



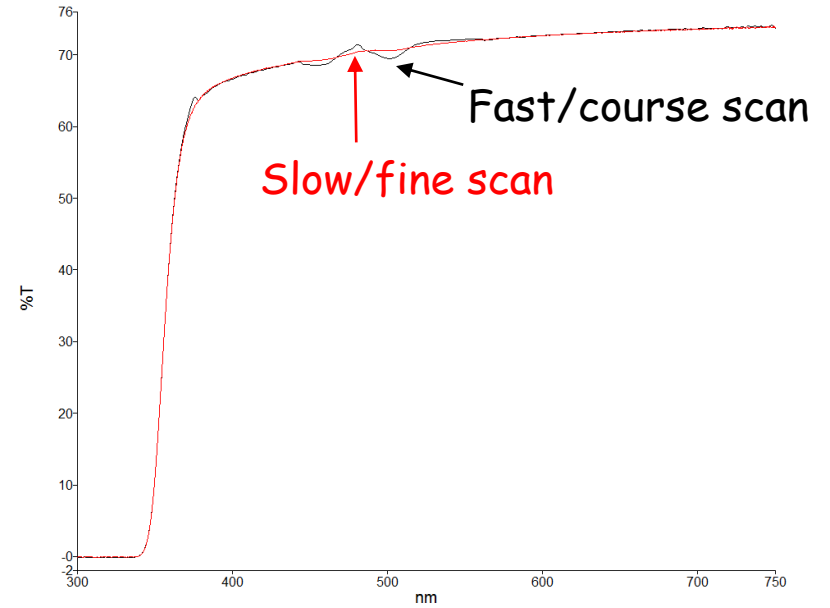
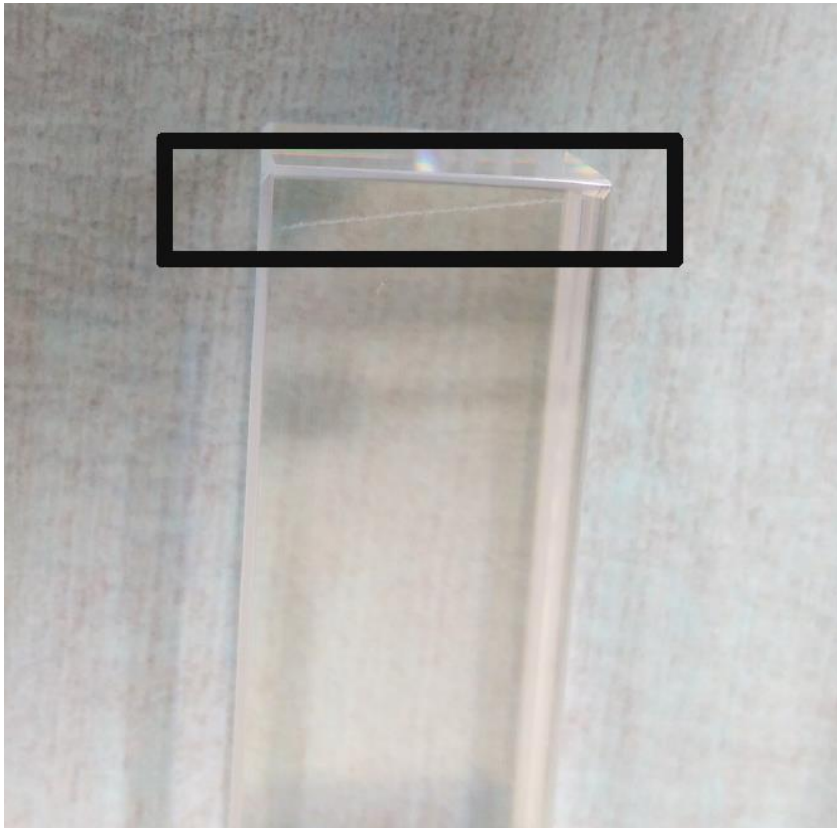
# Irradiation tests of 10 Crytur crystals

Pu-Kai Wang, C.M.C.

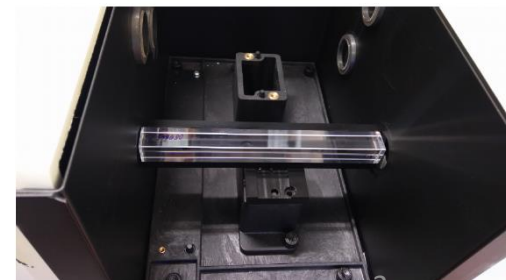
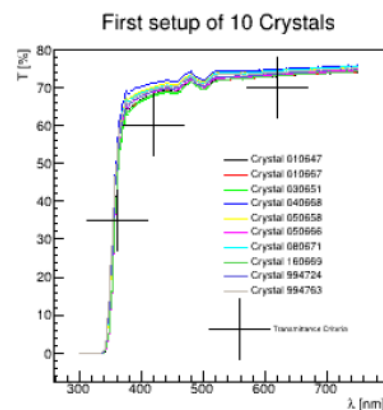
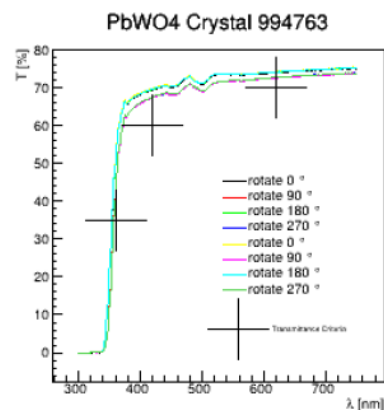
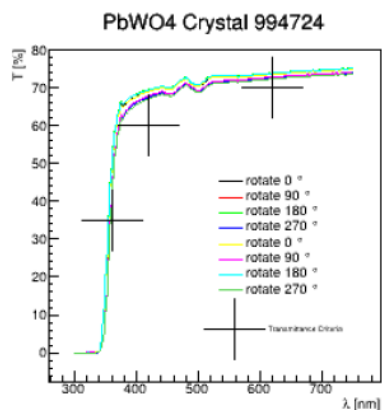
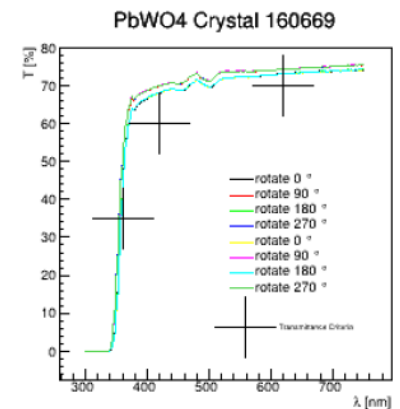
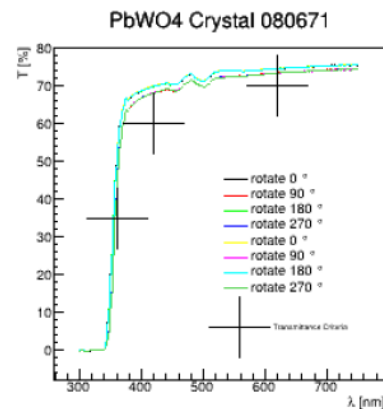
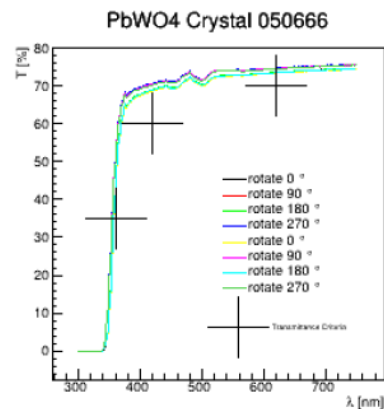
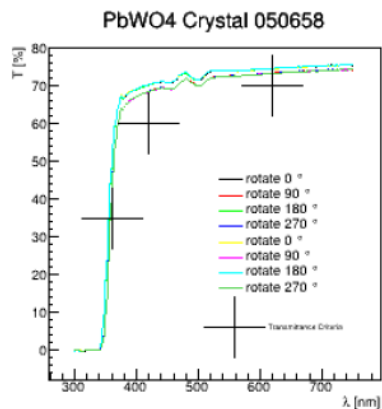
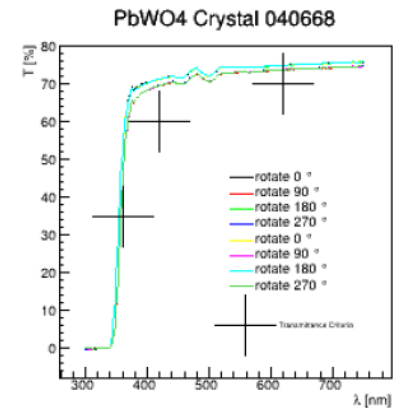
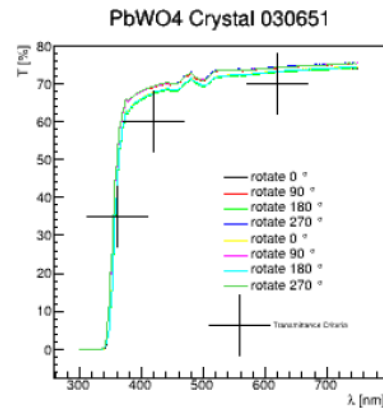
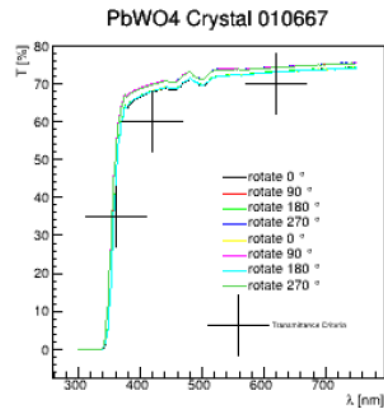
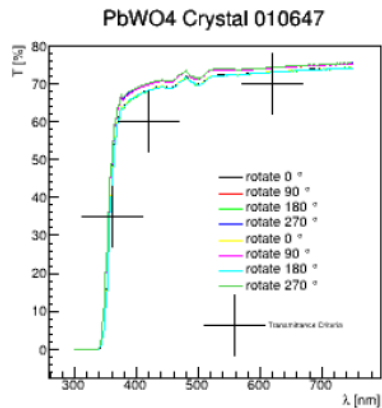
Feb 25, 2021

# Some preliminary comments

Small scratch: crystal 010667



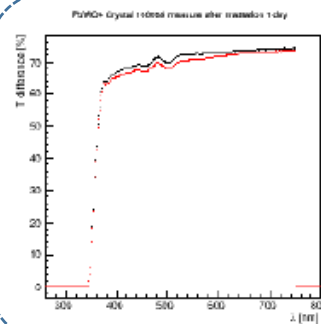
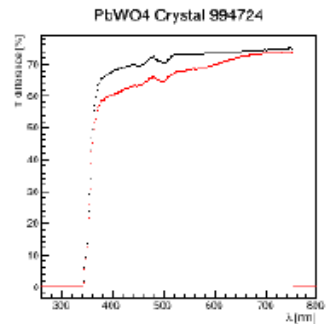
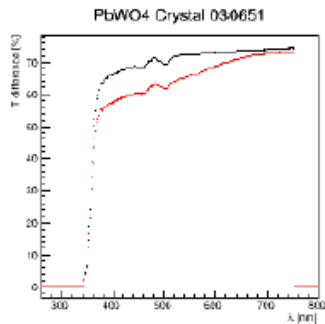
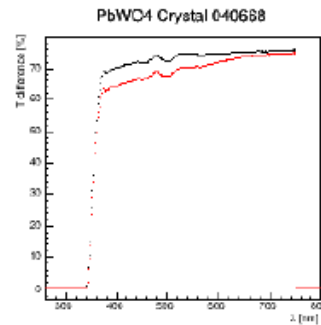
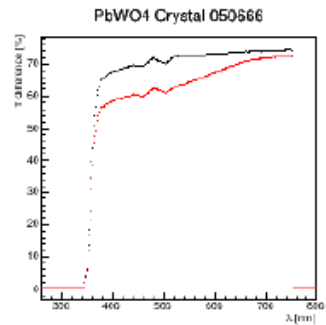
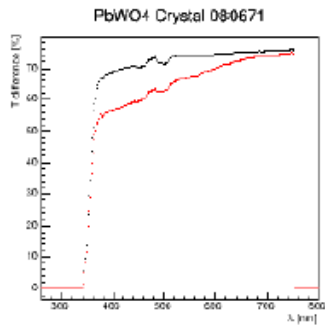
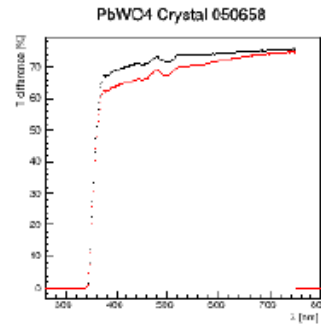
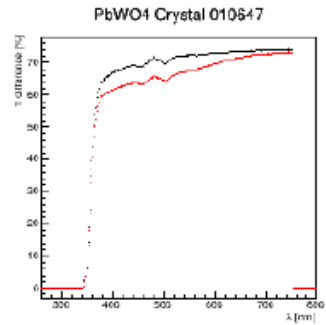
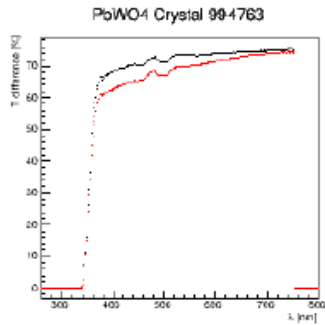
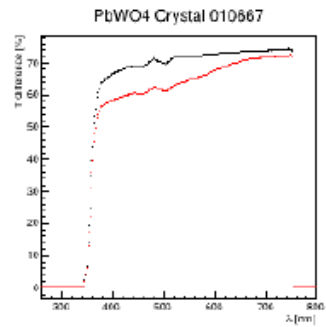
# Transmittance all above specs



# Nominal irradiation dose

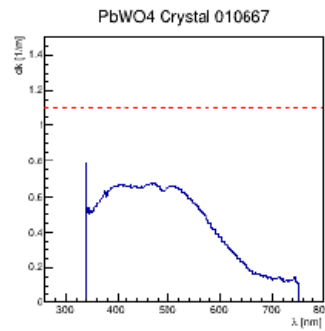
30 Gy at 1Gy/min:

at most 10% loss in transmittance

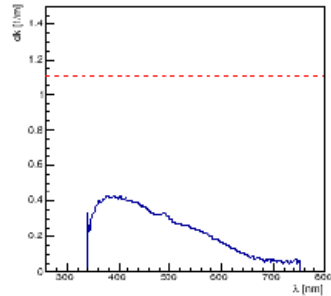


Measured 24h later,  
naturally recovered

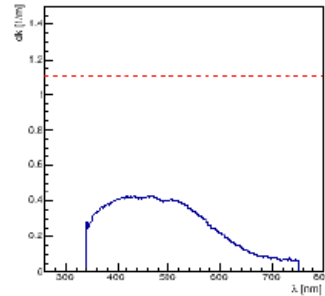
# Nominal irradiation dose



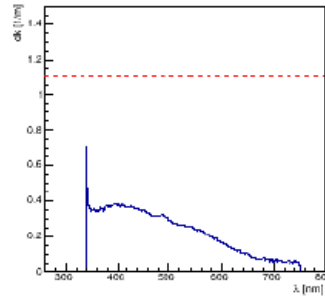
PbWO<sub>4</sub> Crystal 994763



PbWO<sub>4</sub> Crystal 010647



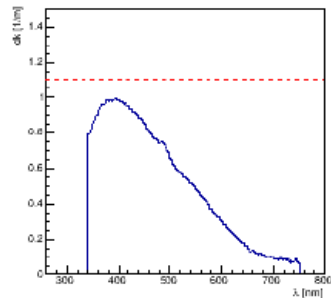
PbWO<sub>4</sub> Crystal 050658



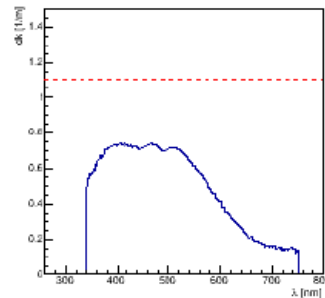
$$dk = \ln(T_{\text{before}}/T_{\text{after}}) / 0.2\text{m}$$

All below 1.1 m<sup>-1</sup>

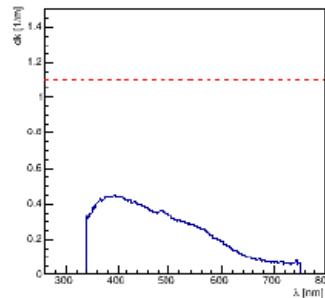
PbWO<sub>4</sub> Crystal 080671



PbWO<sub>4</sub> Crystal 050666

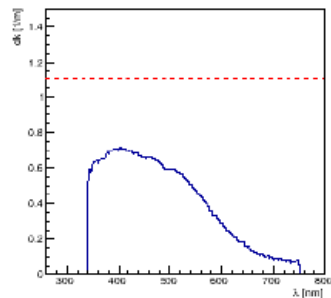


PbWO<sub>4</sub> Crystal 040668

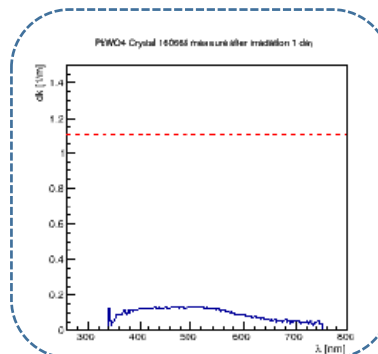
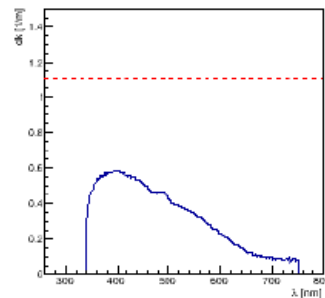


All within specs !

PbWO<sub>4</sub> Crystal 030651

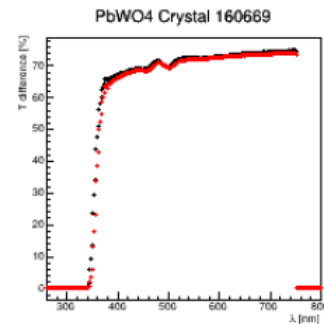
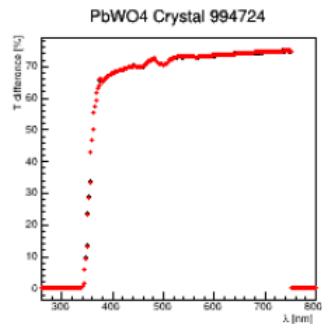
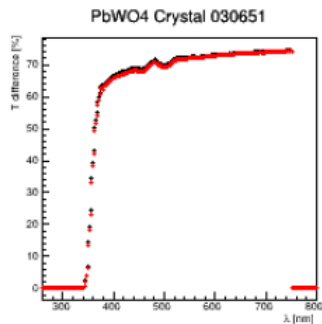
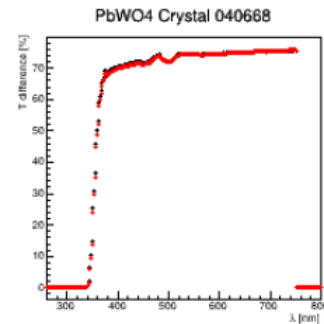
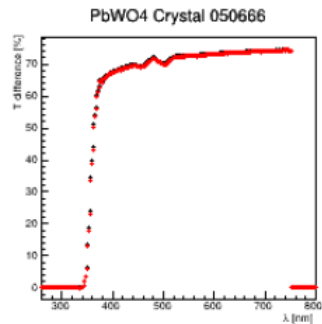
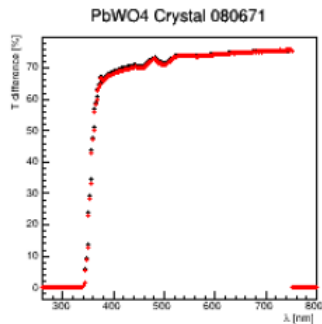
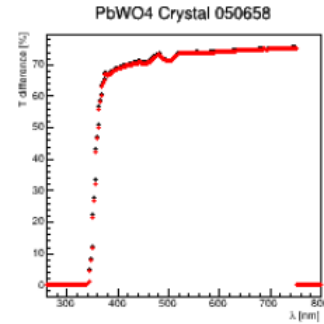
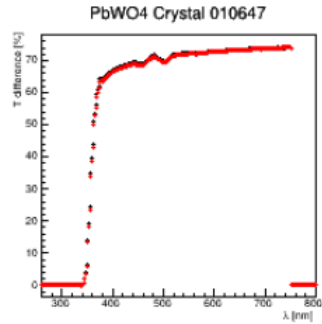
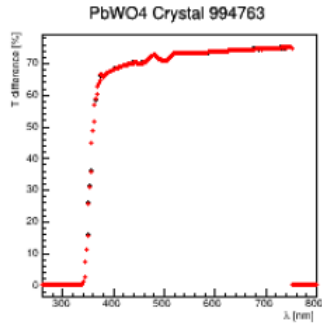
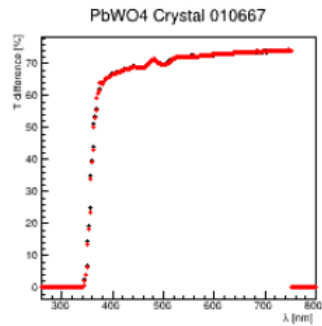


PbWO<sub>4</sub> Crystal 994724



Measured 24h later,  
naturally recovered

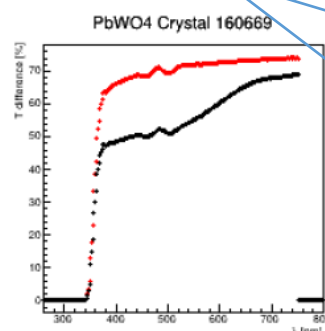
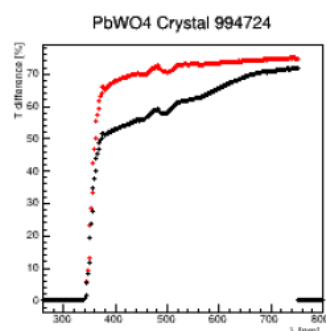
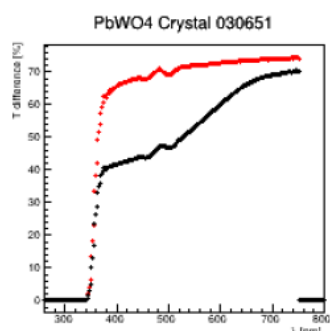
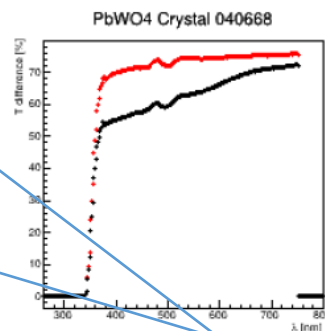
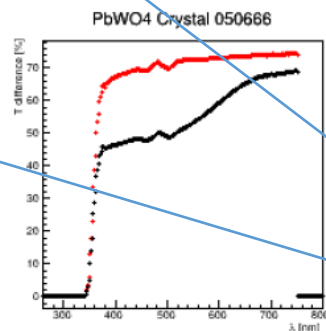
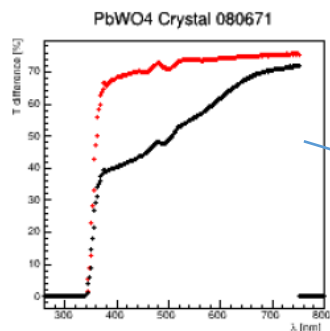
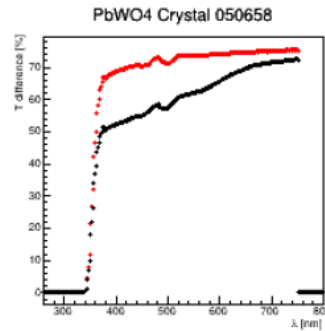
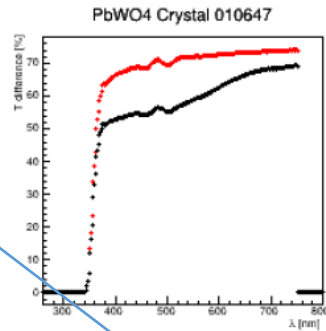
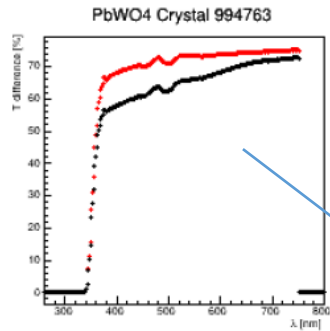
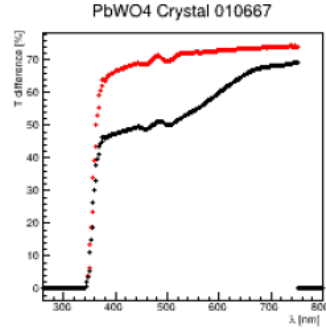
# Crystals thermally annealed



Transmittance as  
before irradiation

# 1Mrad at 750 rad/h

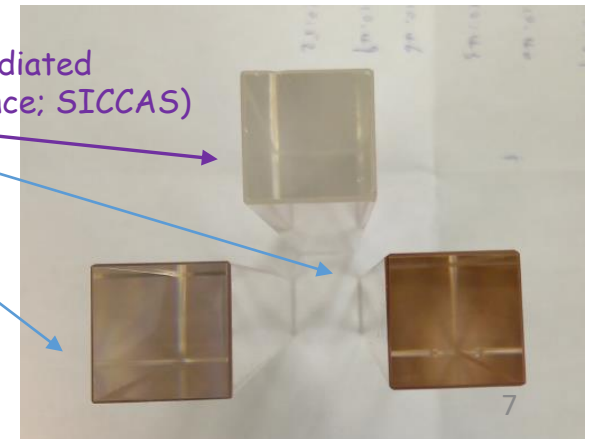
Damage saturates at  
~30% loss max.



Not irradiated  
(reference; SICCAS)



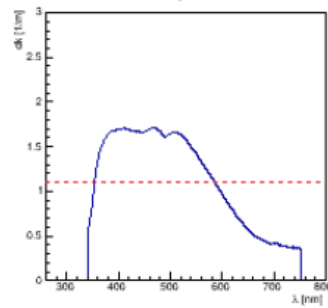
Not irradiated  
(reference; SICCAS)



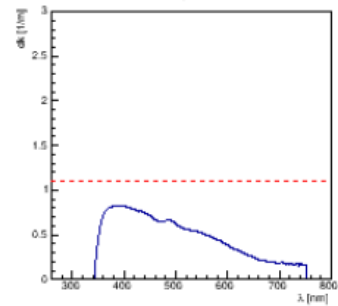
# 1Mrad at 750 rad/h

$$dk = \ln(T_{\text{before}}/T_{\text{after}}) / 0.2m$$

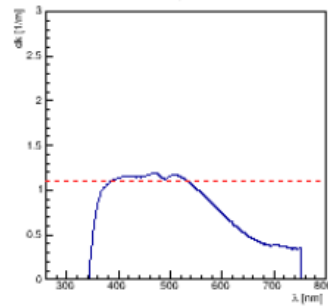
PbWO4 Crystal 010667



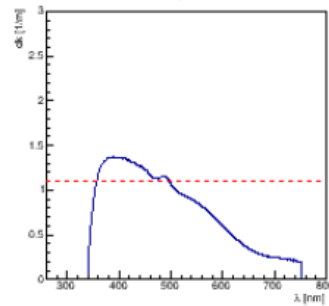
PbWO4 Crystal 994763



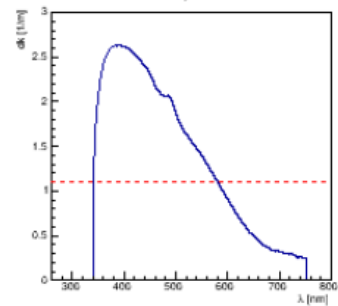
PbWO4 Crystal 010647



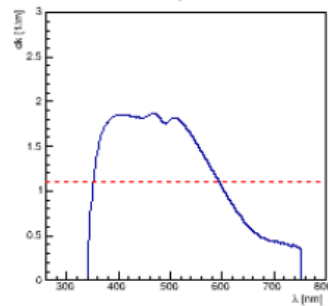
PbWO4 Crystal 050658



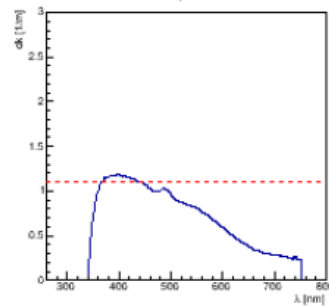
PbWO4 Crystal 080671



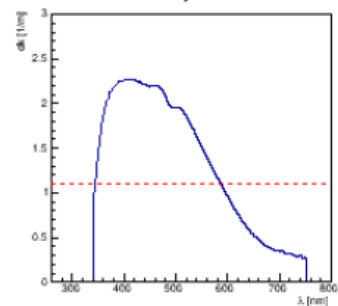
PbWO4 Crystal 050666



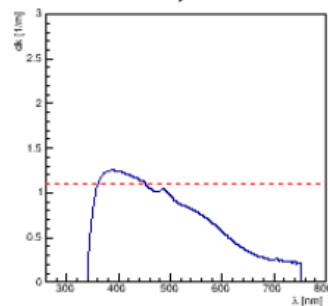
PbWO4 Crystal 040668



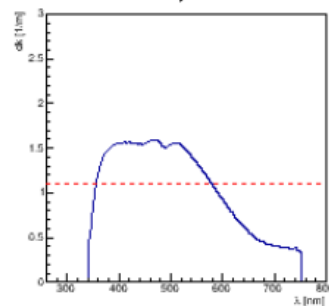
PbWO4 Crystal 030651



PbWO4 Crystal 994724



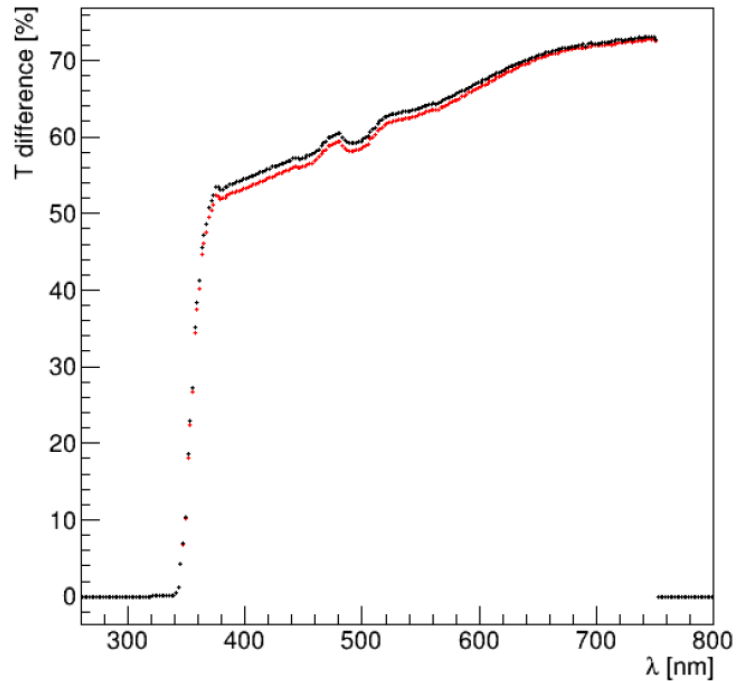
PbWO4 Crystal 160669



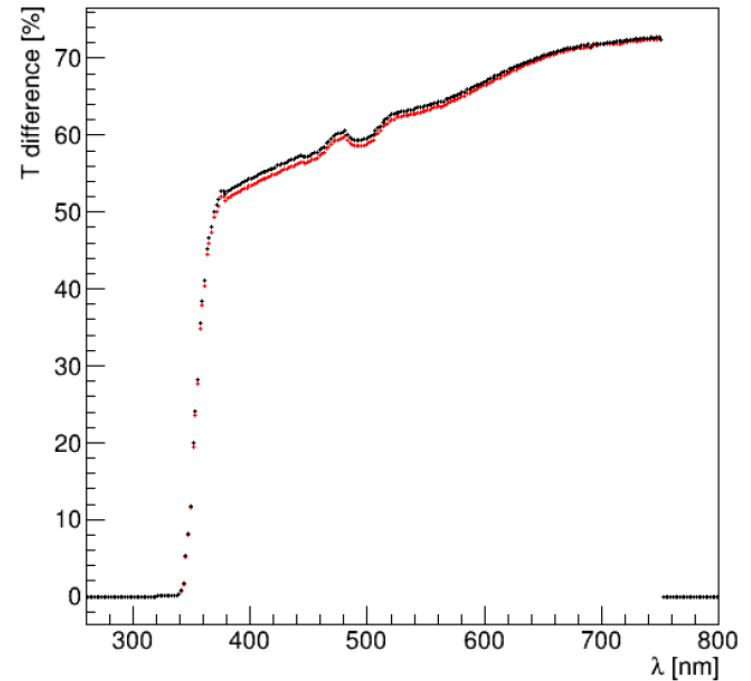


# Blue light bleaching

PbWO<sub>4</sub> Crystal 050658



PbWO<sub>4</sub> Crystal 994724



After a large dose (1 Mrad), crystals do not recover, even after 4 days of bleaching