

Investigation of 5-ALA-PDT and Direct Light Therapy (DLT) for the Treatment of Glioma (GlioLighT Project)

Krishna Prasad Subedi^{1,2}, Maximilian Aumiller^{1,2}, Adrian Ruhm^{1,2}, Ronald Sroka^{1,2},

¹ Laser-Forschungslabor, LIFE-Zentrum, LMU University Hospital, LMU Munich, Planegg, Germany

² Department of Urology, LMU University Hospital, LMU Munich, Munich, Germany

XXII Seminar Alghero Sardinia; Italy
12th June 2025



Grade I Tumor

- *Slow-growing cells*
- *Almost normal appearance under a microscope*
- *Least malignant*
- *Usually associated with long-term survival*

Grade II Tumor

- *Relatively slow-growing cells*
- *Slightly abnormal appearance under a microscope*
- *Can invade adjacent normal tissue*
- *Can recur as a higher grade tumor*

Grade III Tumor

- *Actively reproducing abnormal cells*
- *Abnormal appearance under a microscope*
- *Infiltrate adjacent normal brain tissue*
- *Tumor tends to recur, often as a higher grade*

Grade IV Tumor

- *Abnormal cells which reproduce rapidly*
- *Very abnormal appearance under a microscope*
- *Form new blood vessels to maintain rapid growth*
- *Areas of dead cells (necrosis) in center*

Radiation therapy (RT)

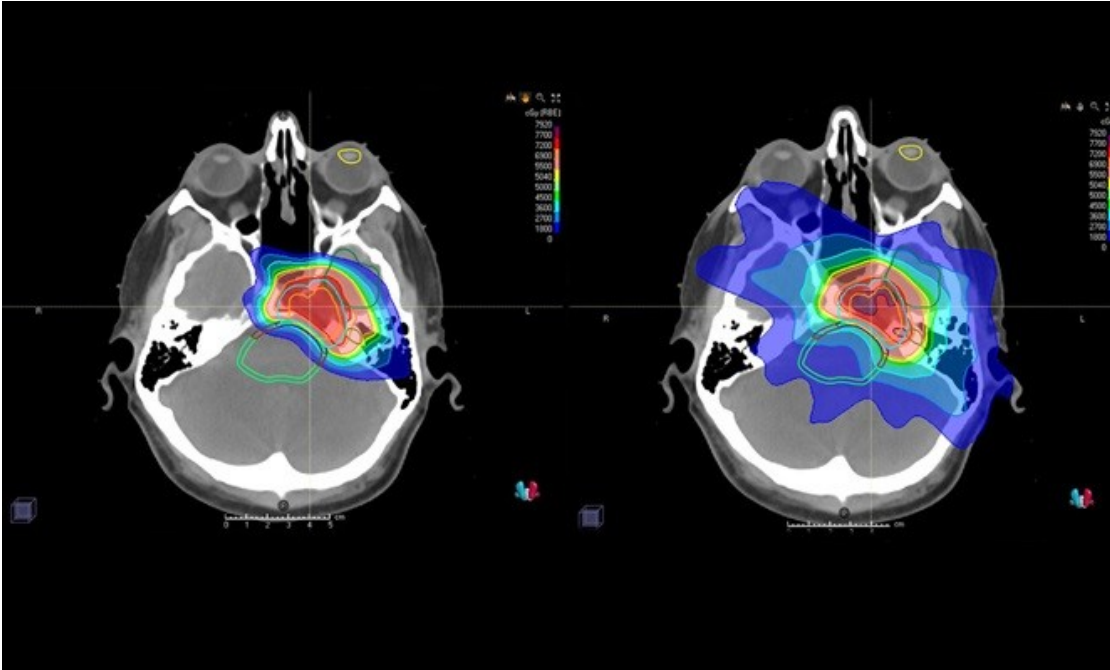
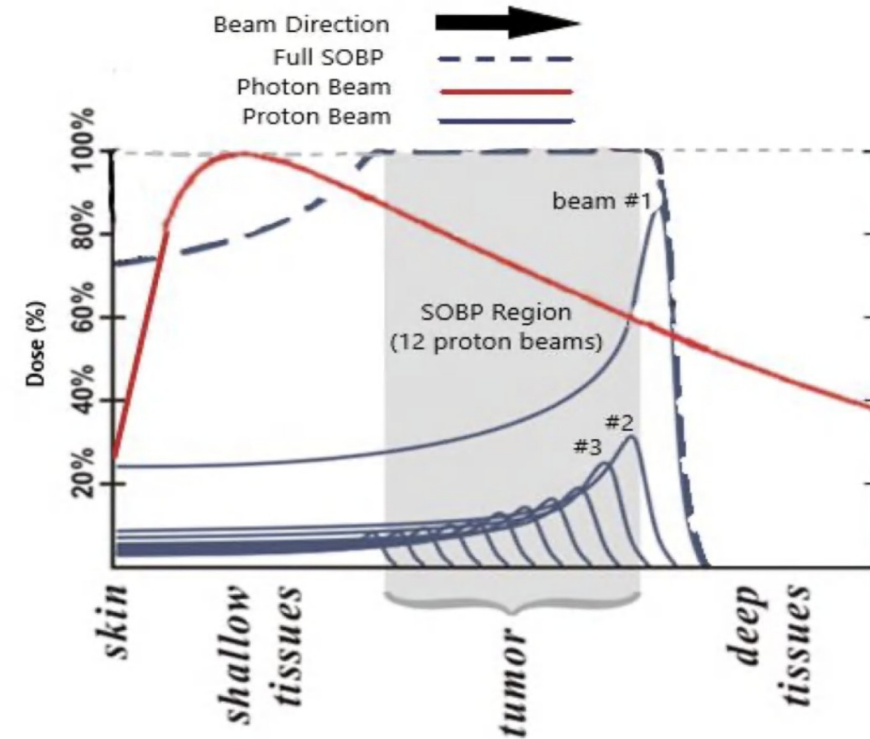
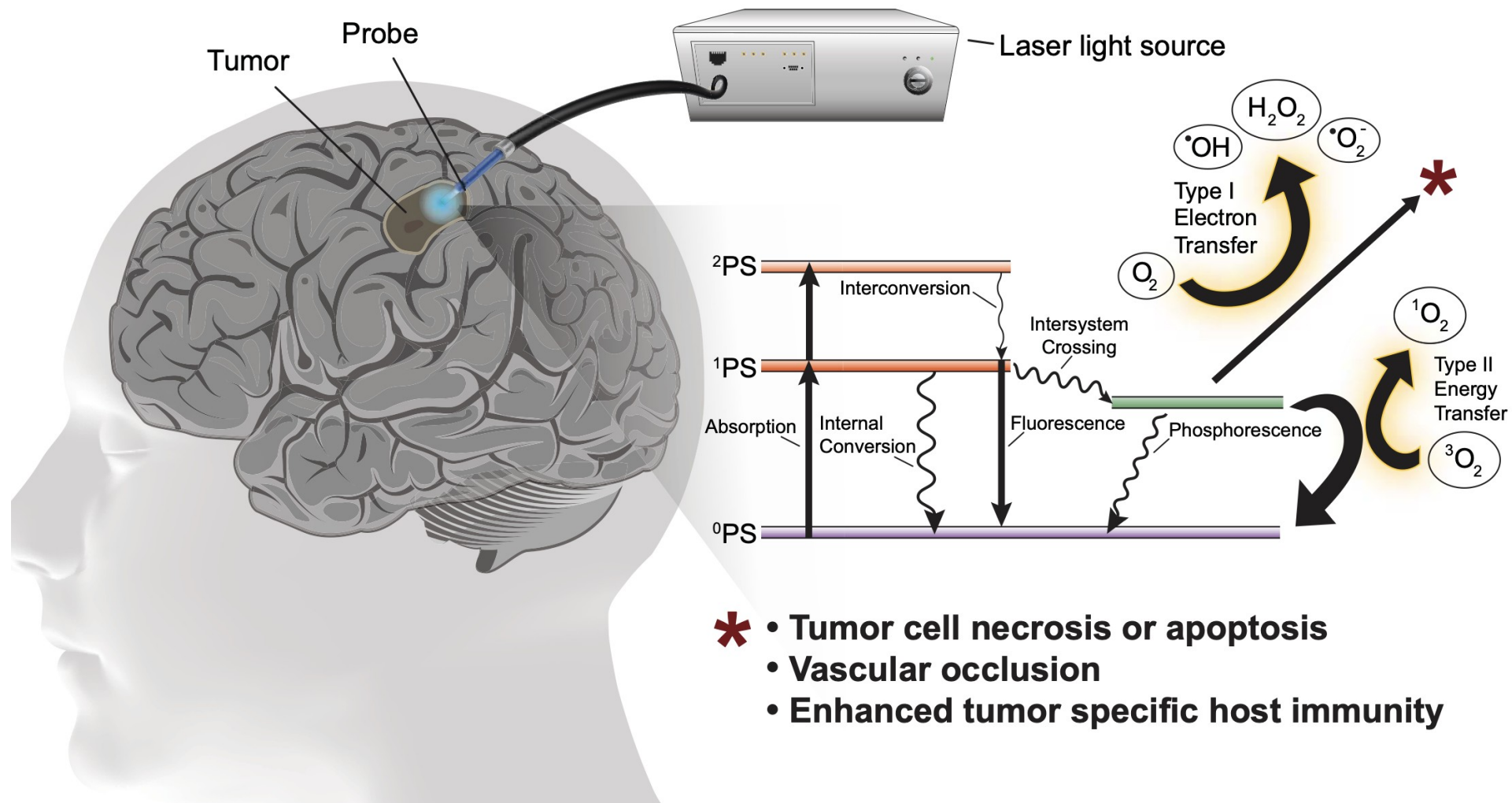


Fig: Spatial distribution of dose from IMRT and IMPT



Depth dose curve of photon and proton beam

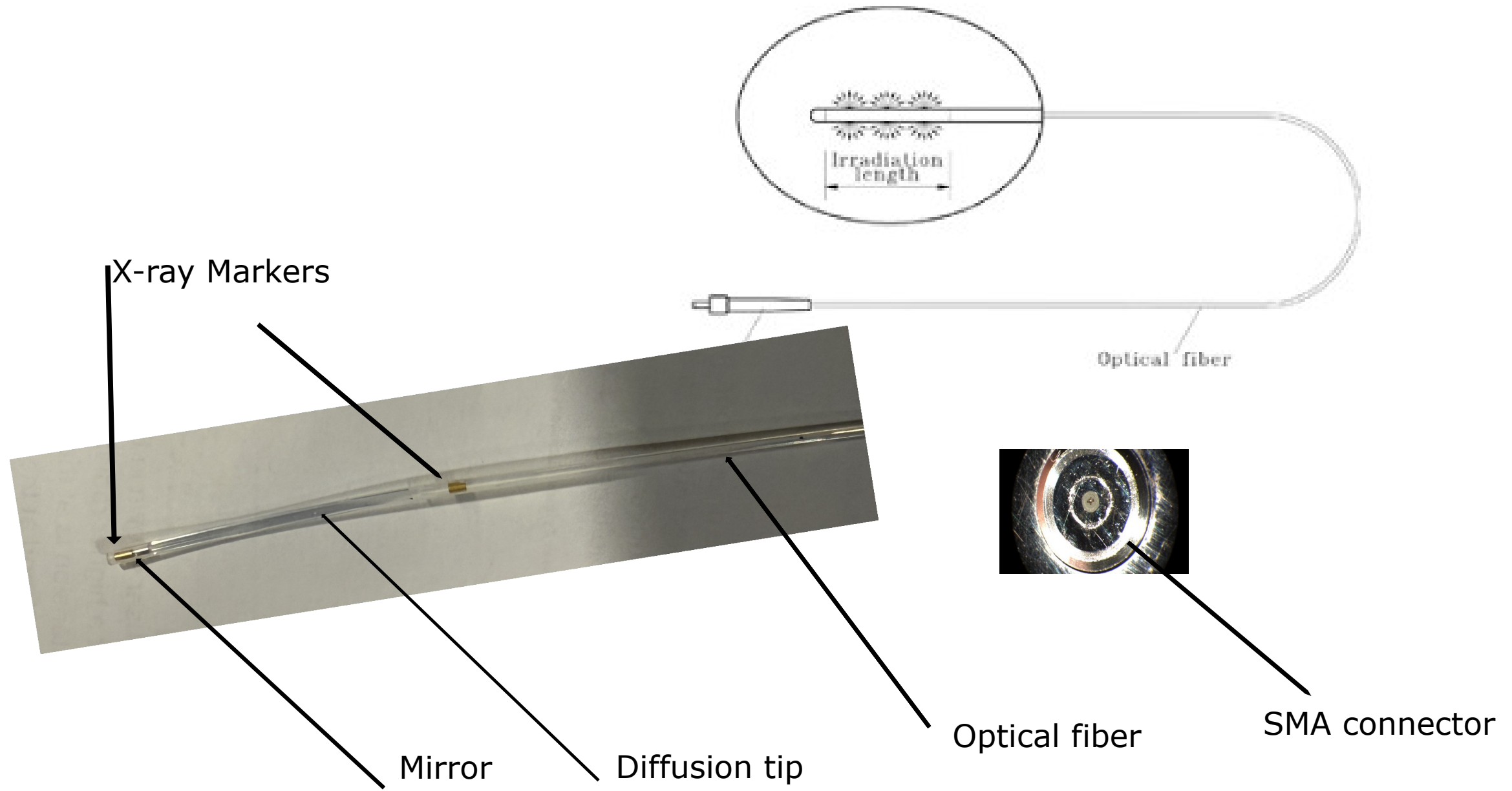


- * • Tumor cell necrosis or apoptosis
- Vascular occlusion
- Enhanced tumor specific host immunity

- Minimal or non-invasive techniques to target the tumor cells.
- Less toxic to the normal cells.
- Cost effective
- No drugs required
- Deep penetration in human tissues

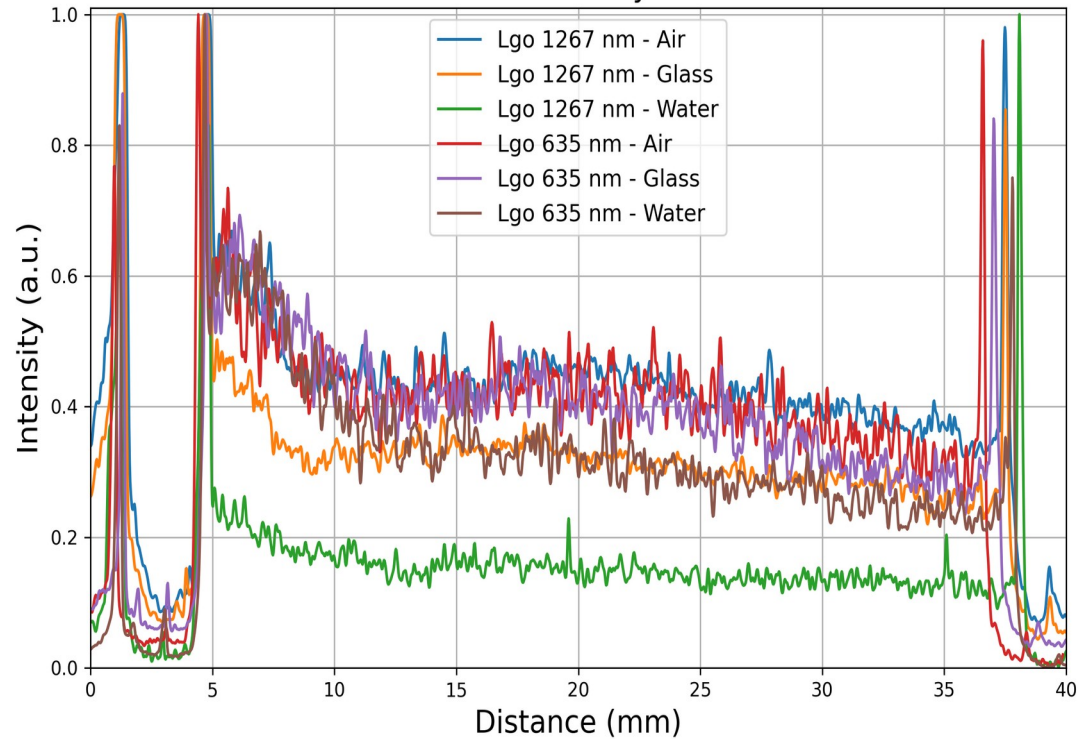
- Optimize the direct light therapy (DLT) for glioma treatment
 - a. Characterization of cylindrical diffuser fibers
 - b. Simulation of light dose distribution and heat distribution in normal brain and tumor tissue.
 - c. Measurement of optical properties brain and tumor tissue.
- Development of the preclinical GlioLighT delivery and sensing system (pcGli-DSS)
- Demonstrate the therapeutic benefits of DLT

Cylindrical Diffusor Fiber

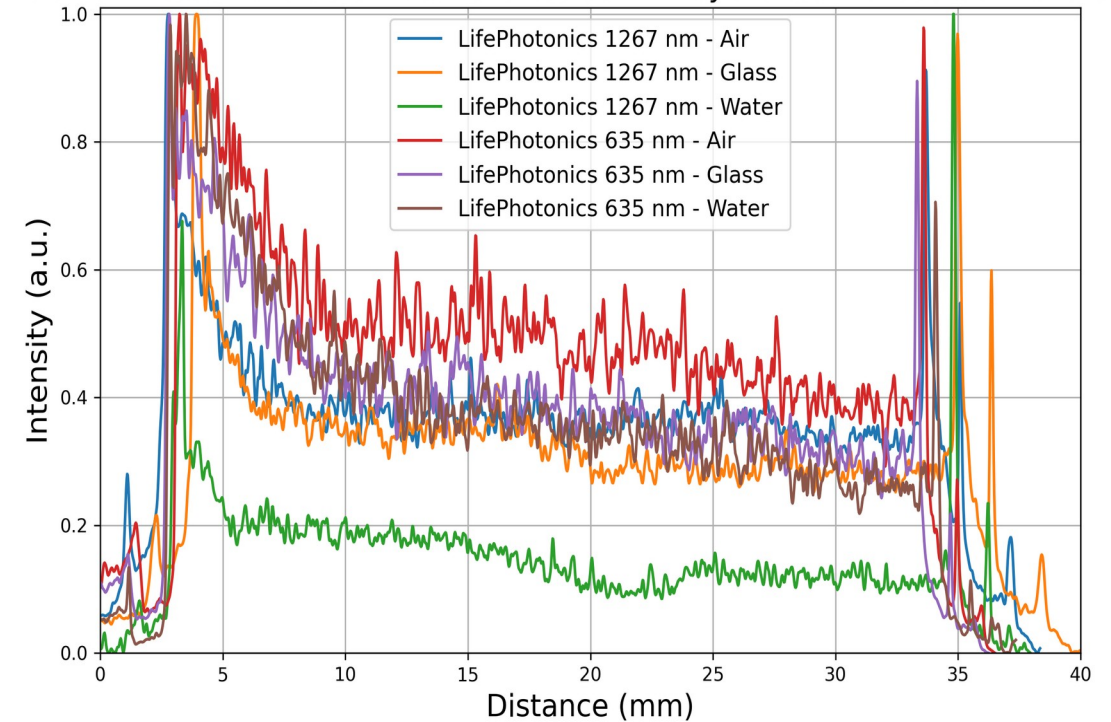


Profiles of Cylindrical diffuser

Normalized Emission Profile of LGO 30 mm Cylindrical Diffusers in Different Media

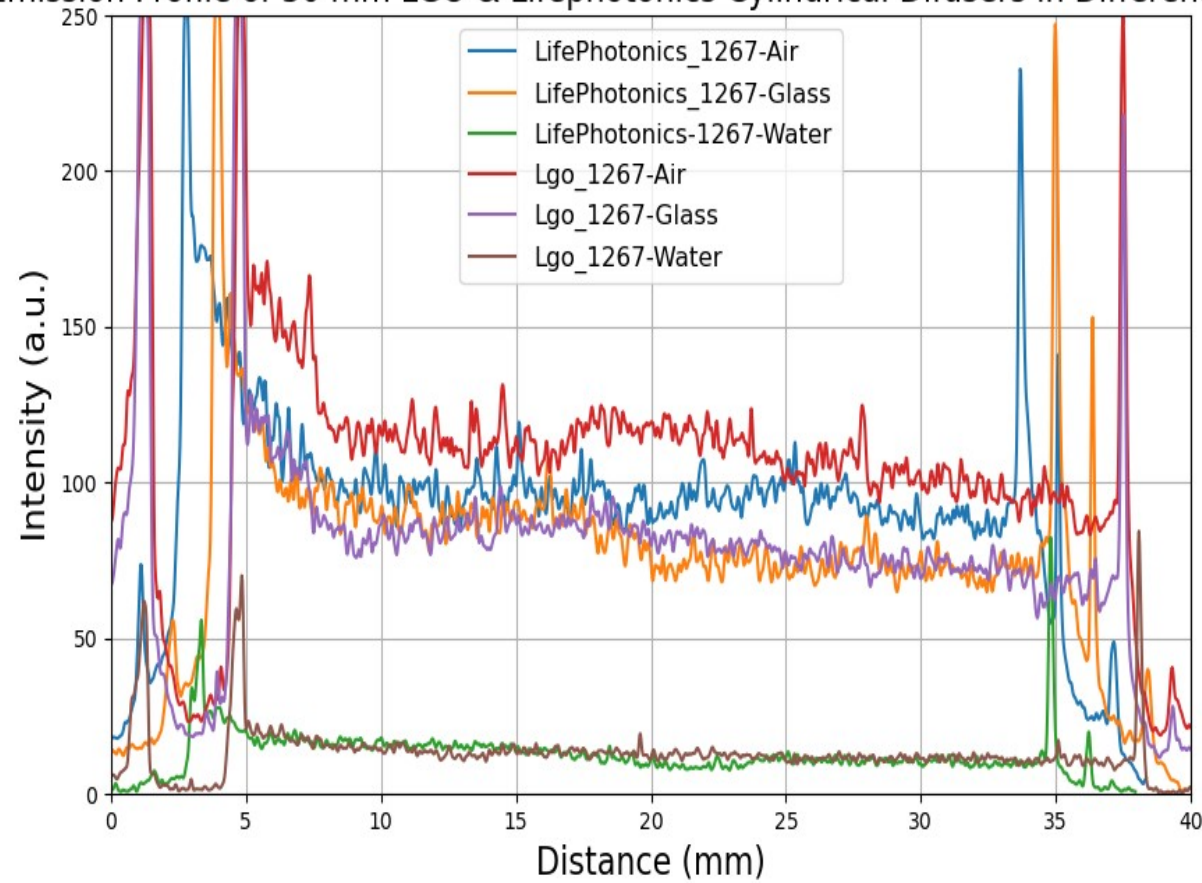


Normalized Emission Profile of LifePhotonics 30 mm Cylindrical Diffusers in Different Media



Profile cont...

Emission Profile of 30 mm LGO & Lifephotonics Cylindrical Difusers in Different Media



Funding Agency and Project partners

Funded by: EU



Project partners



JOHANNES GUTENBERG-
UNIVERSITÄT MAINZ
Germany

GlioLight coordinator.
Leading research on the
mechanisms of action and
protective effects of DLT.



UNIVERSITY OF
BARCELONA
Spain

Leading research on the
potential side-effects and
safety of DLT on the brain



LUDWIG MAXIMILIAN
UNIVERSITY OF MUNICH
Germany

Leading assessment of
optical tissue properties,
treatment, and side effects
of DLT.



ASTON UNIVERSITY
United Kingdom



MODULIGHT OYJ
Finland








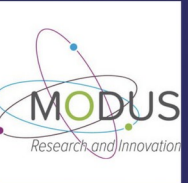
MODUS RESEARCH AND
INNOVATION
United Kingdom

Funding agency and project partners

Funded by: EU



Project partners






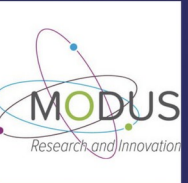
 <p><u>JOHANNES GUTENBERG- UNIVERSITÄT MAINZ</u> Germany</p> <p>GlioLight coordinator. Leading research on the mechanisms of action and protective effects of DLT.</p>	 <p><u>UNIVERSITY OF BARCELONA</u> Spain</p> <p>Leading research on the potential side-effects and safety of DLT on the brain</p>	 <p><u>LUDWIG MAXIMILIAN UNIVERSITY OF MUNICH</u> Germany</p> <p>Leading assessment of optical tissue properties, treatment, and side effects of DLT.</p>
 <p><u>ASTON UNIVERSITY</u> United Kingdom</p>	 <p><u>MODULIGHT OYJ</u> Finland</p>	 <p><u>MODUS RESEARCH AND INNOVATION</u> United Kingdom</p>

Funding agency and project partners

Funded by: EU



Project partners

 <p><u>JOHANNES GUTENBERG- UNIVERSITÄT MAINZ</u> Germany</p> <p>GlioLight coordinator. Leading research on the mechanisms of action and protective effects of DLT.</p>	 <p><u>UNIVERSITY OF BARCELONA</u> Spain</p> <p>Leading research on the potential side-effects and safety of DLT on the brain</p>	 <p><u>LUDWIG MAXIMILIAN UNIVERSITY OF MUNICH</u> Germany</p> <p>Leading assessment of optical tissue properties, treatment, and side effects of DLT.</p>
 <p><u>ASTON UNIVERSITY</u> United Kingdom</p>	 <p><u>MODULIGHT OY</u> Finland</p>	 <p><u>MODUS RESEARCH AND INNOVATION</u> United Kingdom</p>

1.Thank you for your attention !!!!