

Status on PWO development

R. W. Novotny, V. Dormenev

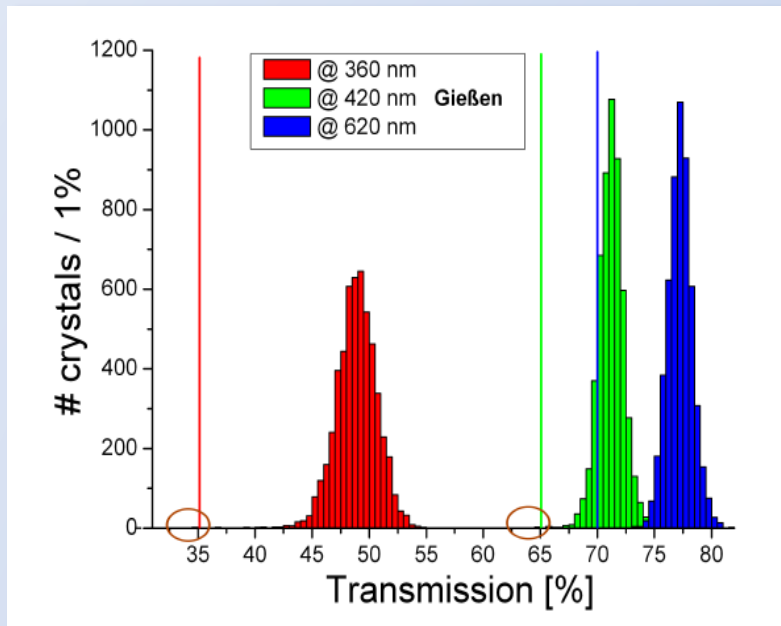
Justus-Liebig-Universität, II. Physikalisches Institut, Giessen, Germany

- **SICCAS**
- **Status on CRYTUR development**
- **Timelines and financing**

- **SICCAS:** obviously no interest anymore
- **ongoing activities:**
 - contract from Uppsala for pre-production ~ 90 crystals
 - parallel activities at Jlab, BNL and Orsay: NPS
 - JRA as part of HP-HORIZON2020
spokesperson: Carlos Munioz
 - Contribution by CZ-FAIR

- optical longitudinal transmission

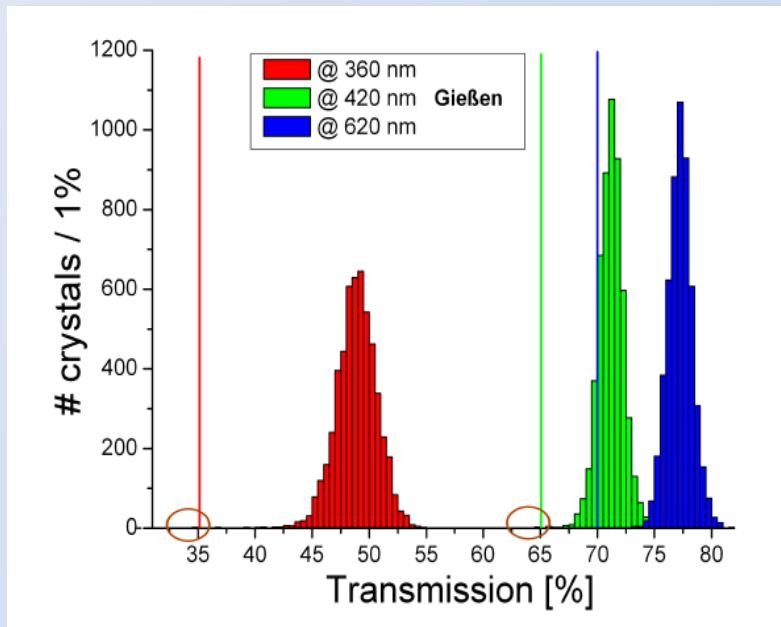
BTCP



property	condition	specification
longitudinal transmission	at 360nm	$\geq 35\%$
	at 420nm	$\geq 60\%$
	at 620nm	$\geq 70\%$
uniformity of transv. transmission	wavelength at $T = 50\%$	$\Delta\lambda \leq 3\text{nm}$

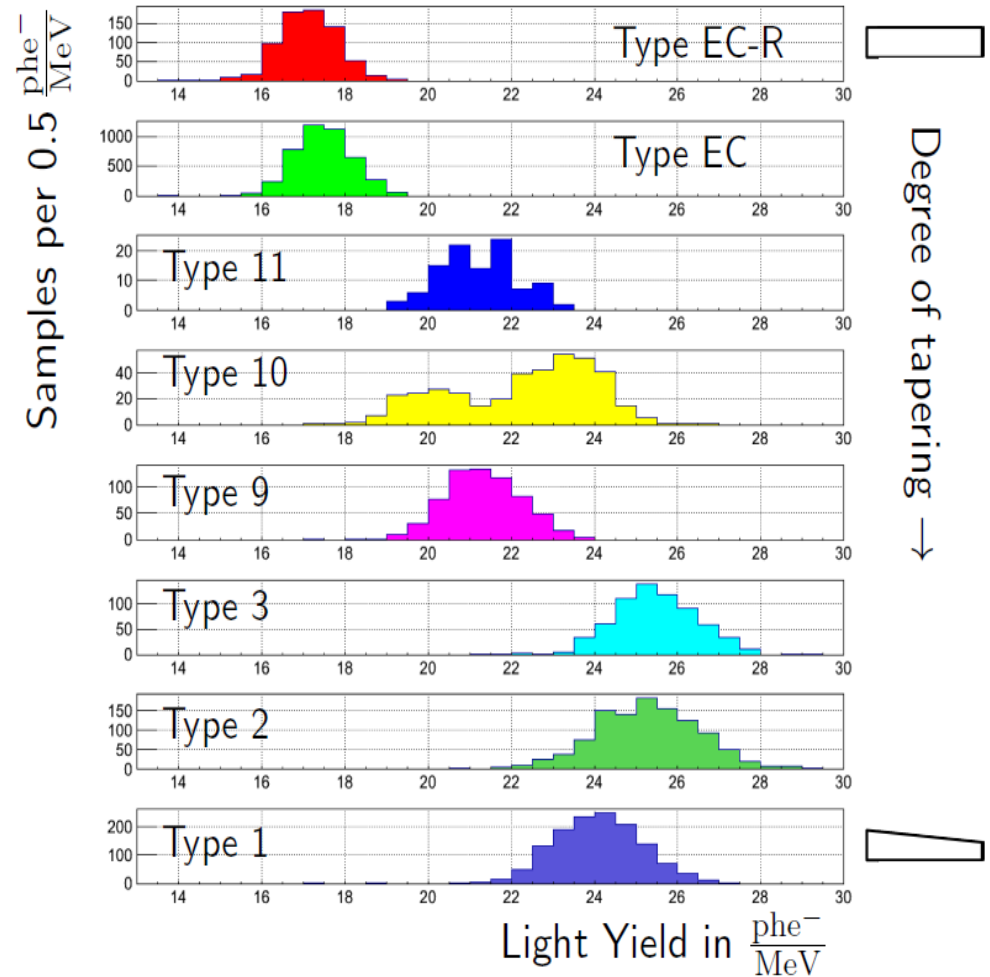
- optical longitudinal transmission

BTCP

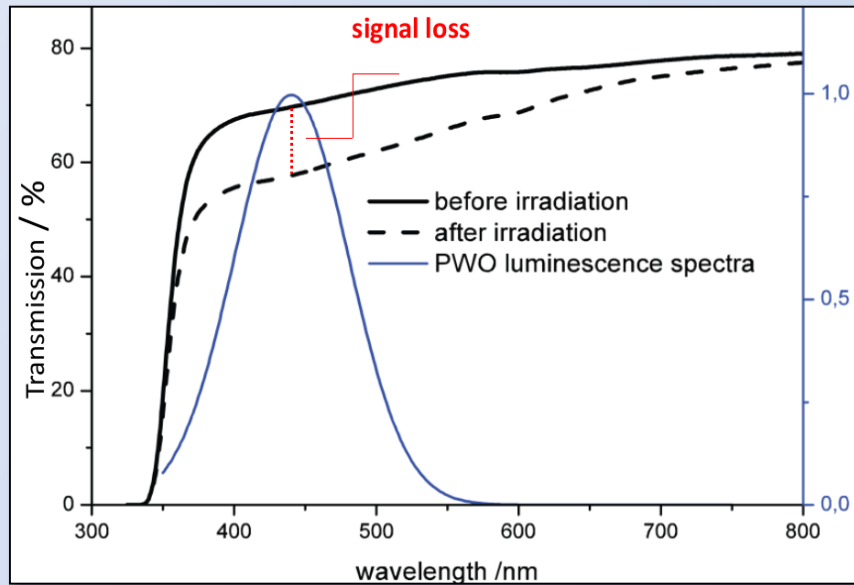


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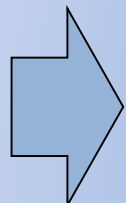
- light yield @ 18°C

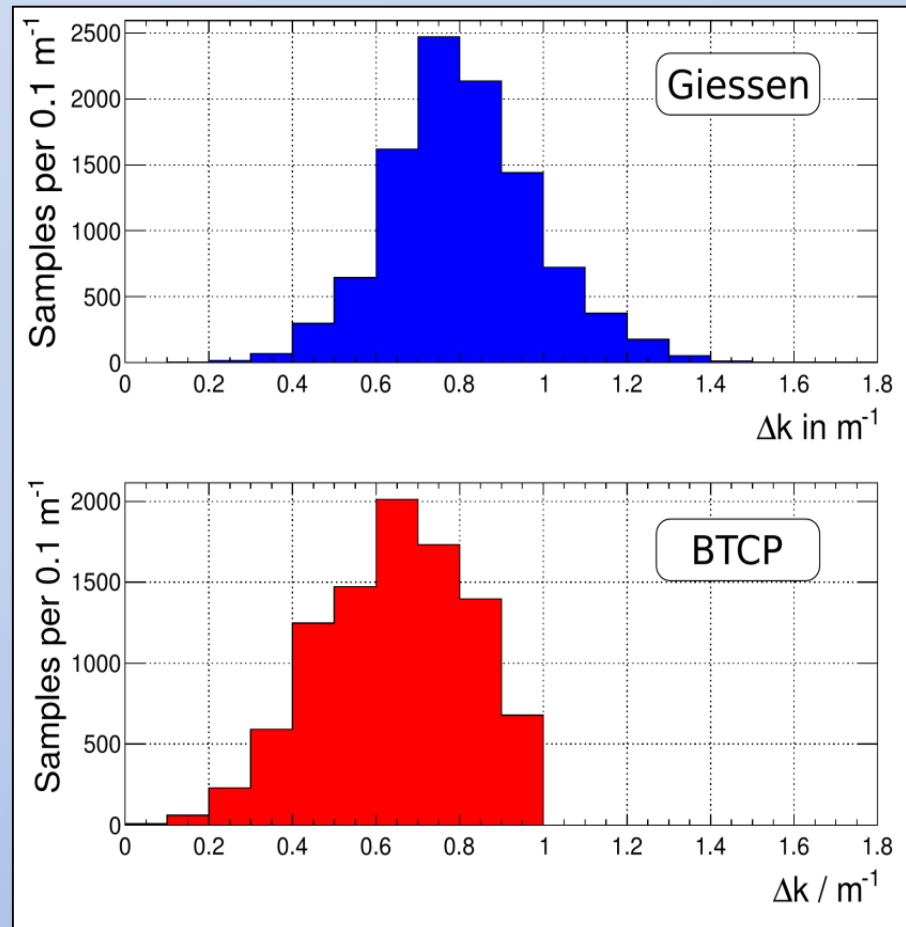


- radiation hardness



tested using γ -rays: ~ 1.2 MeV
 ^{60}Co
 integral dose: 30Gy

$$\Delta k = \ln\left(\frac{T_{\text{bef}}}{T_{\text{after}}}\right) \cdot \frac{1}{d}$$




acceptance limit: $\Delta k < 1.1$ m⁻¹

• restart of PWO production in summer 2014

- production based on Czochralski technology
- use of existing pre-mixture of raw material (*NeoChem*, Moscow)
- network: close collaboration with *RINP* Minsk and *IPAS* Prague

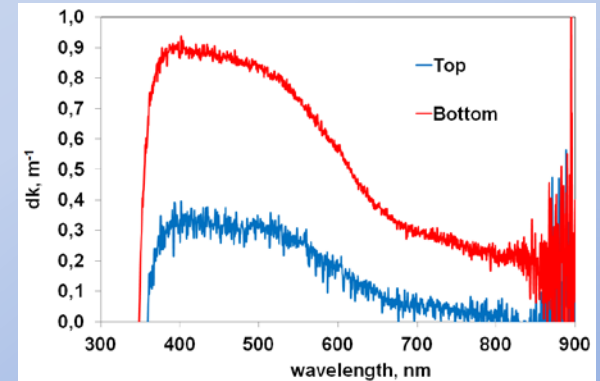
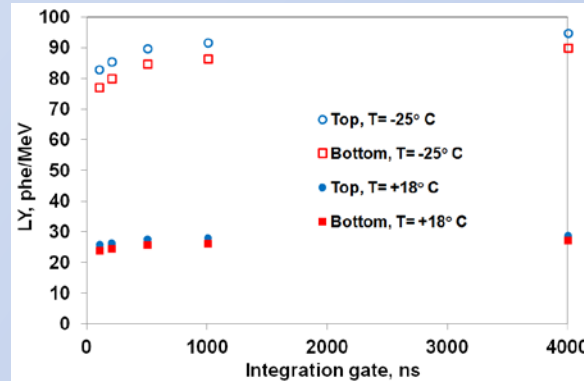
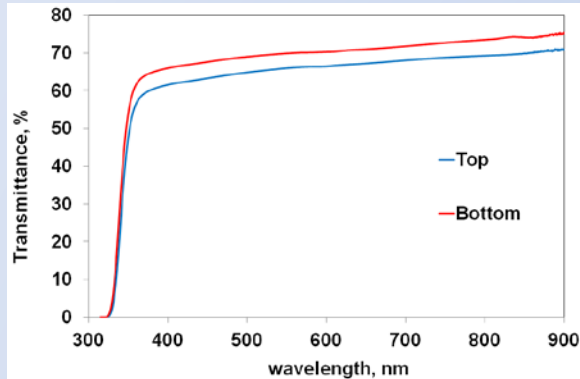


- additional installations already started including device for geometry controle
- optimization of ovens and N₂-flushing

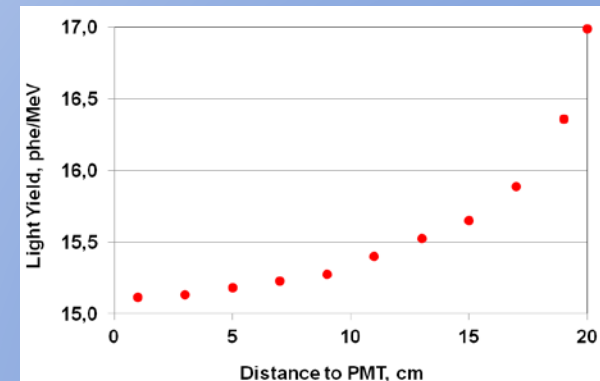
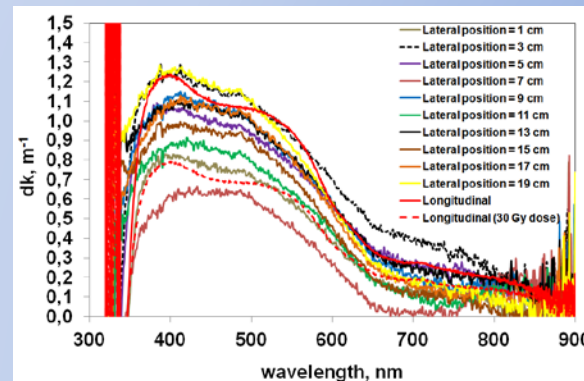
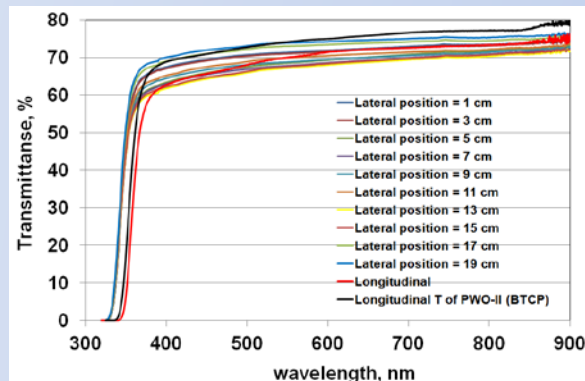


first full size ingots:

grown in Ar atmosphere and doped with La+Y

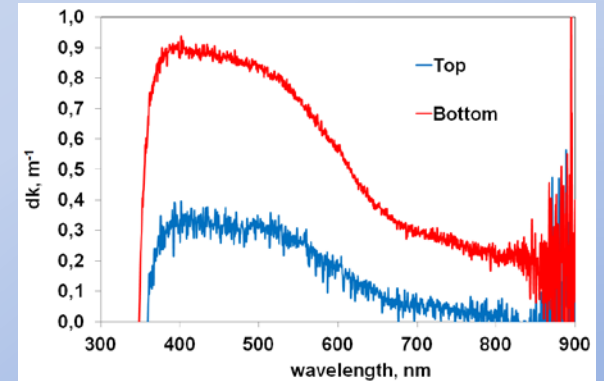
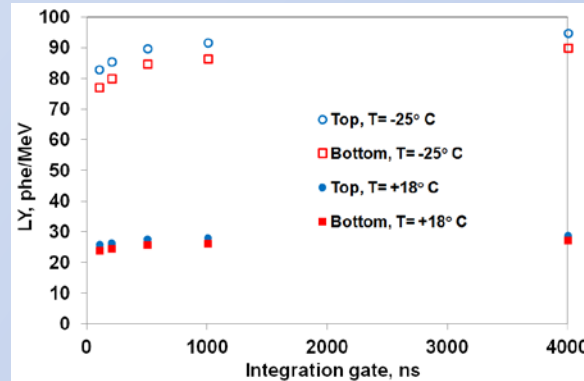
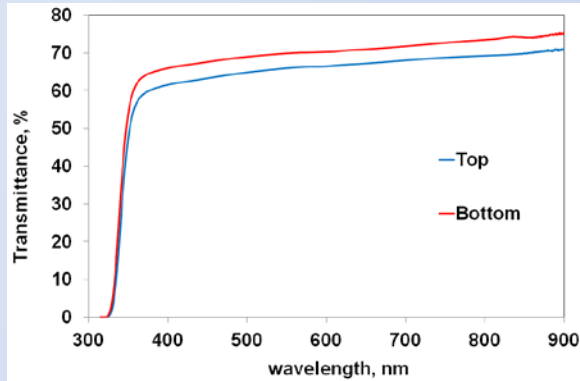


dimension: 20x20x200mm³

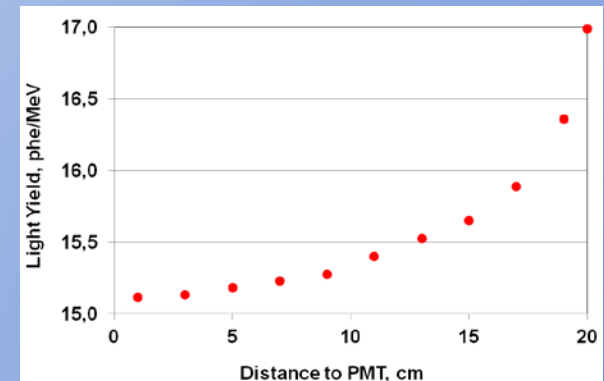
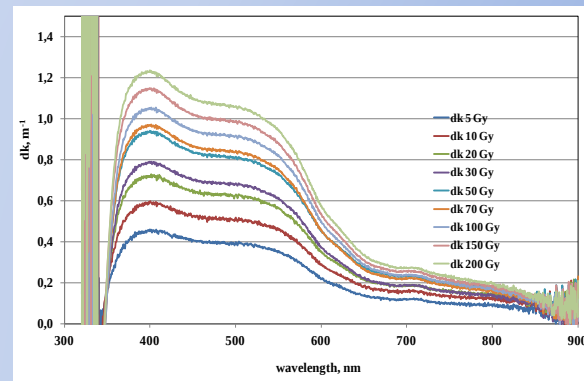
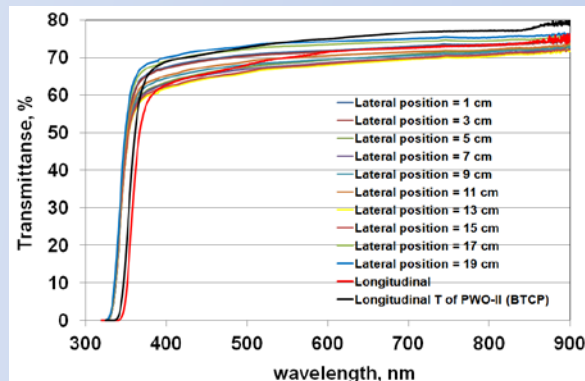


first full size ingots:

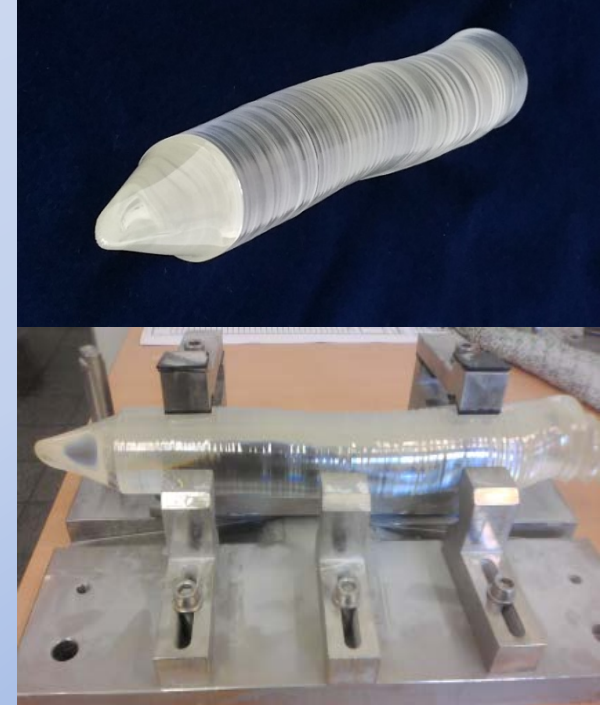
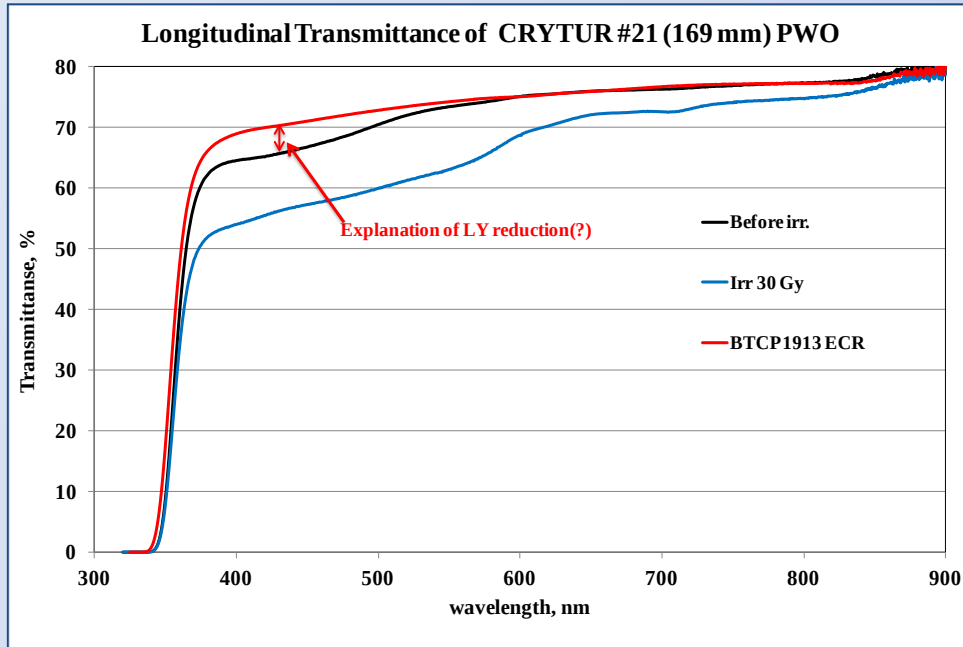
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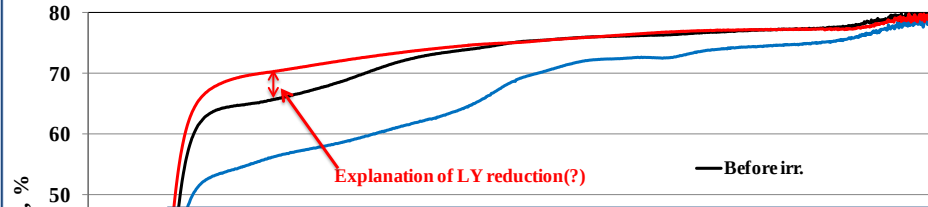


last sample: 20x20x169 mm³

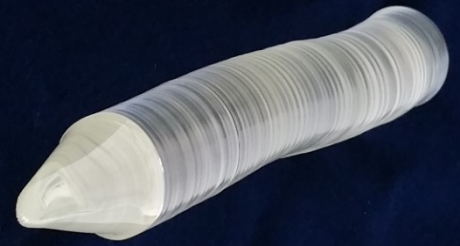
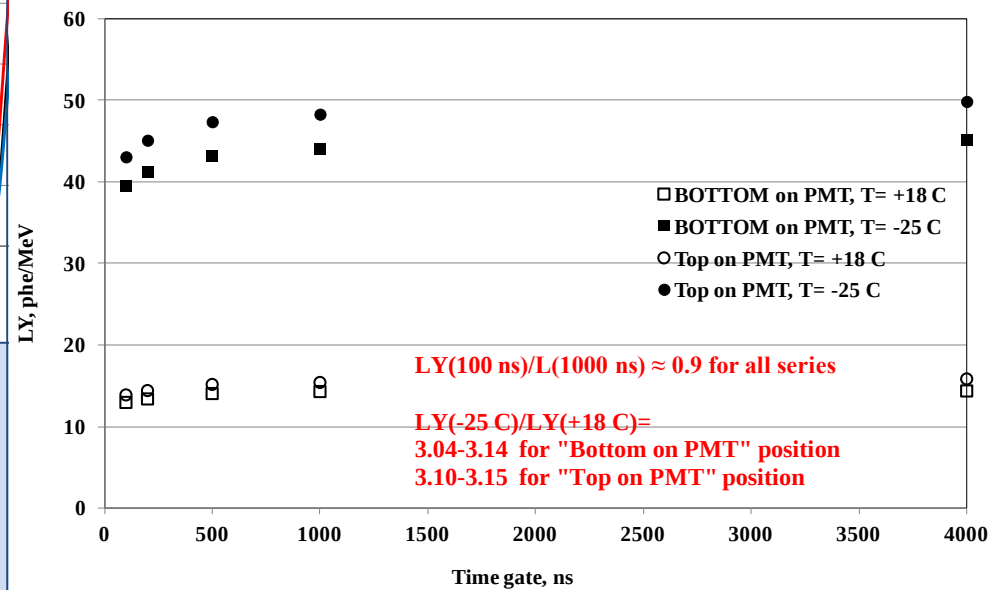


last sample: 20x20x169 mm³

Longitudinal Transmittance of CRYTUR #21 (169 mm) PWO

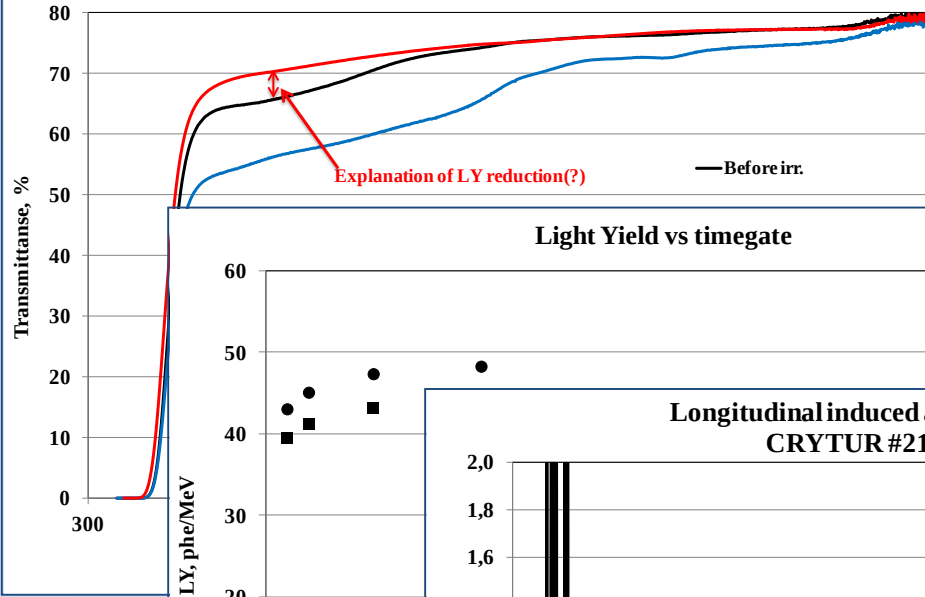


Light Yield vs timegate

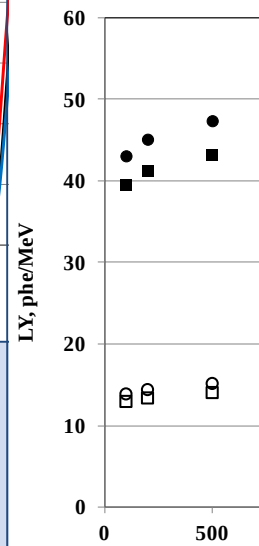


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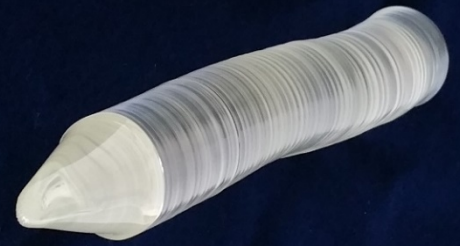
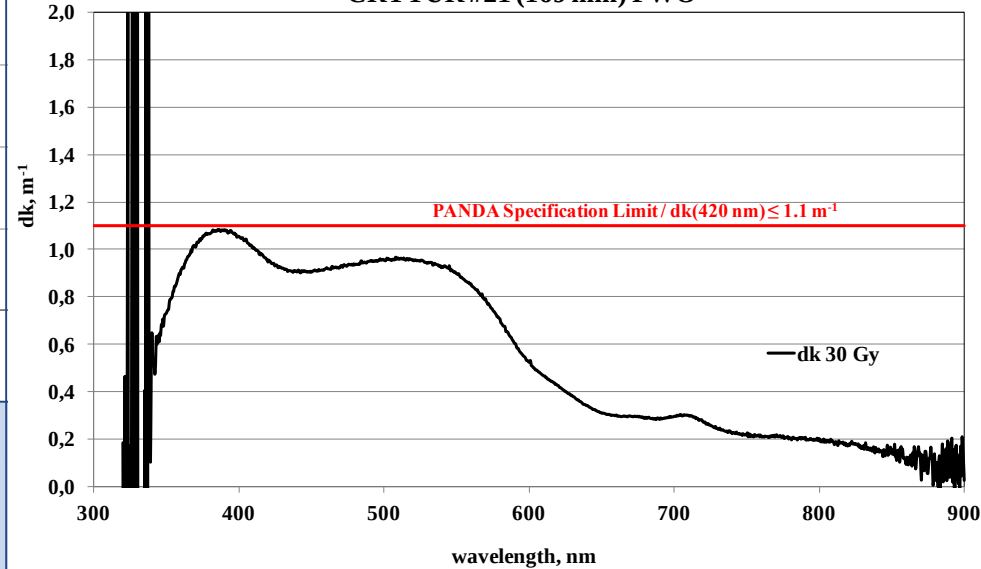
Longitudinal Transmittance of CRYTUR #21 (169 mm) PWO



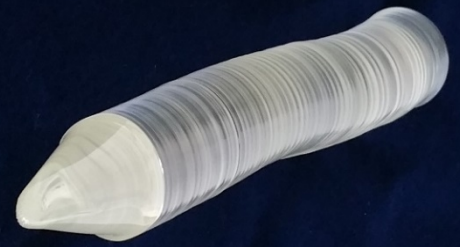
Light Yield vs timegate



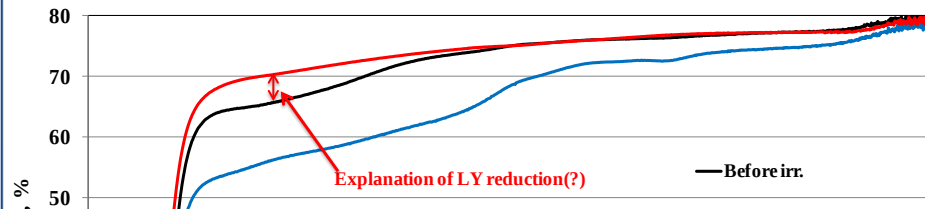
Longitudinal induced absorption coefficient of CRYTUR #21 (169 mm) PWO



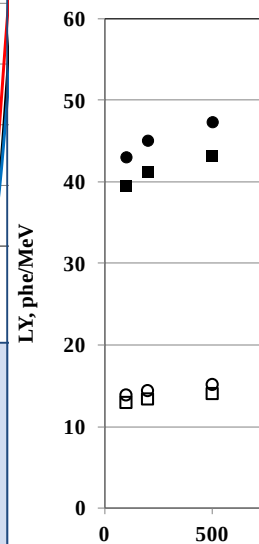
last sample: 20x20x169 mm³



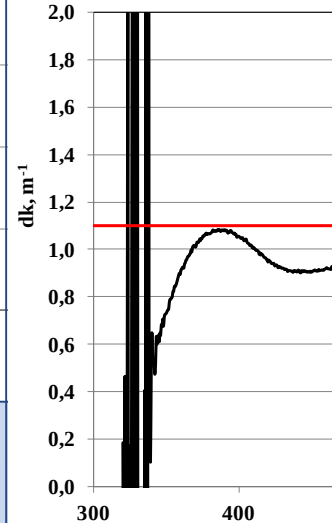
Longitudinal Transmittance of CRYTUR #21 (169 mm) PWO



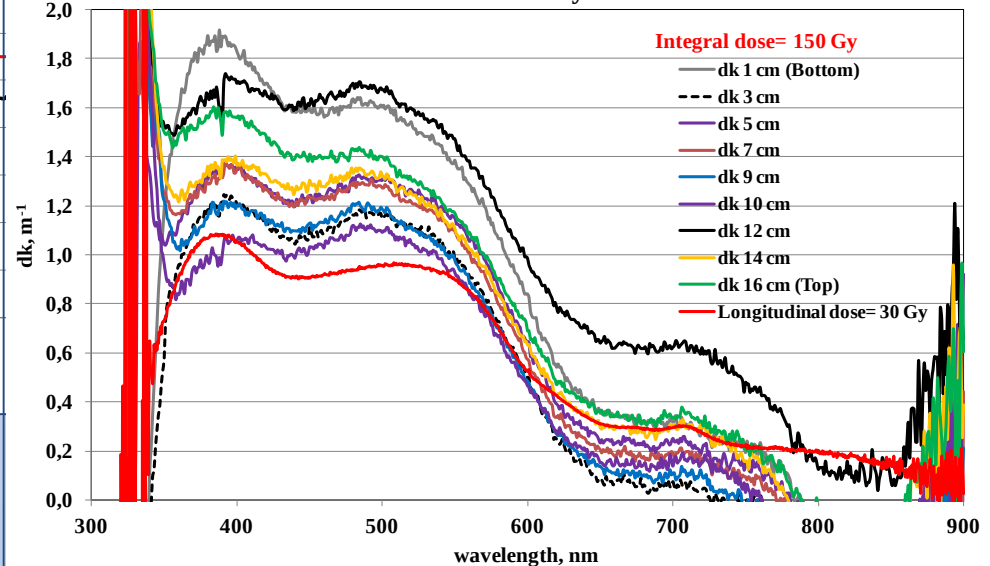
Light Yield vs timegate



Longitudinal induced absorption coefficient of CRYTUR #21 (169 mm) PWO

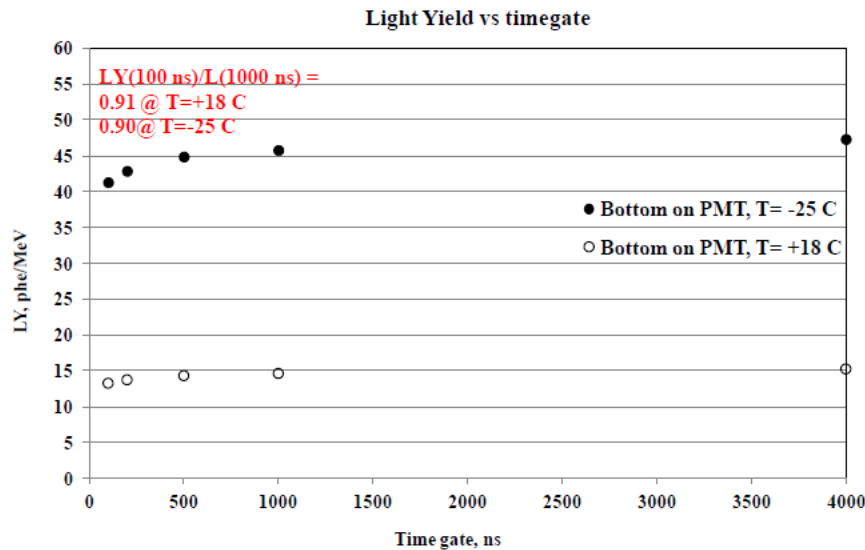


Transversal radiation induced coefficient of CRYTUR #21 (169 cm) PWO crystal



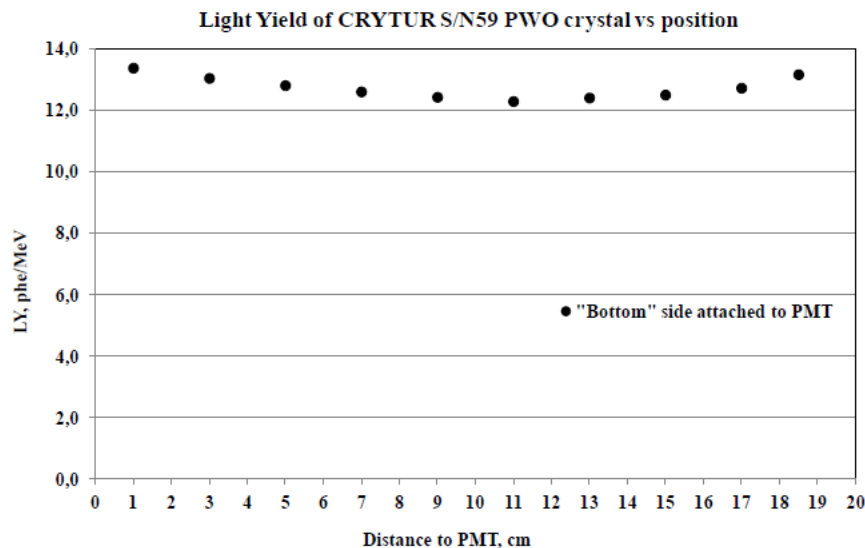
most recent samples # 58, 59, 60

ordered by Orsay:
Carlos Munioz (Jlab, NPS)



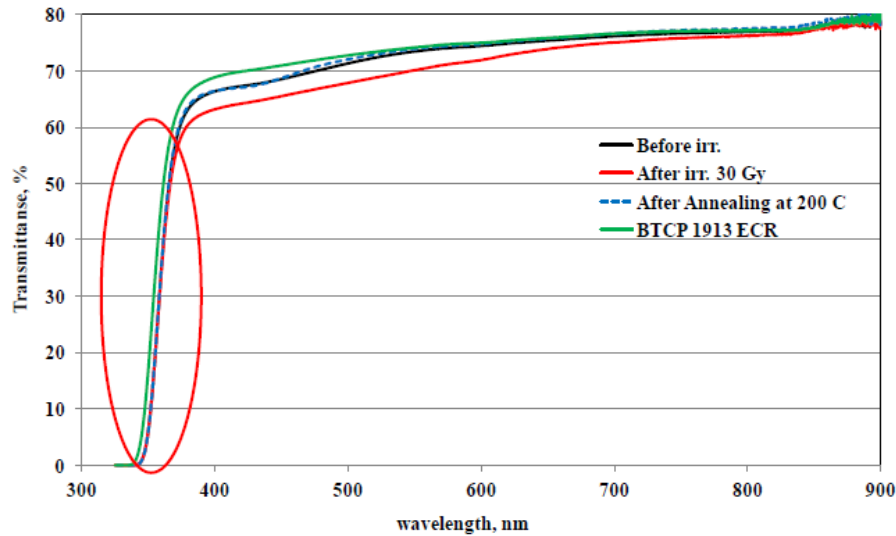
Dimensions:
20 x 20 x 185 mm³

light yield reduced via
overdoping

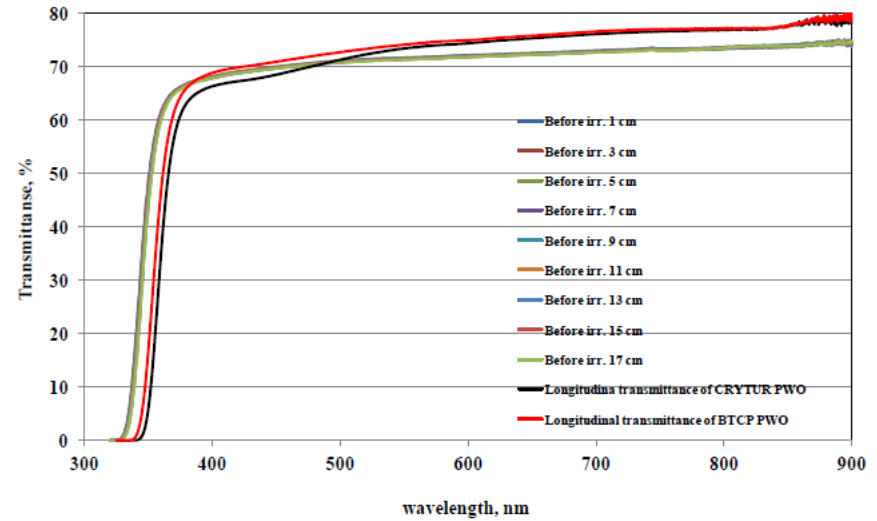


optical transmission and radiation hardness: 1

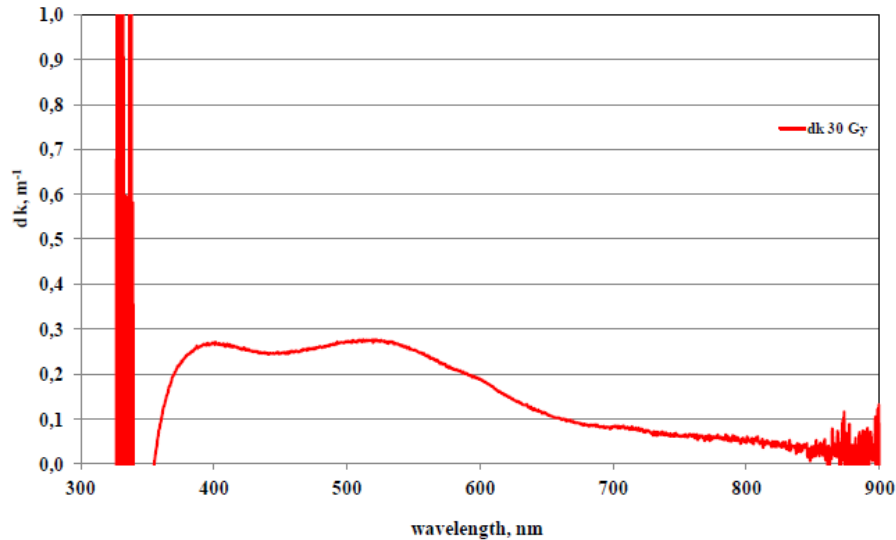
Longitudinal Transmittance of CRYTUR S/N59 PWO



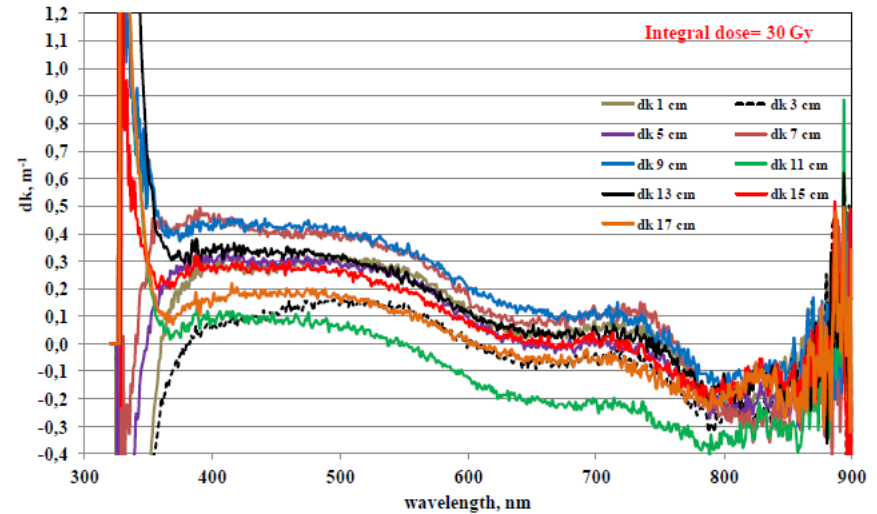
Lateral Transmittance of CRYTUR S/N59 PWO crystal



Longitudinal induced absorption coefficient of CRYTUR S/N59



Radiation induced coefficient of S/N59 PWO



optical transmission and radiation hardness: 2

