

EEL 6395 Applied Superconductivity

Join Dr. Larkins as he uses over 40 years of real world and research experience to guide you through the exploration of the mysterious realm of superconductivity. Starting with the lowly hydrogen atom and its noble cousin, helium, we will examine the causes of superconductivity, models for superconductors and how to use this novel and wonderful material in engineering applications of the 21st Century and beyond.

This course will cover:

- 1. The fundamentals of superconductivity, why it exists, and the basic properties of superconductivity in bulk materials.*
- 2. The macroscopic applications of bulk superconductors (power transmission, magnetic levitation etc.) and the limitations involved.*
- 3. The applications and limitations of thin superconducting films in rf and microelectronics.*
- 4. Monolayer superconductors and 2-dimensional superconducting materials, their advantages and disadvantages.*
- 5. Aspects of Quantum superconductive devices, how they work and what their fundamental limitations are.*
- 6. Elementary RSFQ Logic Gates.*
- 7. Quantum computing elements using superconducting Qubits.*

Your coursework will include guided problems on the fundamentals of superconductivity and the writing of several term papers on aspects of superconductivity that the student and Dr. Larkins mutually agree upon.

Come and Explore the Future!