

## Thulium Doped Garnets for Quantum Repeaters and Optical Quantum Memory

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# Propositions

accompanying the dissertation

## THULIUM DOPED GARNETS FOR QUANTUM REPEATERS AND OPTICAL QUANTUM MEMORY

by

**Jacob Harley DAVIDSON**

1. Multiplexing across multiple degrees of freedom simultaneously will be required to produce useful quantum repeaters. This proposition pertains to this dissertation.
2. Rare earth ion based quantum computing will never be realized using large ensembles of ions. This proposition pertains to this dissertation.
3. The optical and spin coherence properties of rare earth ions are a unique resource that will one day outpace the capabilities of color centers in wide bandgap semiconductors as a quantum networking technology. This proposition pertains to this dissertation.
4. Thulium ions, though promising for other technologies and initial demonstrations, will not be part of a major component of a quantum repeater in the long run. This proposition pertains to this dissertation
5. Today's field of quantum information rewards versatile experimental platforms more than ones which excel at a specific task.
6. Qubit connectivity within a single quantum computer is simply a quantum network on a different distance scale and should share a common language of solutions with networks over larger distances.
7. All analysis code should be published alongside any academic paper or thesis and perhaps included in the review process.
8. In pursuing a PhD it is more important to have the capacity to learn new things quickly and effectively than to know a lot of things.
9. The quality of a country on a global scale is proportional to the difference between maximum and minimum elevations in that country's topology.
10. Even with unlimited funding from governments, societal problems plaguing the world will not be solved until more people are interested in reaching a more equitable distribution of resources.

These propositions are regarded as opposable and defensible, and have been approved as such by the promotor prof. dr. W. Tittel.