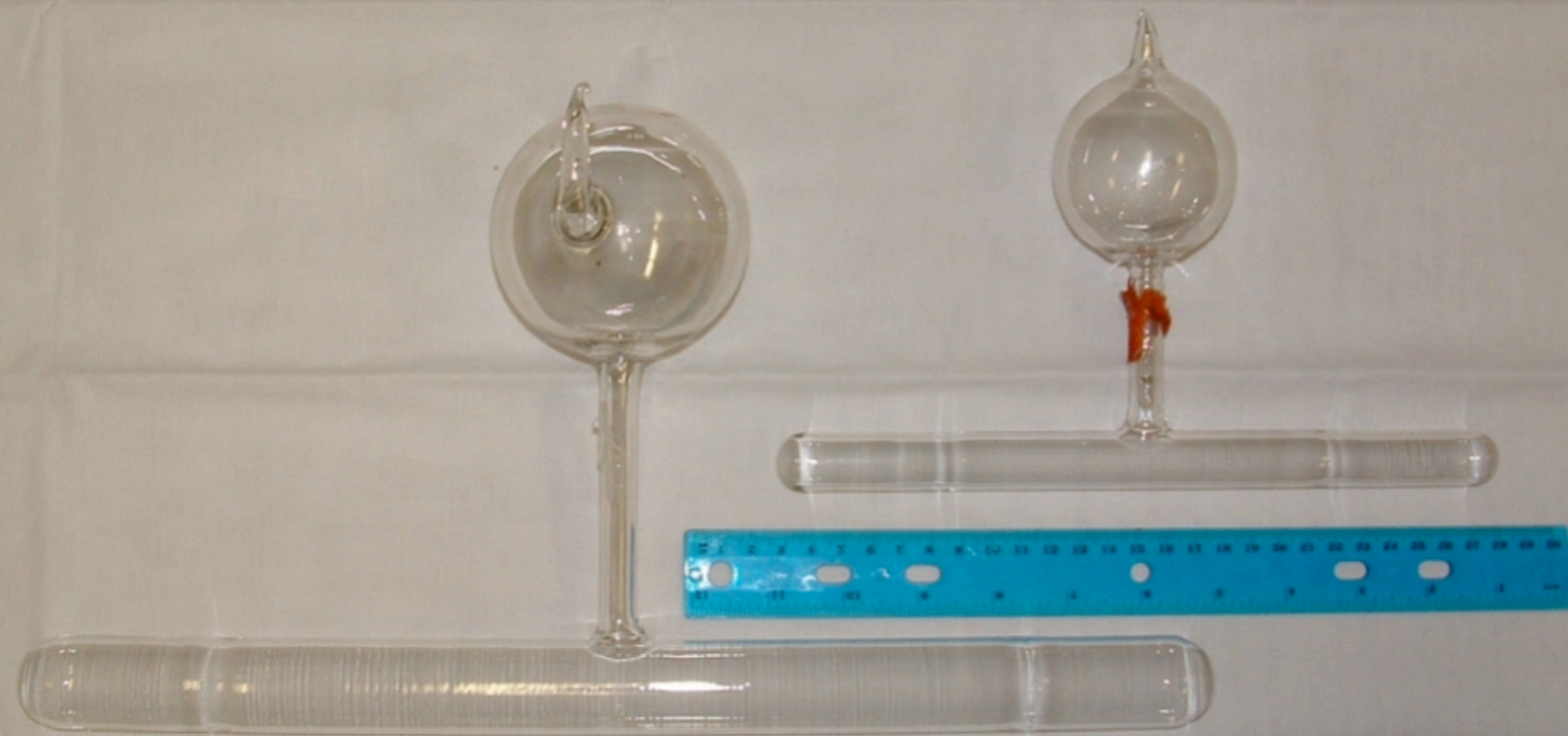


Polarized ^3He Target Development at Duke University

- Being Developed for the H γ S (High-Intensity Gamma Source) Program at the Duke Free Electron Laser Laboratory
- Several Experiments Planned (3-Body Breakup, Neutron Spin-Polarizabilities, GDH Sum Rule, etc.)
- General Status : Target has some basic functionality (can polarize gas, measure an NMR signal), but much left to do ...

Cells

25cm JLab Cell (Q. Mary)



HIγS Cell (Kosmo)



Willie Shoup
Pull-off

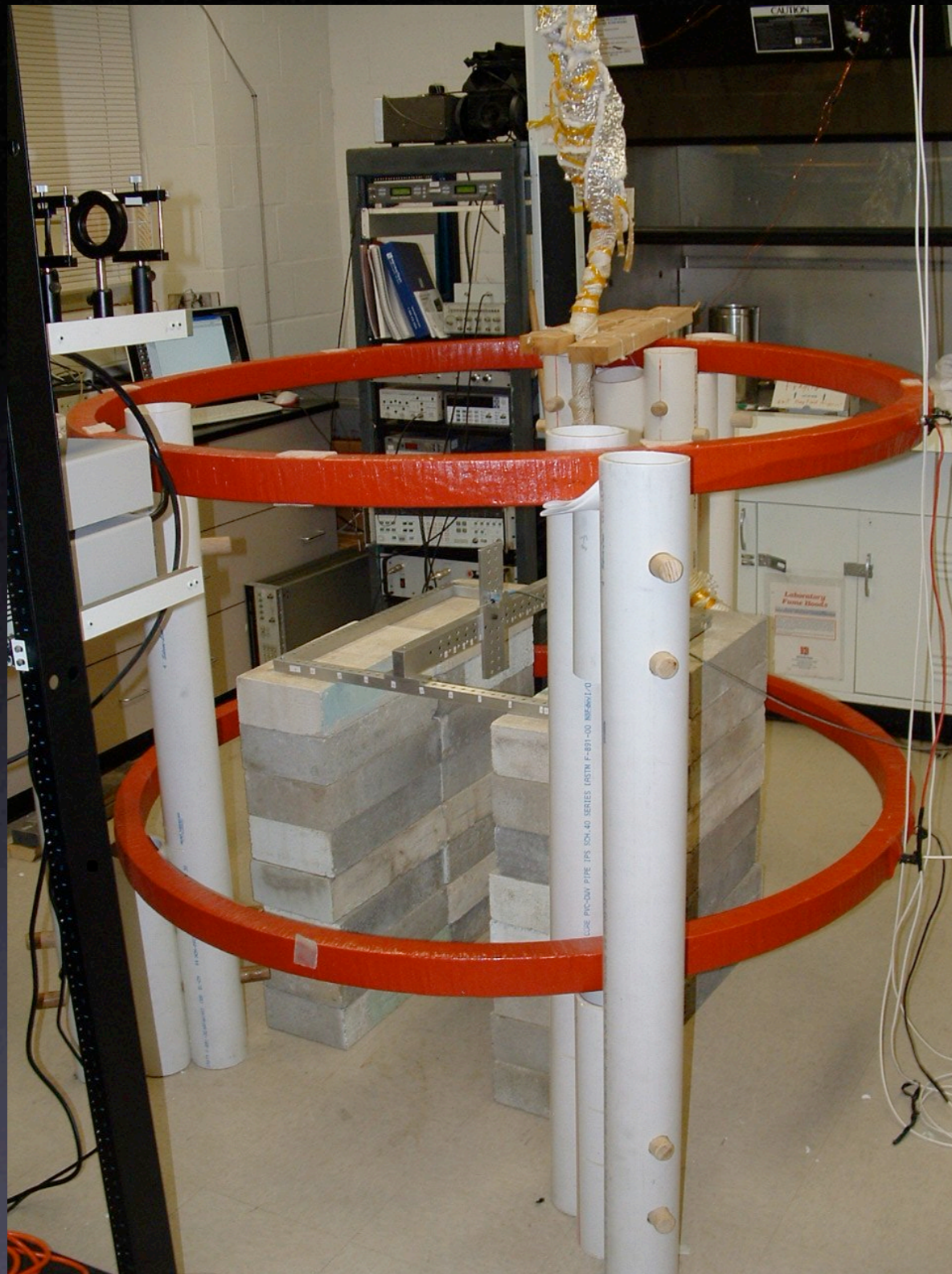


Mike Souza Pull-off

All Cells filled at W&M

Polarized ^3He Cell Testing for $\text{H}\gamma\text{S}$

Cell Name	Glassblower	Room Temp. Density (amg.)	Lifetime (2 hr. int.)	Lifetime (3 hr. int.)	Corrected Lifetime
Red Baron (T. G.'s Pancake Cell)	???	~1.0	9.9	10.3	11.1
Kansas	Willie Shoup	9.2 (Now 0.0)			18.0
Kosmo	Mike Souza	~8.0	13.9	14.9	16.8
Kelly	Mike Souza	~8.0	14.0		17.4
Kor-el	Willie Shoup	~6.0		14.1	16.2
Kenya	Willie Shoup	~4.0			?
Queen Mary	Willie (+Mike??)			15.0	17.0



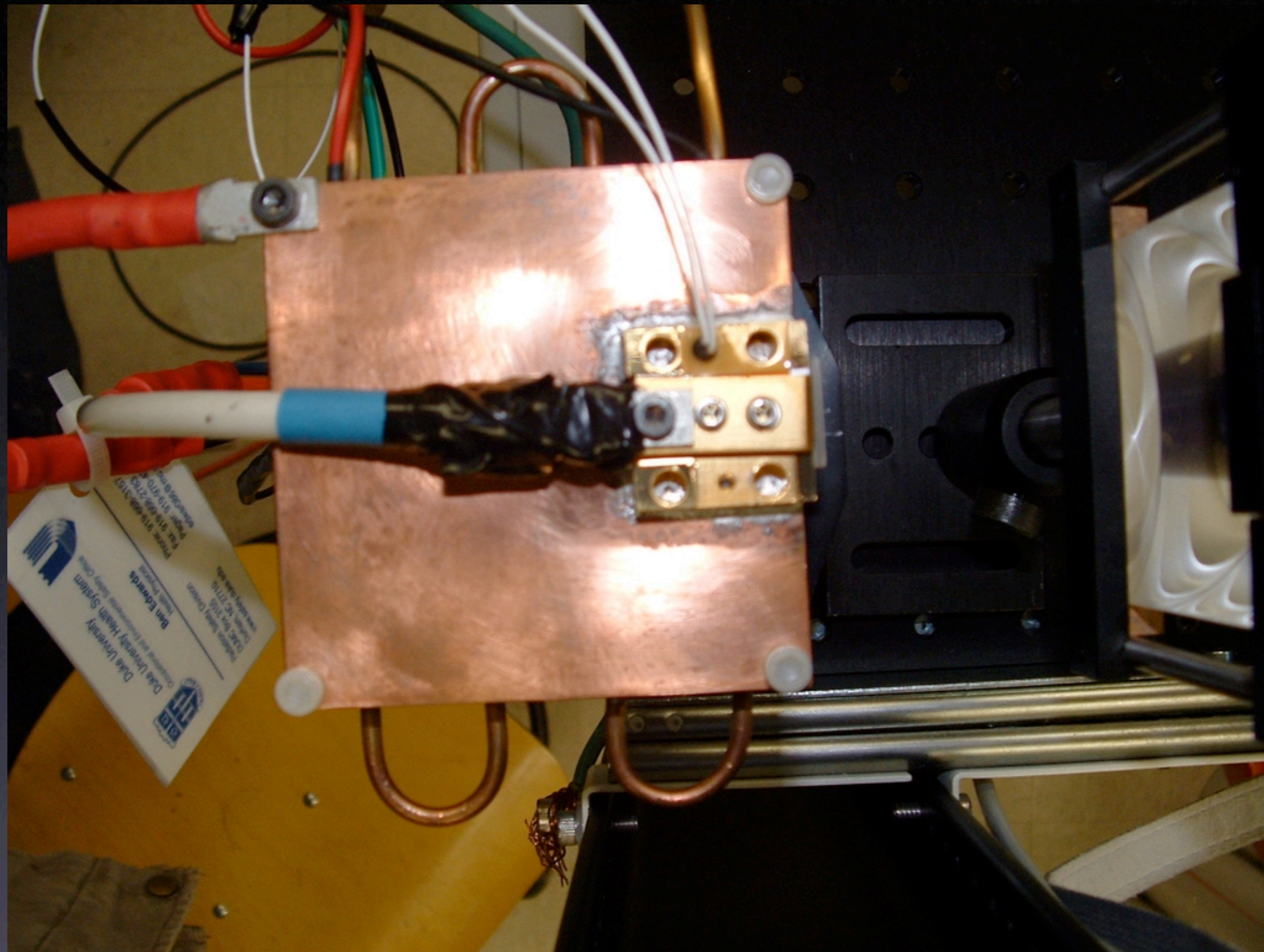
Field Mapping planned

Possible Coil
Misalignment

Similar problems
in MEP group's
nEDM target

Narrowed Linewidth Lasers

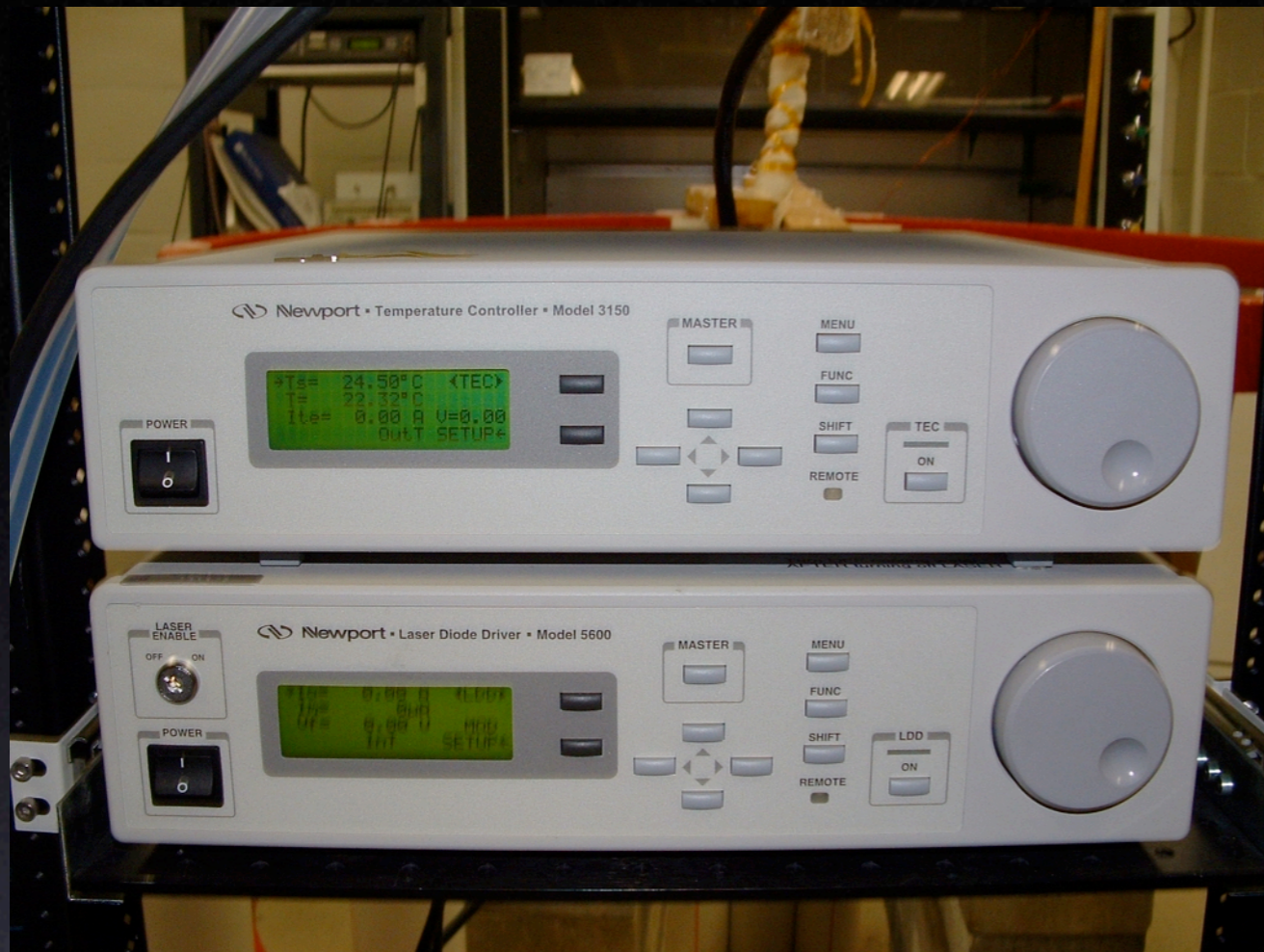
- PD-LD offers a service of installing a combination of a grating and microlenses to narrow the linewidth of a diode laser
- Sacrifice of 25%-35% of laser power
- 0.3 nm FWHM
- Especially useful for low-density cells



35 W after
modification

Quentessence
provides diode

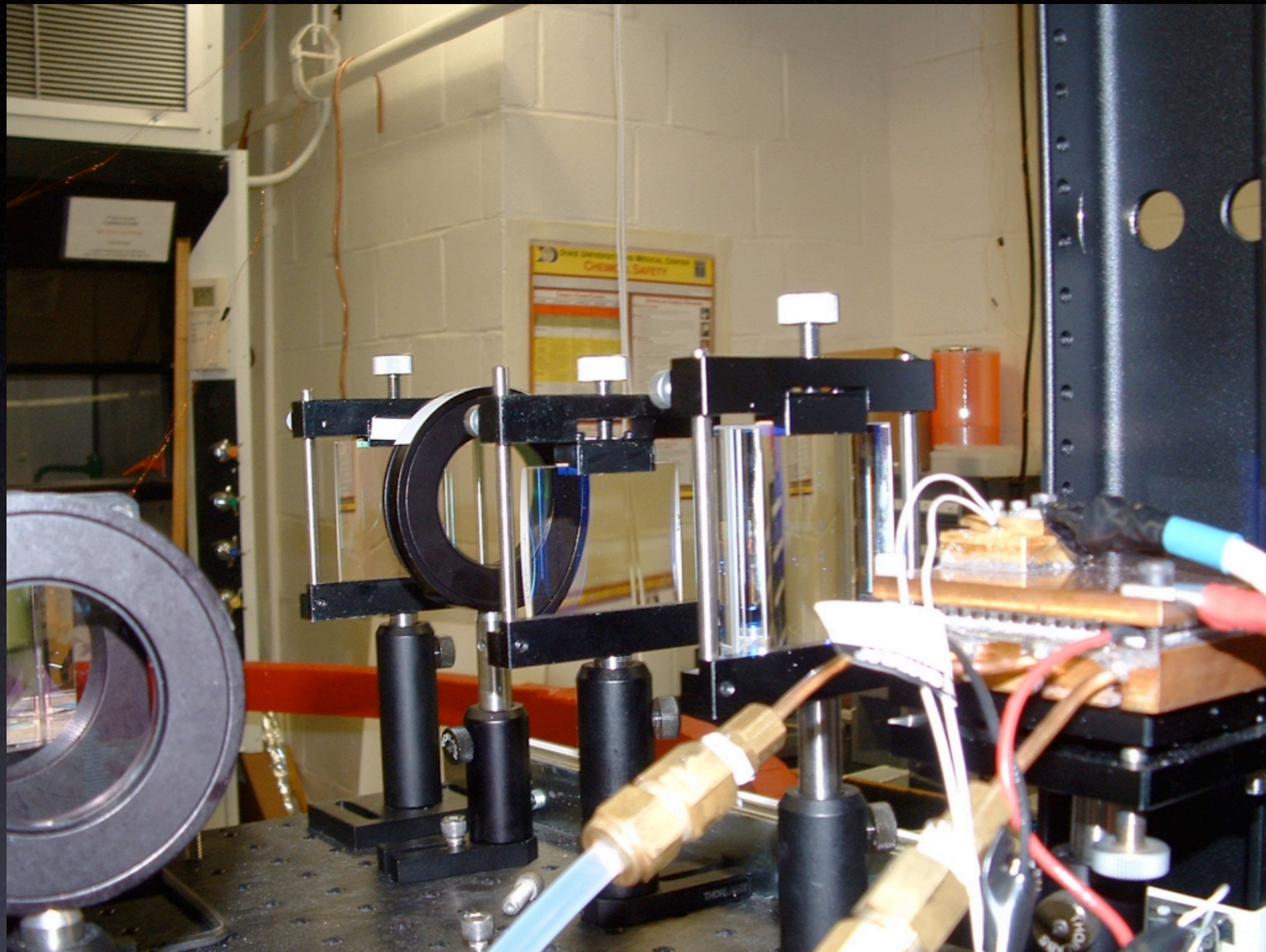
Needs water
and thermo-
electric cooling



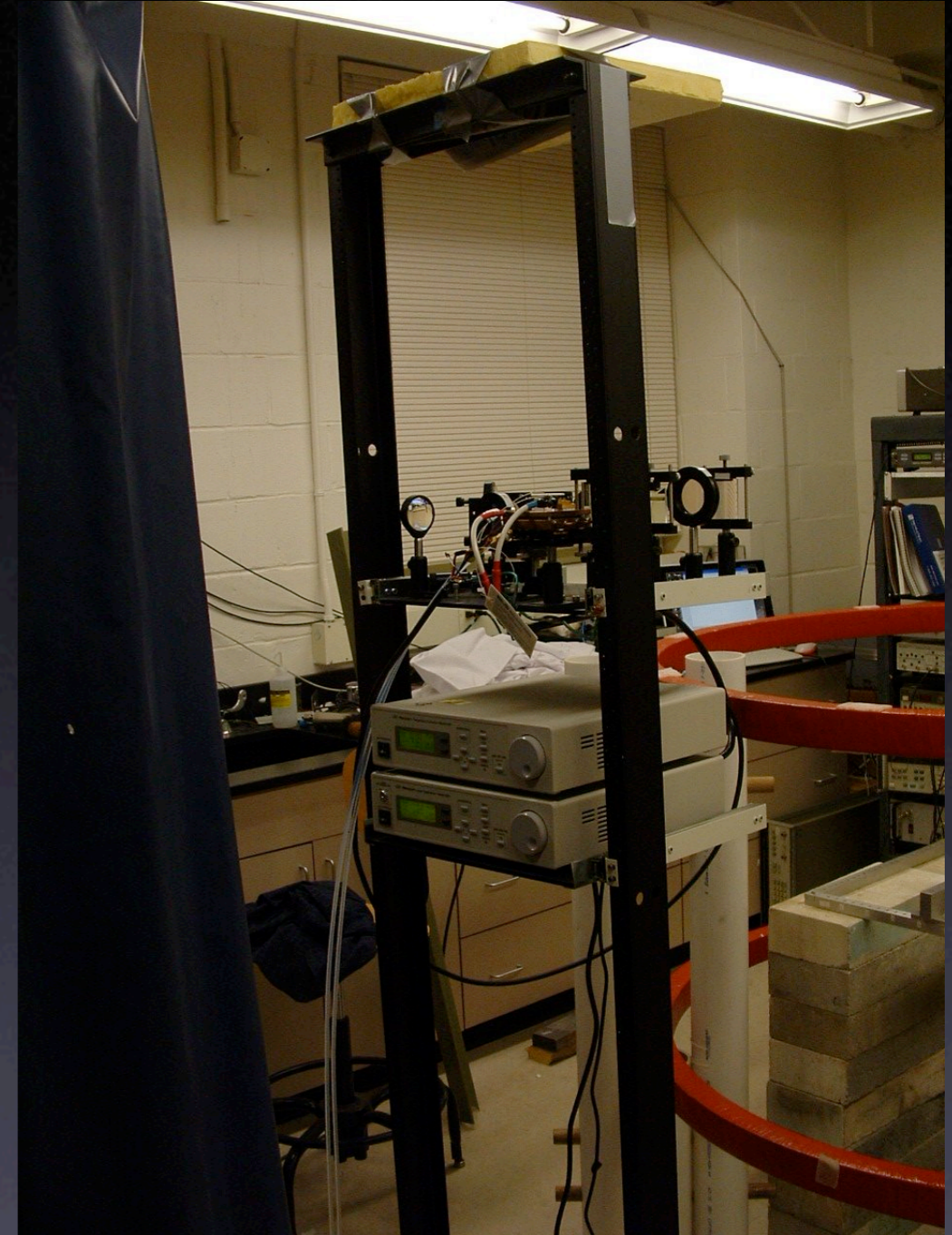
Laser Power Supply and
Thermo-electric cooler
Power Supply



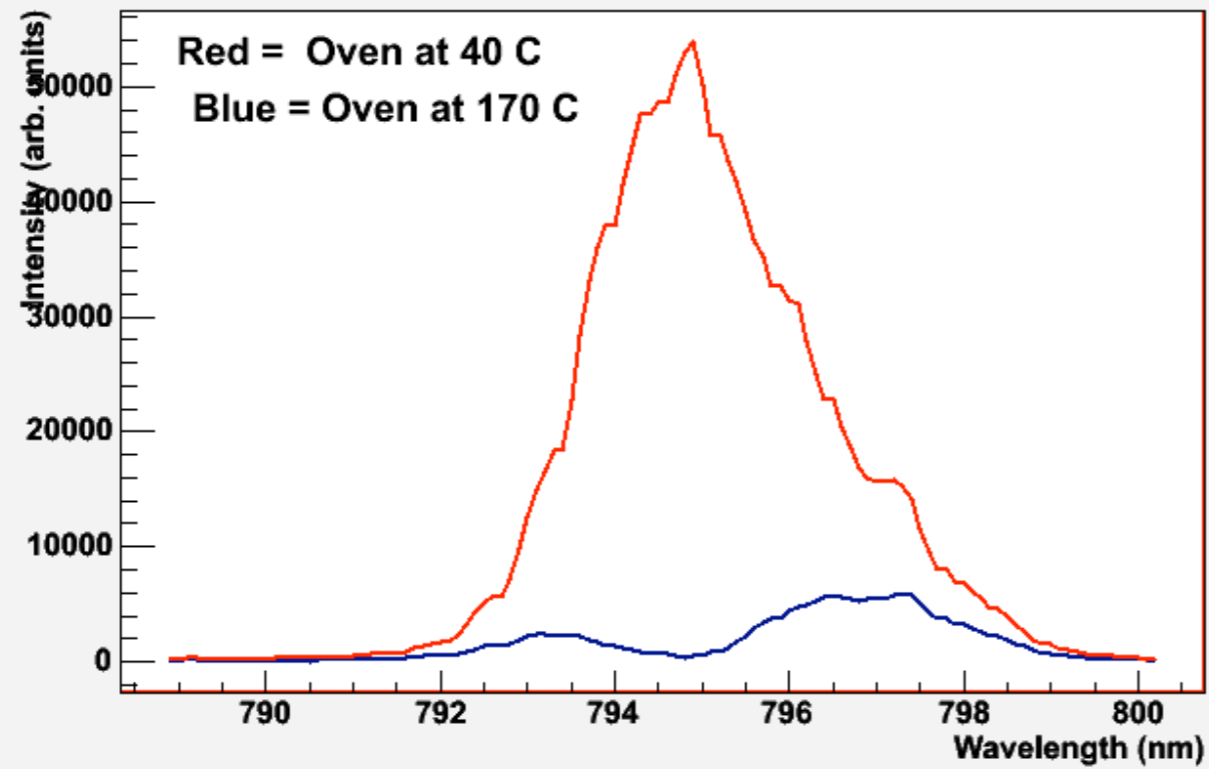
Chiller



Beam divergent 15° horiz.
and 1° vert.
Light Linearly polarized out of
diode

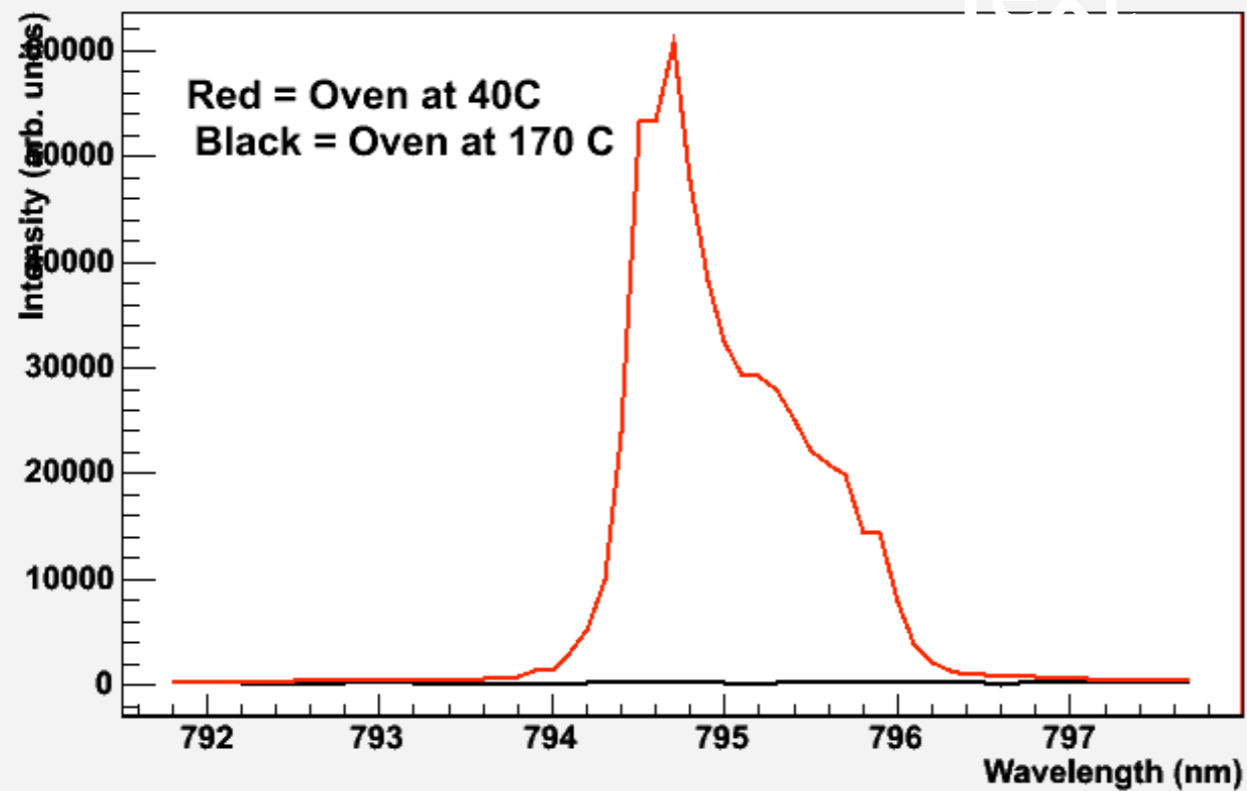


Optopower Laser spectrum through 8.8 μm cell



FWHM 2.5 nm

PD-LD Laser spectrum through 8.8 μm cell



FWHM < 1.0 nm