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LAKESHORE MODEL 622 MAGNET POWER SUPPLY
SERIES CONNECTION TO BOOST VOLTAGE SWING

- We want to determine the magnetic mid-plane of the HRS electron dipole coil at both room and $LN_2$ temperatures to check for asymmetric contraction of the coil support links.

- Power supply requirements:
  - (i) coil resistance @ room temperature: 2.2 Ω
  - (ii) expected coil resistance @ $LN_2$ temperature: ~0.44 Ω
  - (iii) minimum current required for magnetic field measurement: 25 A (from J. LeRose).
  - (iv) Then:
    - voltage drop across coil @ room temperature: 2.2Ω * 25A = 55 Volts.
    - voltage drop across coil @ $LN_2$ temp.: 0.44Ω * 25A = 11 Volts.
    - problem: available power supplies are able to deliver

$$V_{max} = \underbrace{\pm 30 \text{ Volts}}_{<55V}, \quad I_{max} = \pm 125A, \quad P_{max} = 1KVA$$

- Suppose we connect two Lake Shore 622 power supplies in series with the dipole coil at room temperature. The power output of each supply will then be:

$$P_{out} = V_{out} * I_{out} = \frac{55V}{2} * 25A = \underbrace{27.5V}_{<30V;\ OK.} * 25A = \underbrace{687.5\ VA}_{<1KVA;\ OK}$$

- Lake Shore 622 characteristics:
  - (i) Two regulation modes: voltage or current. Command signal for each mode can be external or internal.
  - (ii) Output voltage and current monitoring points available.
  - (iii) All monitoring and control points are referenced with respect to the negative lead of the power supply. This was determined by measuring the resistance between the negative lead and the "common" point used by the V/I control inputs and monitoring outputs. A model of the supply would then be: