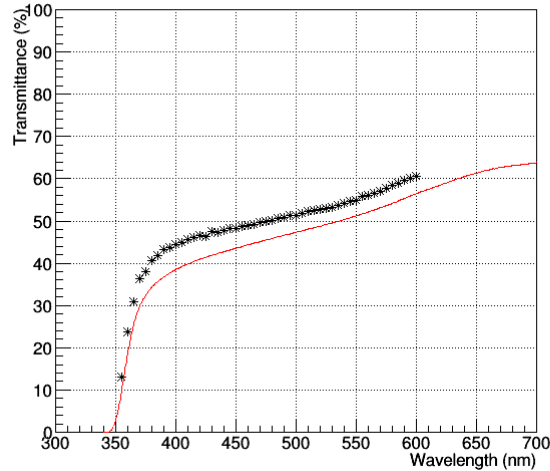
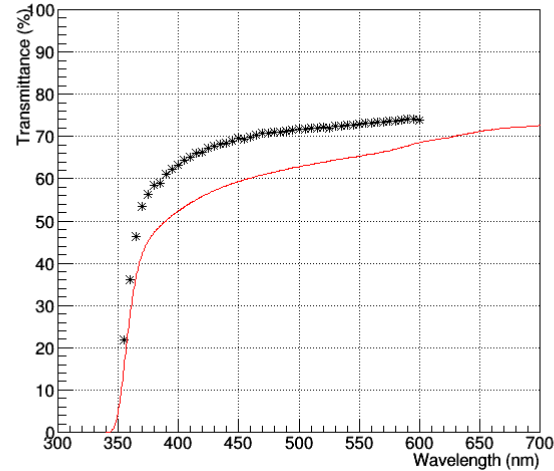


Transmittance comparison (Jlab & Giessen): long.

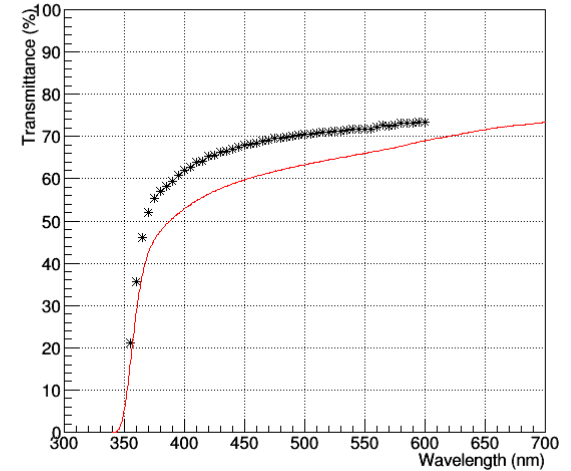
Block 2



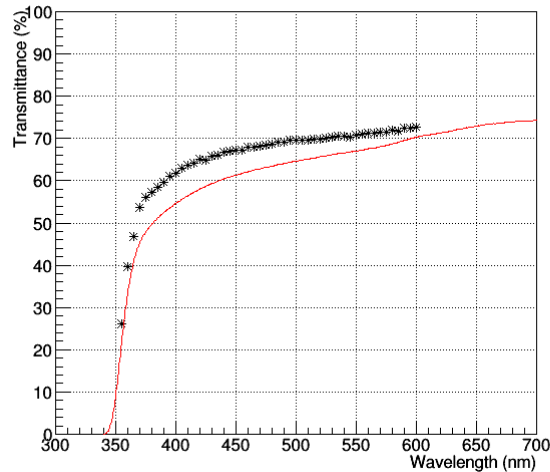
Block 3



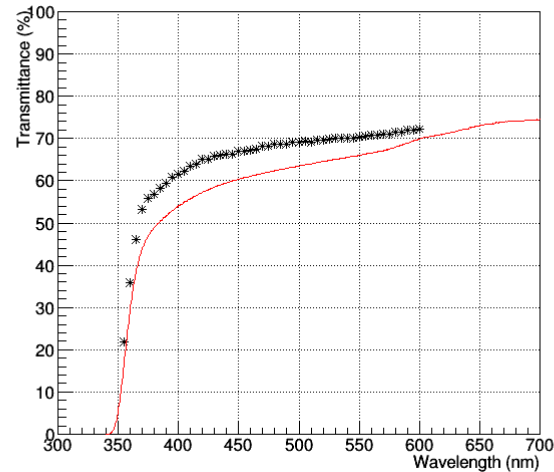
Block 6



Block 8



Block 9



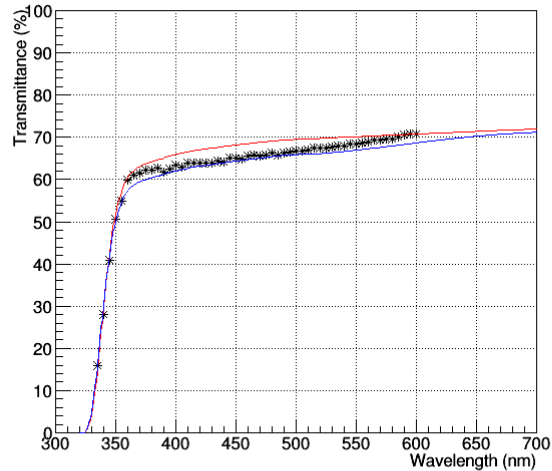
Longitudinal transmittance

— Giessen

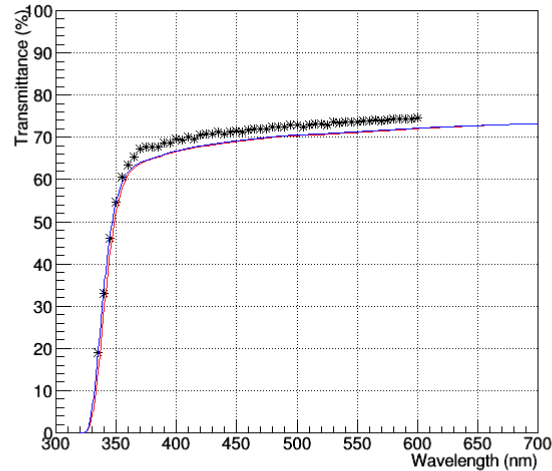
* JLab

Transmittance comparison (Jlab & Giessen): trans.

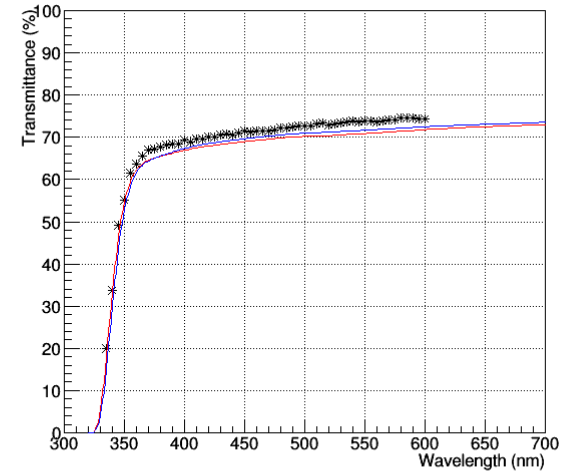
Block 2



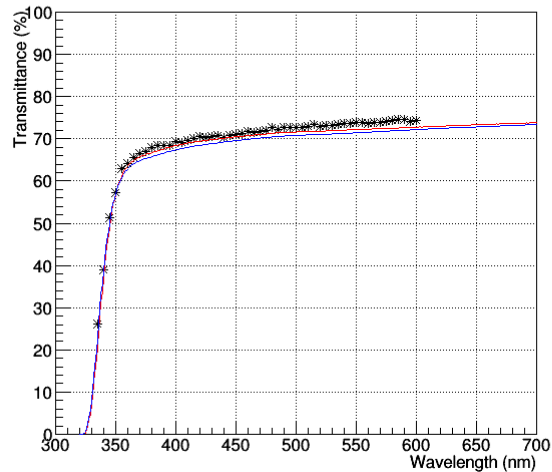
Block 3



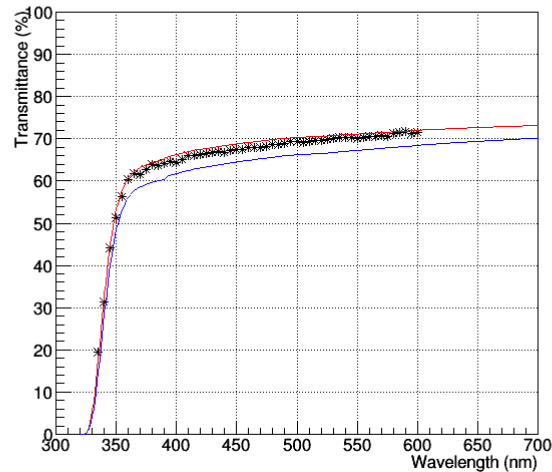
Block 6



Block 8



Block 9



Transverse transmittance at 1 cm

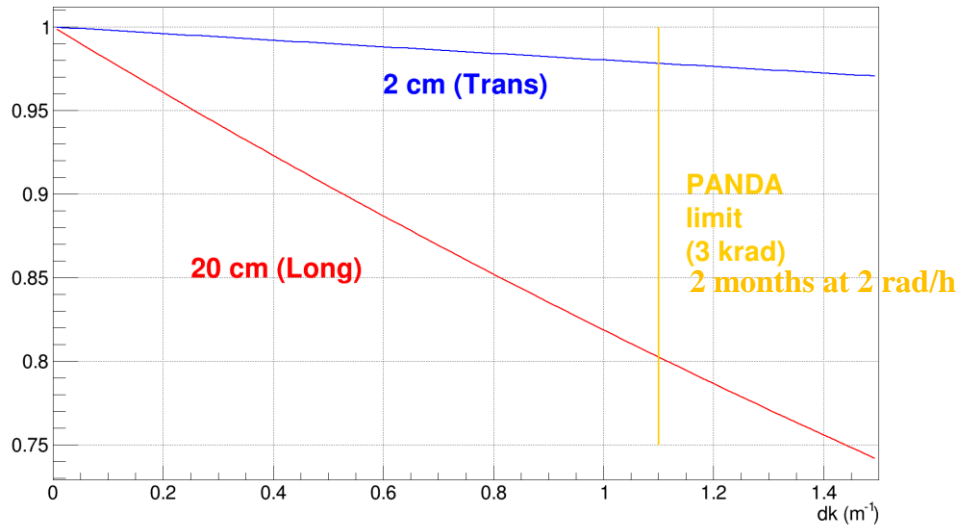
— Giessen (1 cm)

— Giessen (19 cm)

* JLab

Radiation dose and damage

Transmittance loss ($T_{\text{aft}}/T_{\text{bef}}$) vs. dk



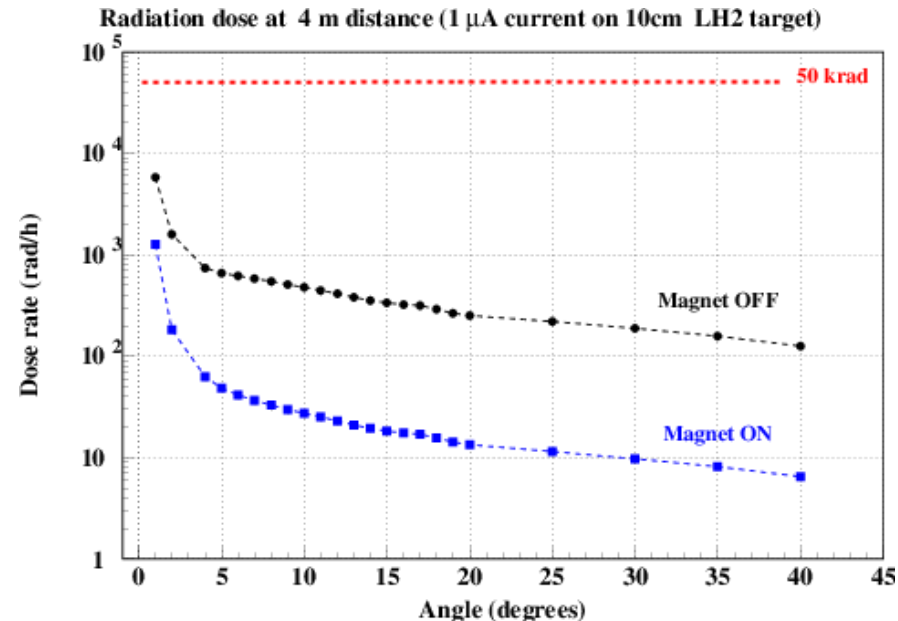
Irradiation tests at Idaho:

432 krad at
1.3 Mrad/h
(20 min irradiations)

Expected dose at PANDA:

0.02 Gy/h = 2 rad/h

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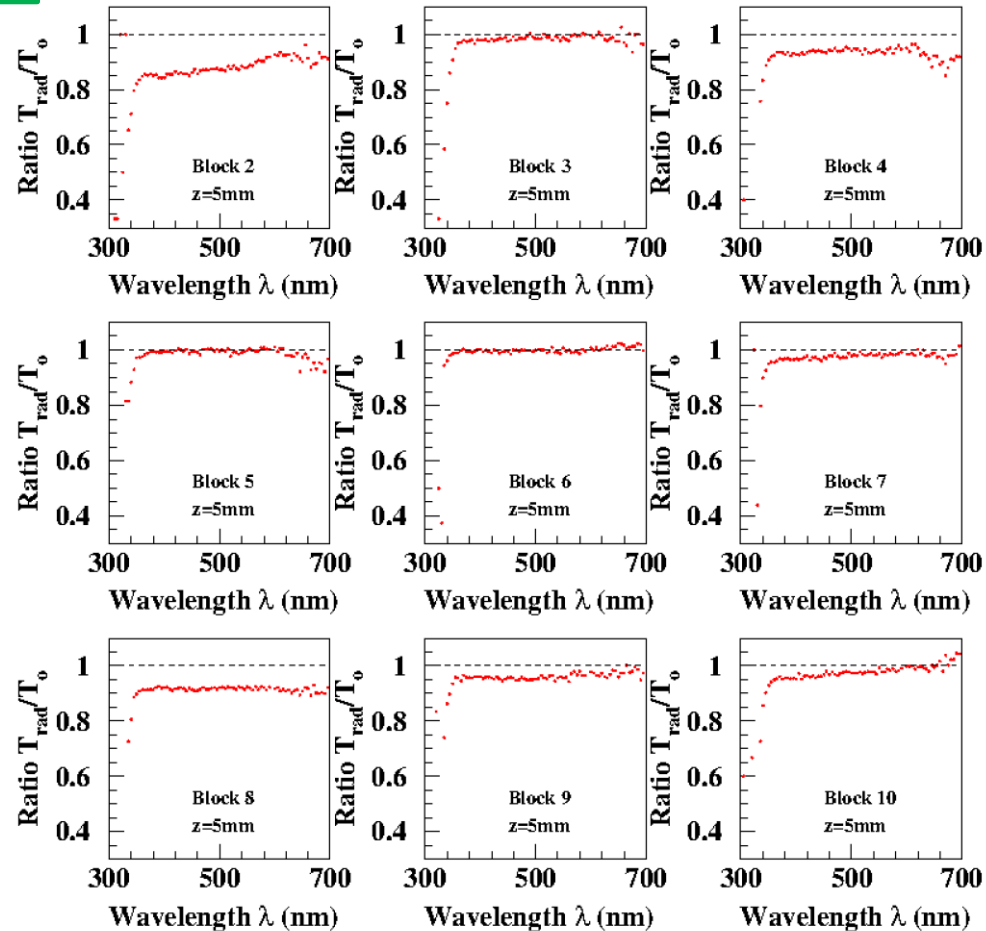
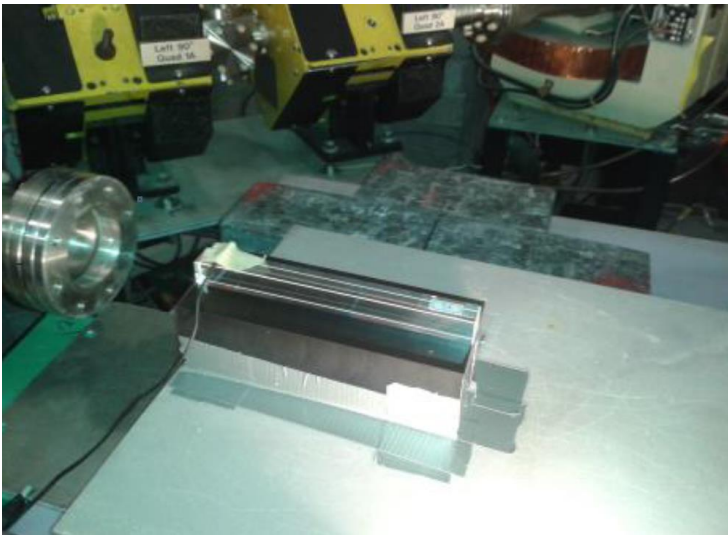


Expected dose at JLab

Radiation hardness tests of PbWO_4 crystals for NPS

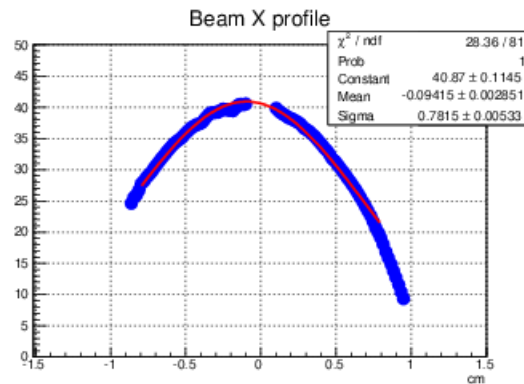
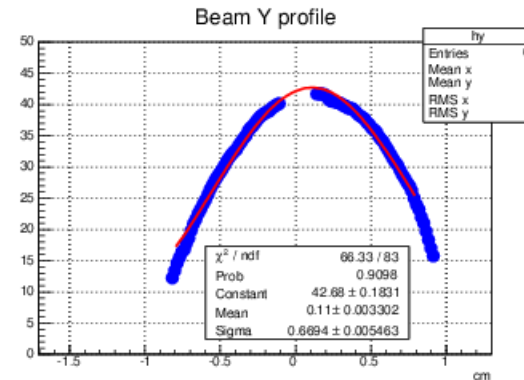
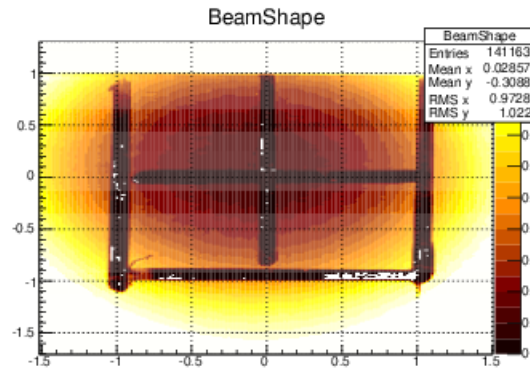
Irradiation with 20 MeV electrons at high rate
in the Idaho Accelerator Center (Feb, 2015)

Transmission degradation after 432 krad
of accumulated dose at 1.3 Mrad/h



**Preliminary results show high resistance to the
doses expected in the approved NPS experiments**

Beam parameters and radiation dose at IAC



Beam parameters:

- 20 MeV electrons
- $I_{\text{peak}} = 111 \text{ nA}$
- 100 ns pulse width
- 0.1 Hz (repetition rate)

A PbWO_4 block of mass $M_{\text{block}} = 0.6 \text{ kg}$ receives a dose:

$$D(\text{Gy}) = \frac{111 \cdot 10^{-3} \times 100 \cdot 10^{-9} \cdot 3.2 \cdot 10^{-12} \cdot 0.1 / 1.61 \cdot 10^{-19}}{0.6} \approx 0.036 \text{ Gy/sec}$$

or 1.3 Mrad/h