ECAL for GEp5

B. Wojtsekhowski

PMT dark current induced TR

a) Emissivity of glass and a heater

100% = Emissivity + Transmissivity + Reflectivity

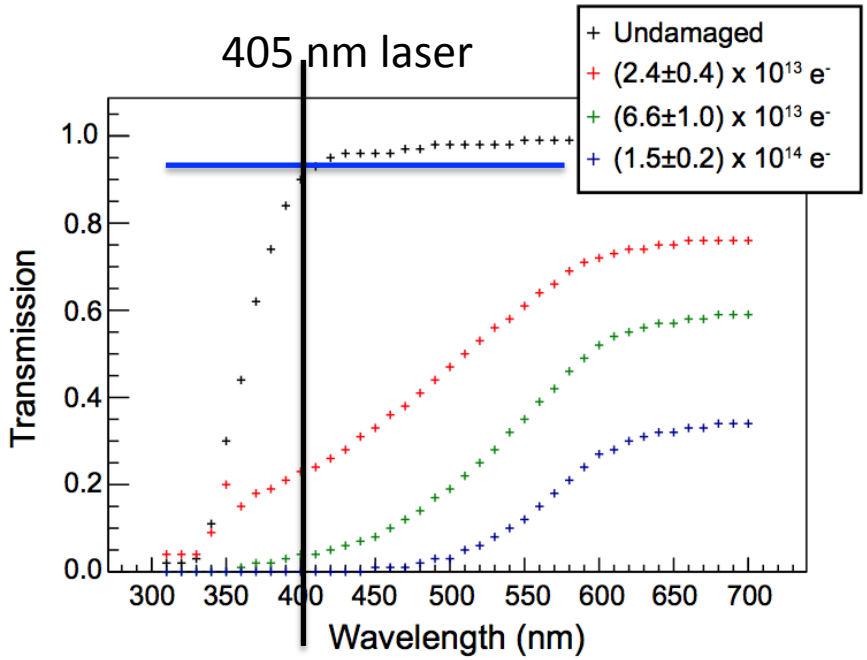


Figure 5: Transmission coefficient of 4 cm of lead glass as a function of wavelength for various amounts of radiation. Estimated errors are 2% (10%) for wavelengths above (below) 380 nm.

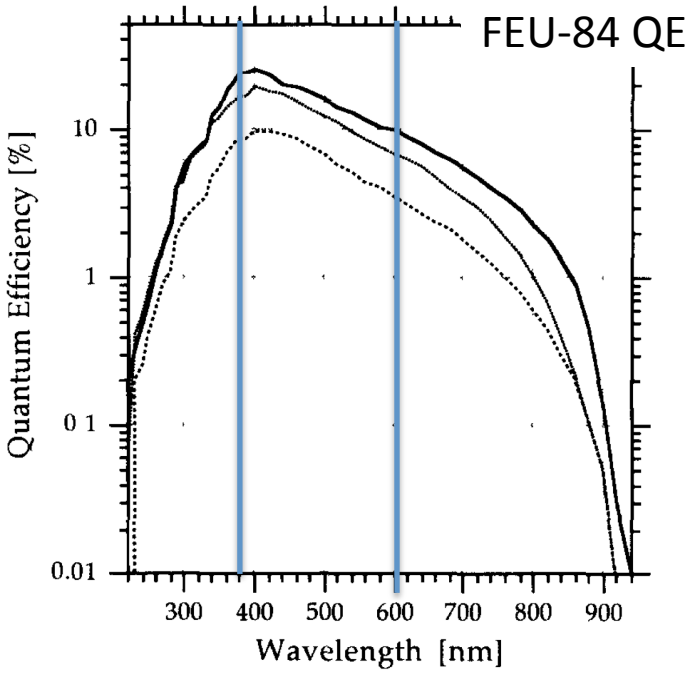
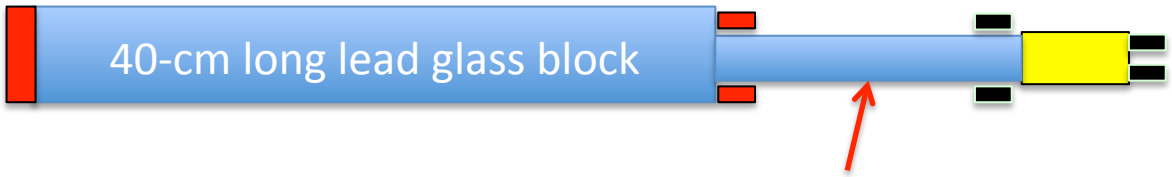
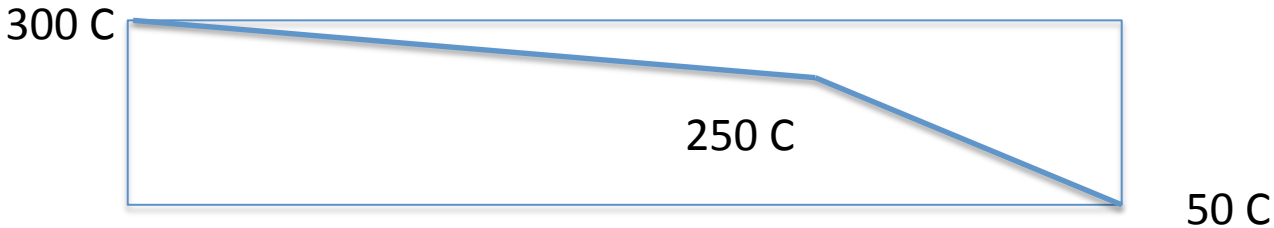


Fig. 4. The absolute quantum efficiency of three FEU-84-3 phototubes as measured by Hamamatsu Inc. using a calibrated source. Three tubes were selected, using the method described in the text, as having relatively high, medium and low relative quantum efficiencies.

The scheme under investigation



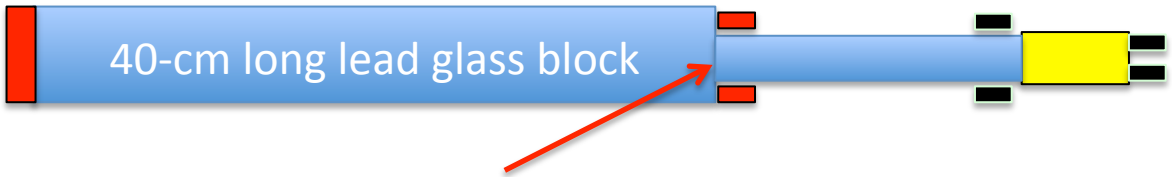
20-cm long glass cylinder



Temperature profile

0.008x7x200/20 = 0.6 W heat through light guide

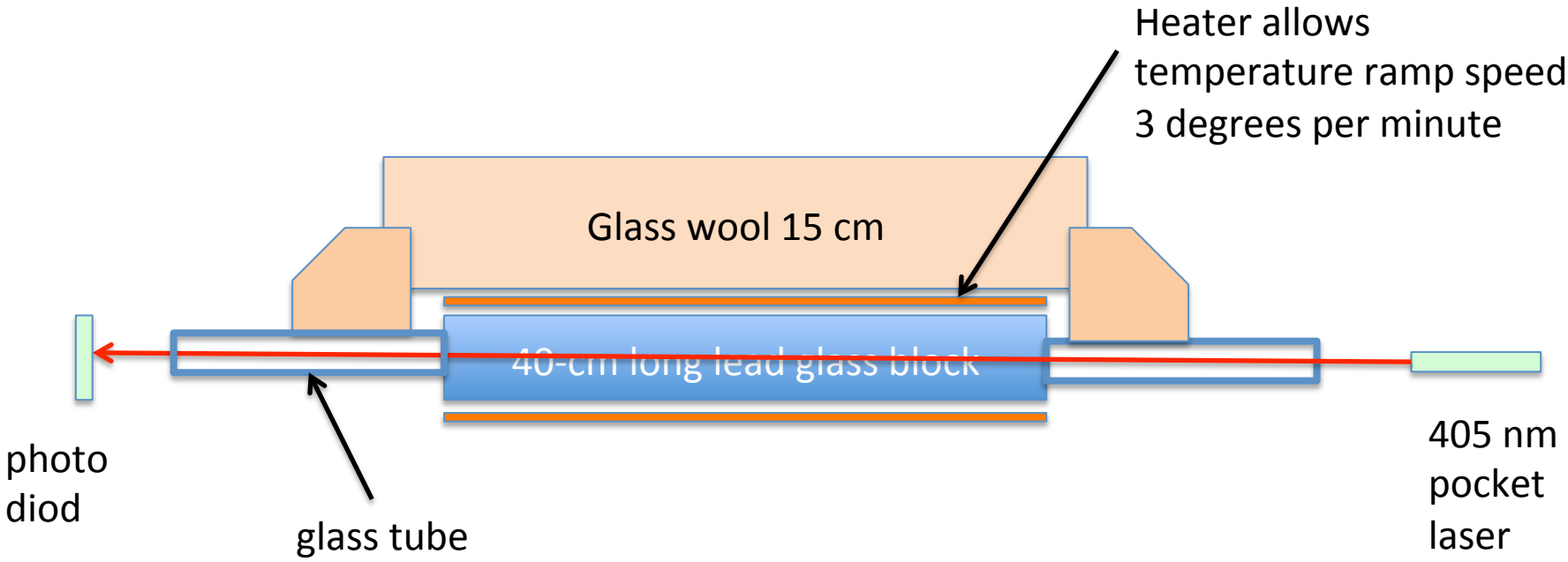
The scheme under investigation



Optical contact at 250 C

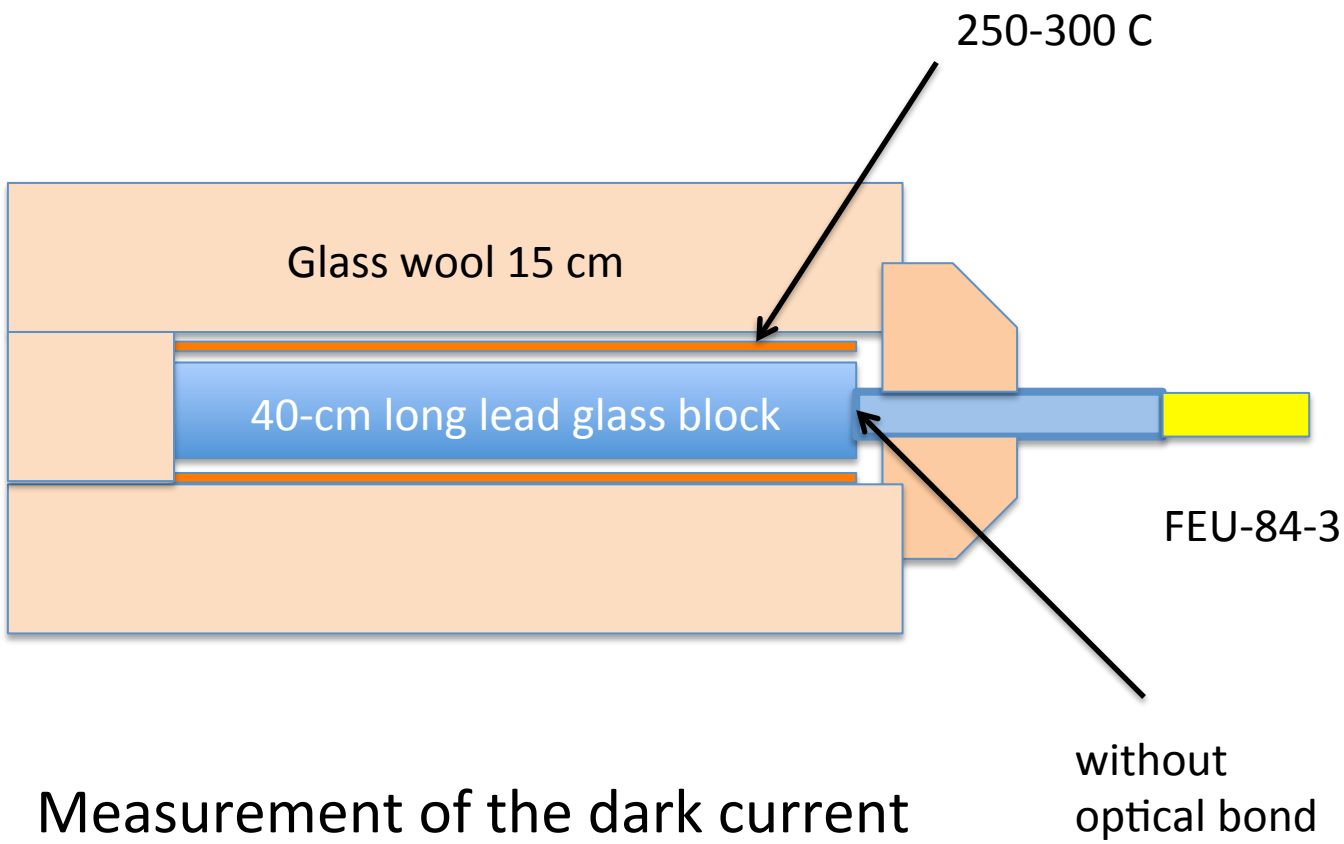
- Dow Corning OE-6630, 200 C, need test for 250 C
- Optical epoxy 353NDPK, 200 C, need to test at 250 C
- Contact optical bond, CADB, will work, but more involve
- Frit bonding, need to learn

The annealing experiment



Measurement of the transparency at 405 nm during the thermal annealing process

The DC final experiment



Measurement of the dark current

The items to do for ECAL

1. Inventory of the available equipment

i) Lead glass blocks
ii) PMTs
iii) HV bases
iv) Front-end electronics
v) Cables (signal and HV)
vi) HV supplies
vii) NIM electronics

2. Investigation of the Thermal annealing

i) Measure DC in the full proposed configuration
ii) Irradiate 8 blocks and test TA
iii) Optical bond technology
iv) Design of 5x5 module
v) Develop the budget of the 5x5 module
vi) Construct 5x5 module
vii) Full test at Idaho State University

3. Preparation of the required equipment

i) PMTs – test gain, QE
ii) HV bases – test, repair
iii) Build front-end and HV system

The milestones for ECAL

1. July 2014: Develop concept of annealing, float is 2 months
   i) Test
   ii) Design
   iii) Budget
2. May 2016: ECAL electronics is ready, float is 6 months
   i) Inventory
   ii) Design
   iii) Construction
   iv) Test
3. Sept. 2017: ECAL is ready for GEp5, float is 9 months
   A) Design
   B) Budget
   C) Construction
   D) Test