Optical Pumping of Rubidium

Experiment performed by:

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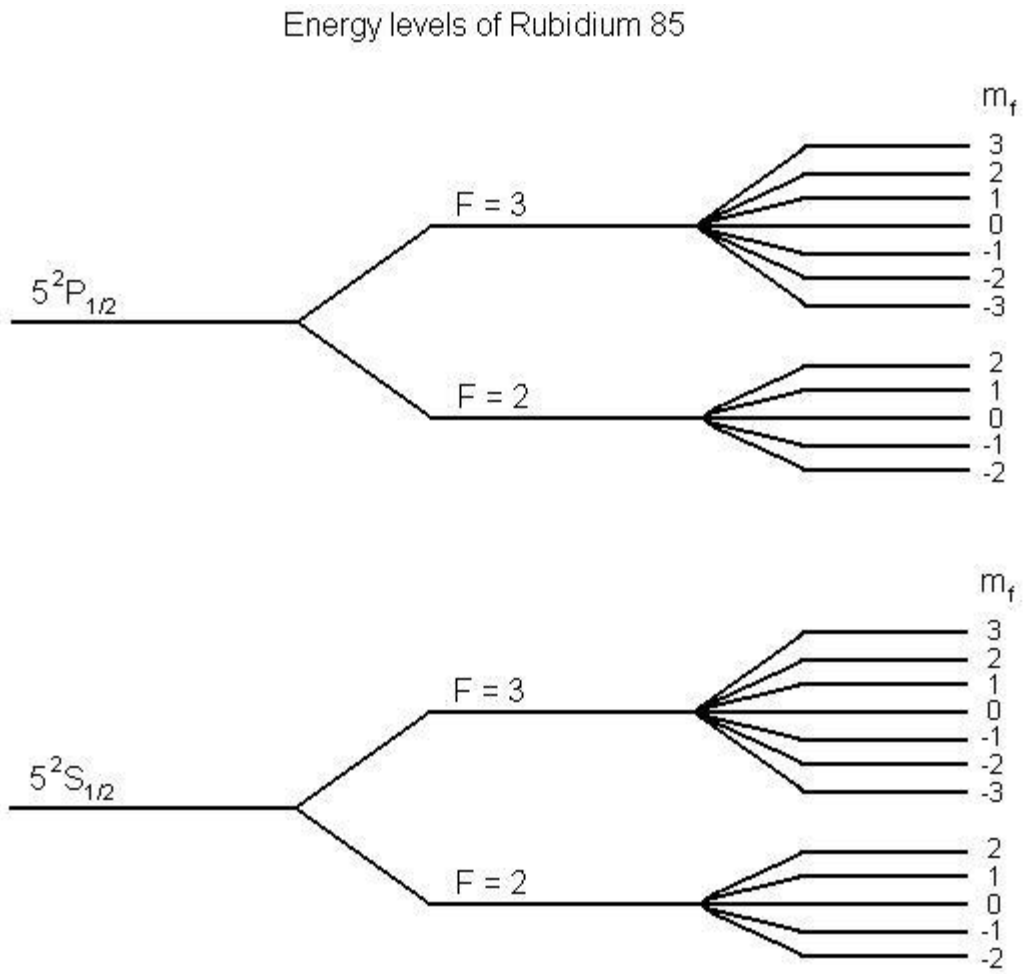
Outline

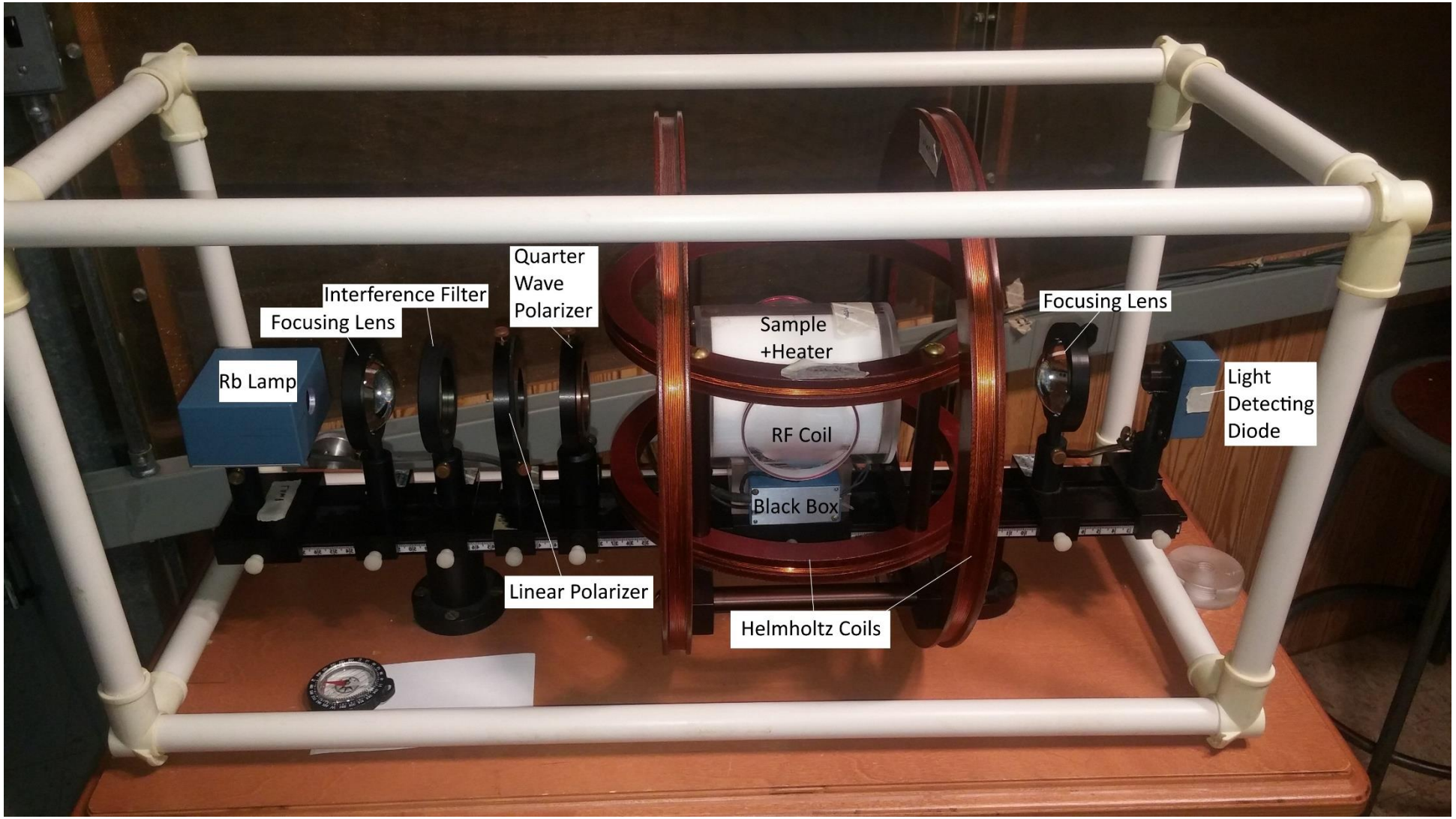
- Background
- Apparatus
- Our Work
- Data
- Acknowledgements
- Questions

What is Optical Pumping?

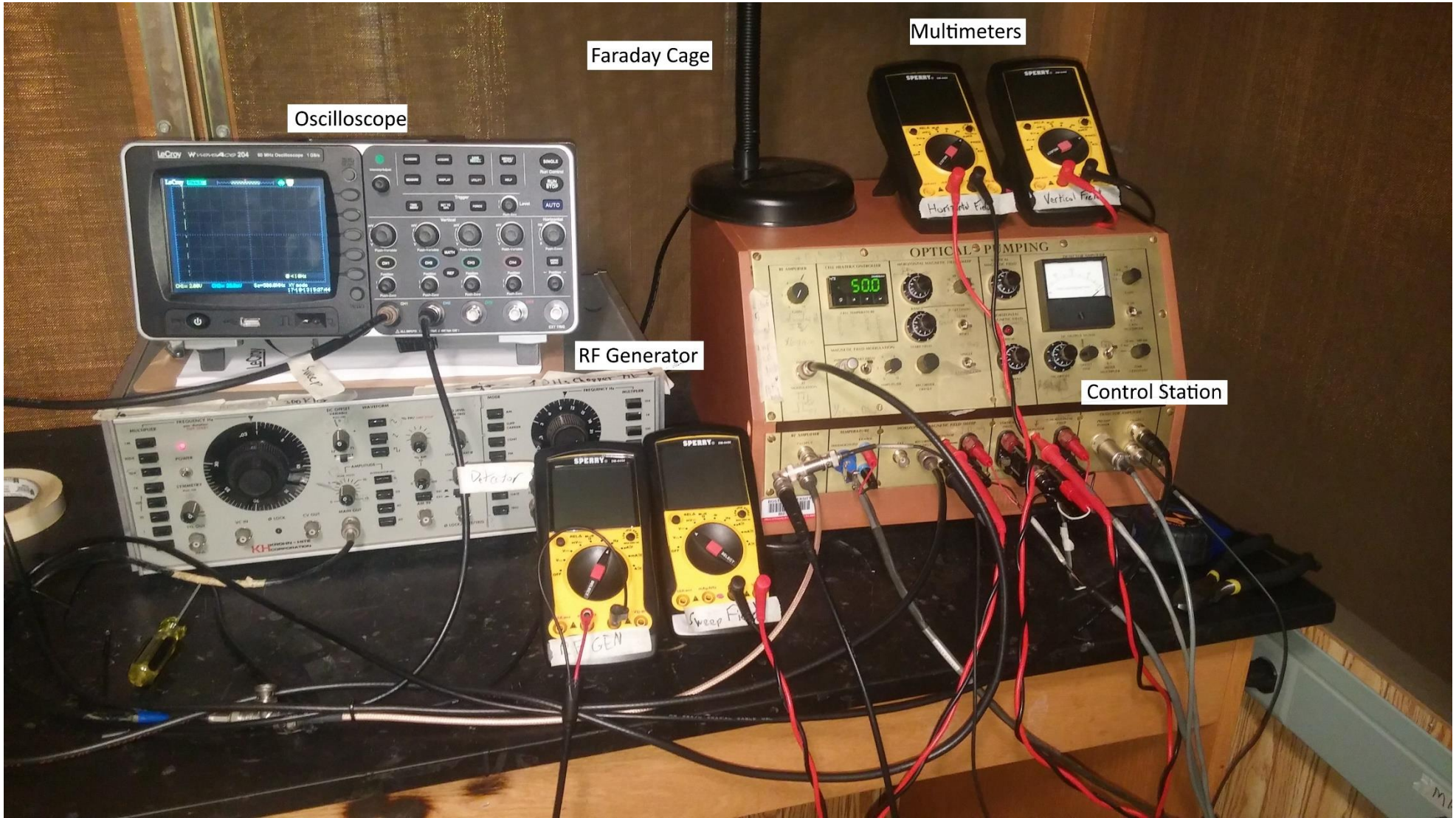
- Simply put, optical pumping is the process of using light to ‘pump’ an electron to a higher energy level in an atom or molecule.
- The process for this experiment is aided by the Zeeman effect, where under a magnetic field the electrons split into Zeeman energy levels given by quantum number m_f.



Apparatus

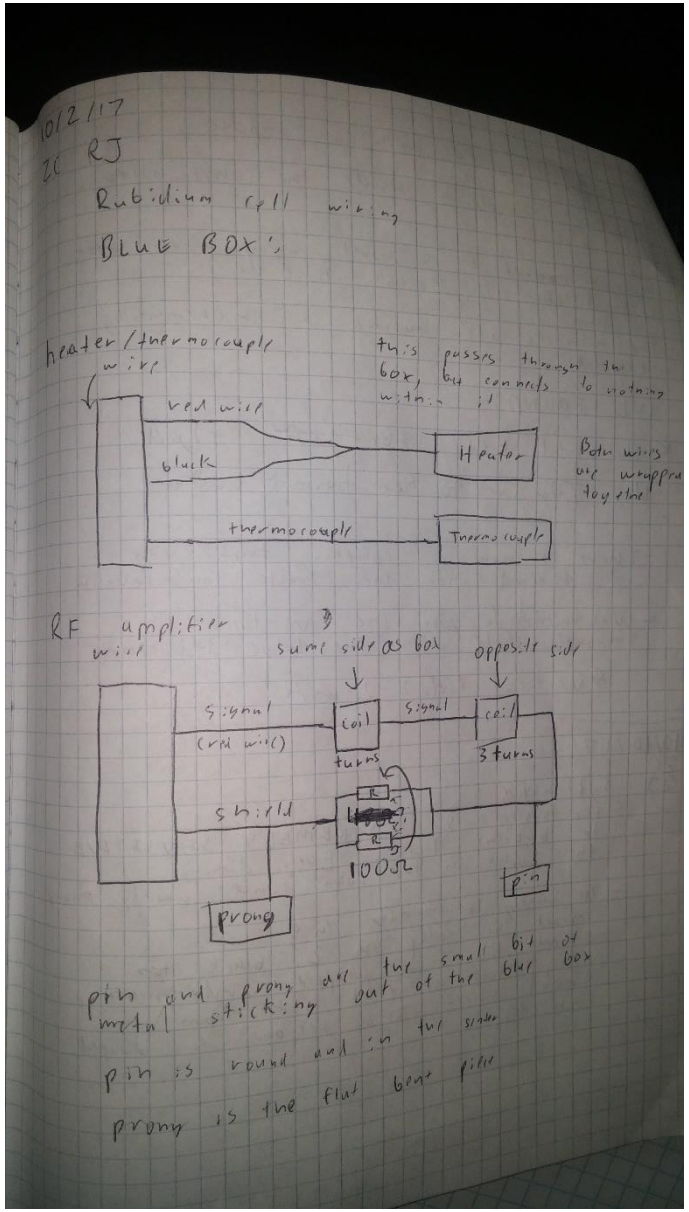

Rb Lamp
Focusing Lens
Interference Filter
Quarter
Wave
Polarizer
Linear Polarizer
Sample
+Heater
RF Coil
Black Box
Helmholtz Coils
Focusing Lens
Light
Detecting
Diode

Apparatus Pt 2, Electric Boogaloo



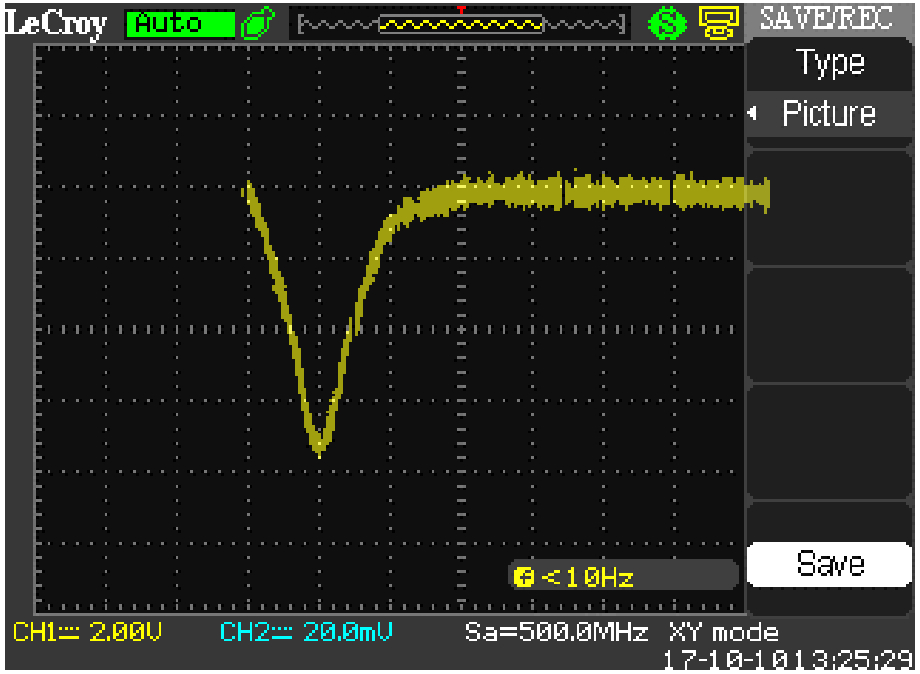
Our Work

- Cable Management and labelling
- Disassembly and reassembly
- Black Box
- Detecting Magnetic Field
- Isolation of Experiment

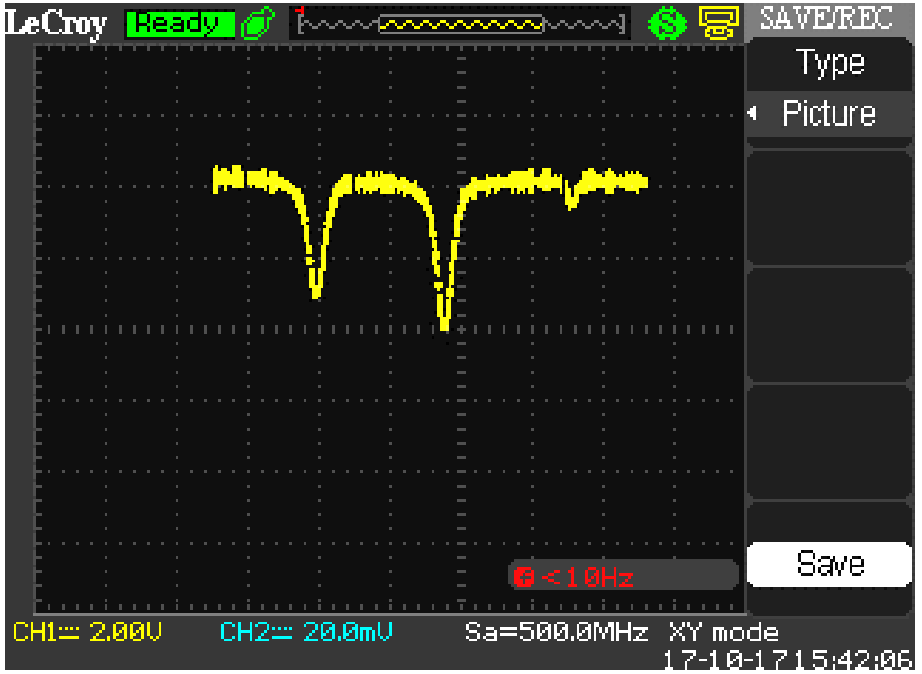


Data

All Graphs:
X axis: Sweep Field Strength
Y axis: Light detected



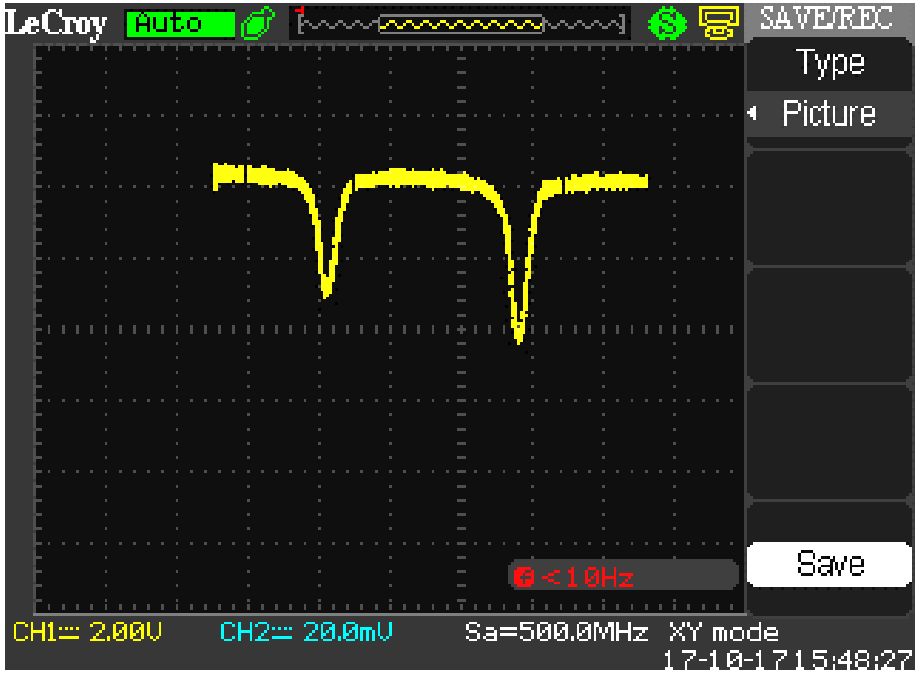
Zero Field Emission



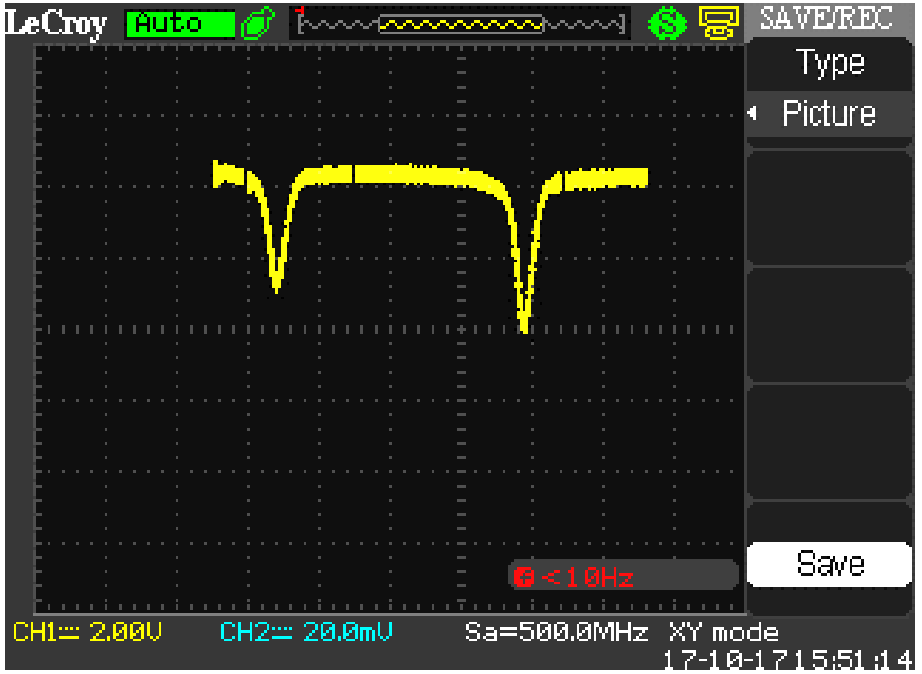
100 Khz

More Data

All Graphs:
X axis: Sweep Field Strength
Y axis: Light detected



150 KHz



200 KHz

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Questions?