EE

Diagrams:

**Global Quench**

Taking the system out of equilibrium

* Rydberg fidelities graph showing revivals
* Understanding what is going on through energy eigenstates
* Backing in up by changing the speed of the quench
* Comparing different initial state behaviour
* Can we gain further insight to what is underneath: EE, Area vs volume law.

Diagrams:

Graphs:

**Local Quench**

Looking at propagation dynamics. Study quantum transport phenomena

* Rydberg fidelities graph showing revivals
* Show similar behaviour of energy
* EE entropy propagation plots (quench vs no quench at each site)
* EE entropy speed calculations
* Pairwise behaviour
* Introduce concurrence and where this breaks down
* Correlation function?
* Bell state fidelities?

Diagrams:

Graphs:

**Conclusion**

* Probing Entanglement dynamics allow us to see things that don’t appear on first glance