LIGHT CONVERSION

Manufacturer of Industrial Femtosecond Lasers & Scientific Laser Systems

Name: Martynas Barkauskas

Date: 11 October 2021

Who we are

Established **27 years** ago with roots in **Vilnius** University Laser Research Center

Privately owned company

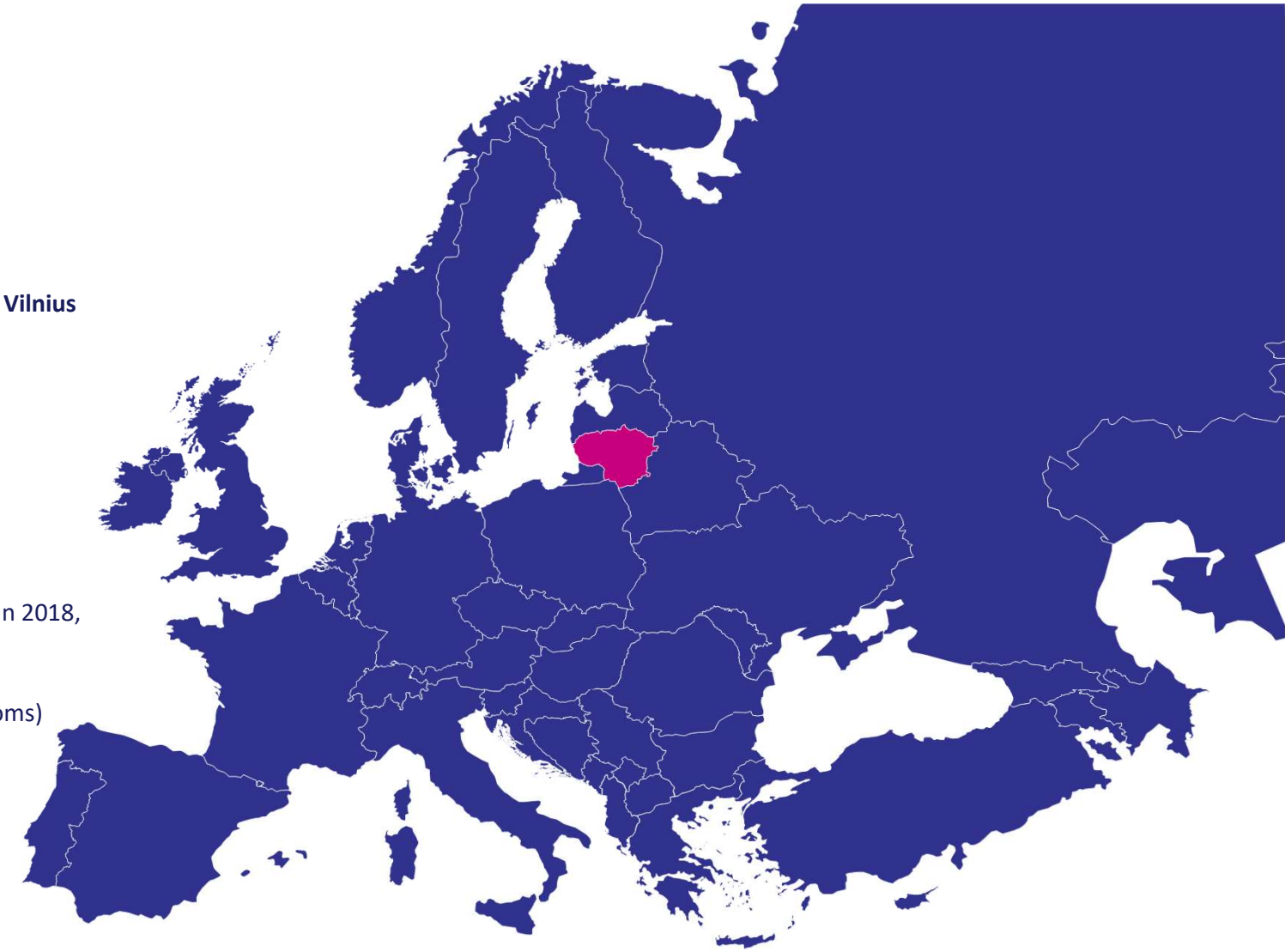
Turnover **>65 M€**

>300 employees

New facilities and machinery opened in 2018, optimized for high volume production

Total space **6500 m²** (600 m² clean rooms)

To be doubled/tripled by end of 2021



What we do

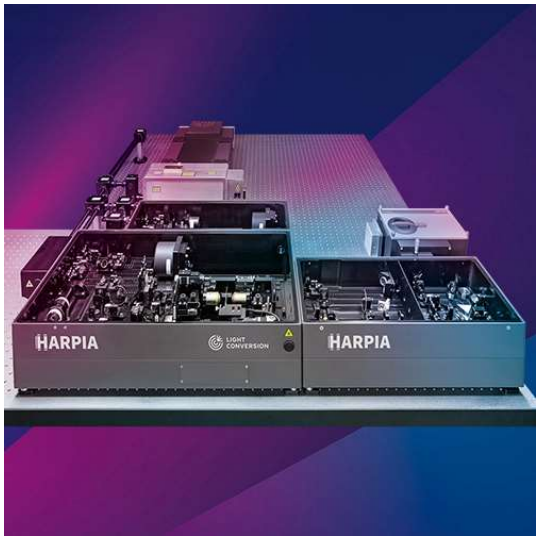
FOCUS ON FEMTOSECONDS

Lasers: PHAROS CARBIDE

Optical Parametric Amplifiers: TOPAS ORPHEUS

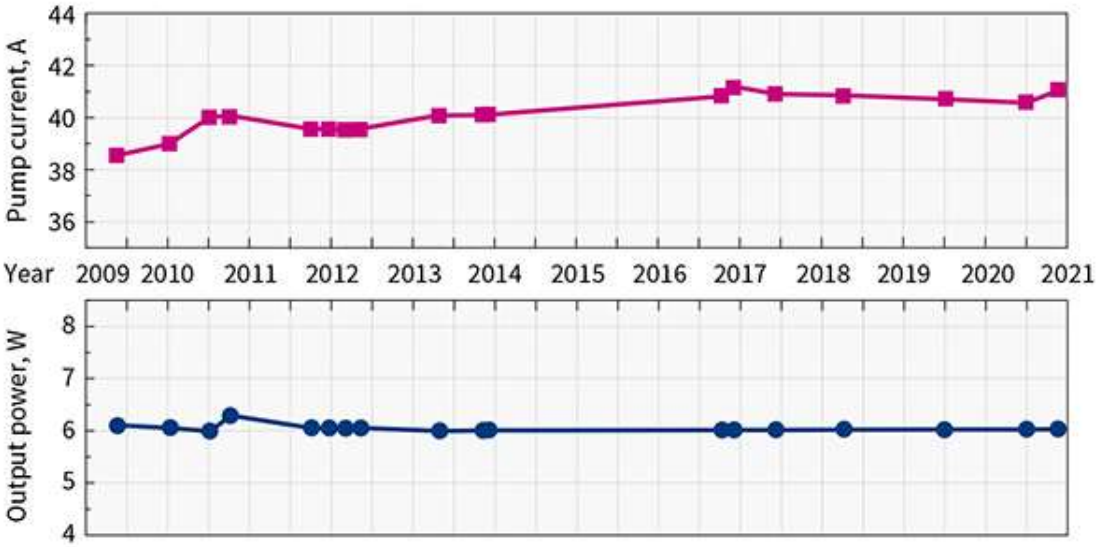
Complete spectroscopy solutions: HARPIA

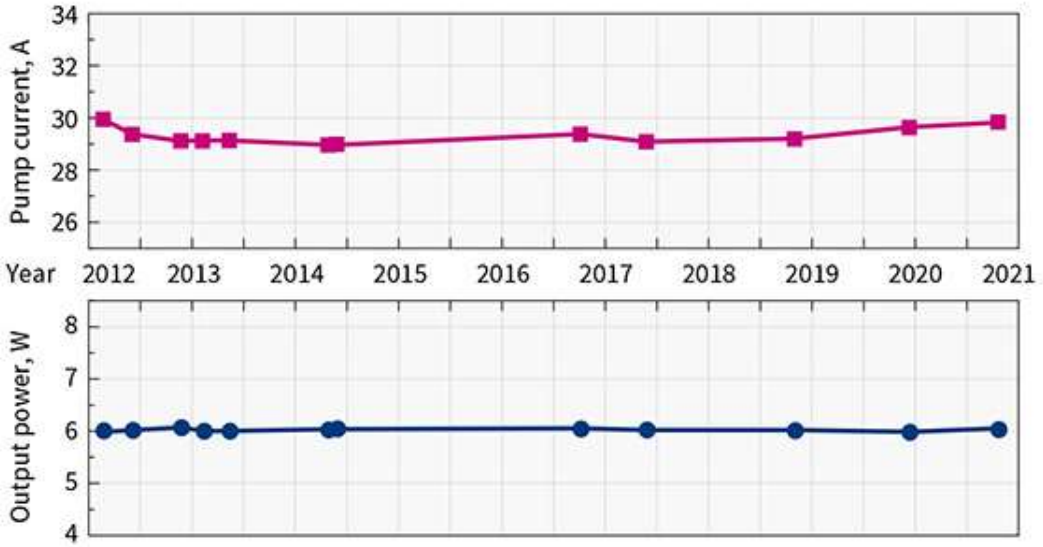
OPCPA, locking to synchrotrons, CEP and other custom solutions



Data from industrial customer. Many tens of lasers operating at 24/7.

The pump current does not grow even when the laser is operating at 24/7 since 2009.





Applications of fs lasers in eye surgery

- LASIK flap creation
- cataract surgery
- correction of myopia (FLEx, SMILE)
- presbyopia treatment
- corneal transplantation

- First results on femtosecond UV laser for corneal stromal ablation:
  - predictable depth, good healing outcomes[1]
- New data on high-speed (1.6 D/s)[2] TransPRK (transepithelial photorefractive keratectomy) in rabbits.

[1]Danieliene E, Gabryte E, Danielius R, Vengris M, Vaiceliunaite A, Morkunas V, Ruksenas O. Corneal stromal ablation with femtosecond ultraviolet pulses in rabbits. J Cataract Refract Surg 2013; 39:258–267

[2]Danieliene E, Gabryte E, Vengris M, Ruksenas O, Gutauskas A, Morkunas V, Danielius R. High-speed photorefractive keratectomy with femtosecond ultraviolet pulses. J Biomedical Optics 2015; 20, 051037

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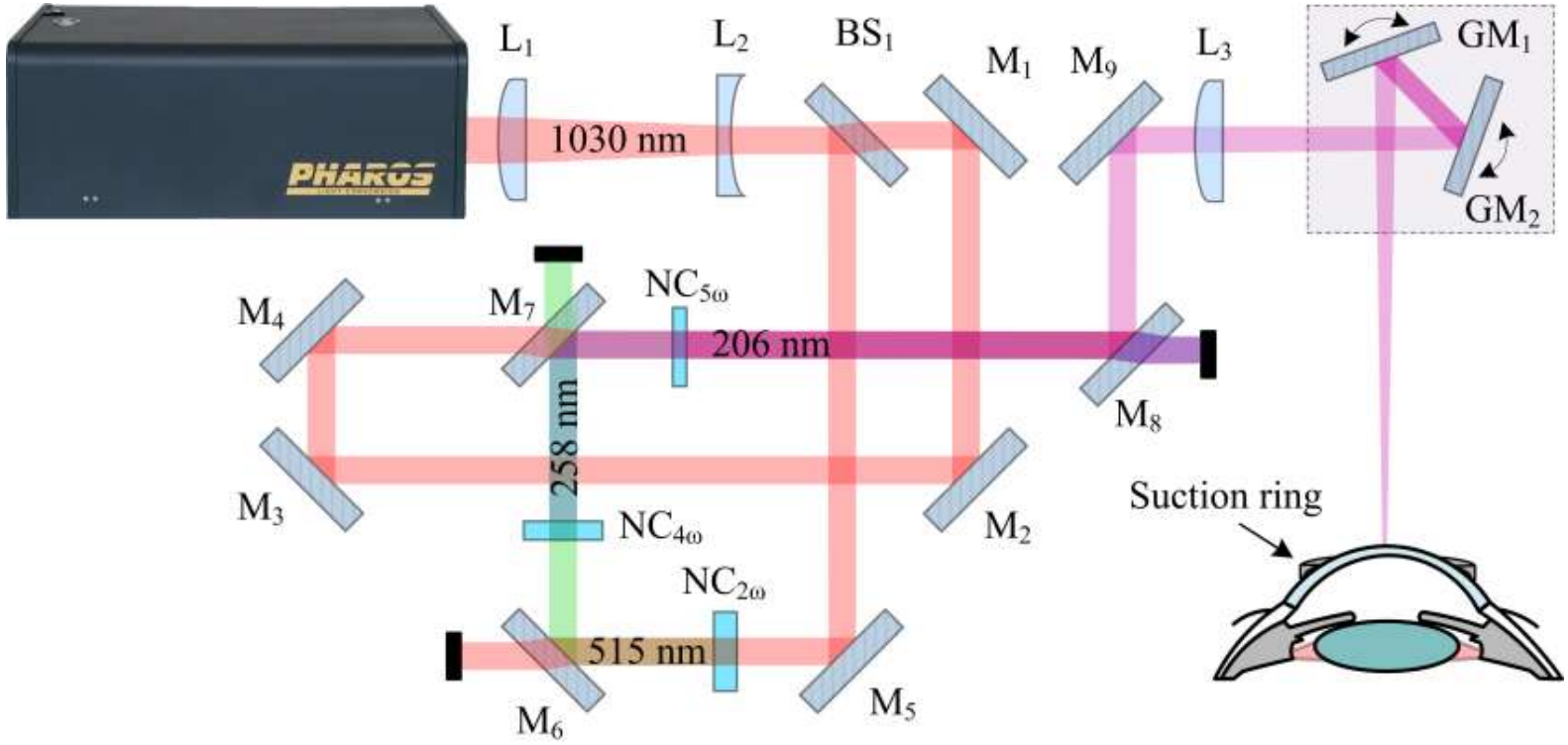
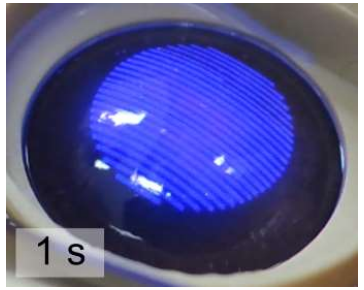
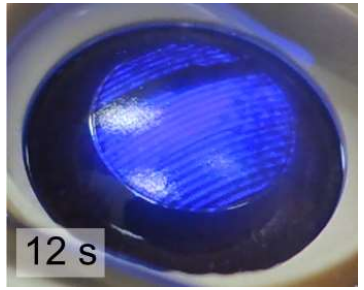
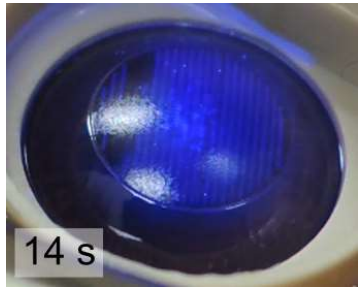
Solid-state femtosecond UV laser system



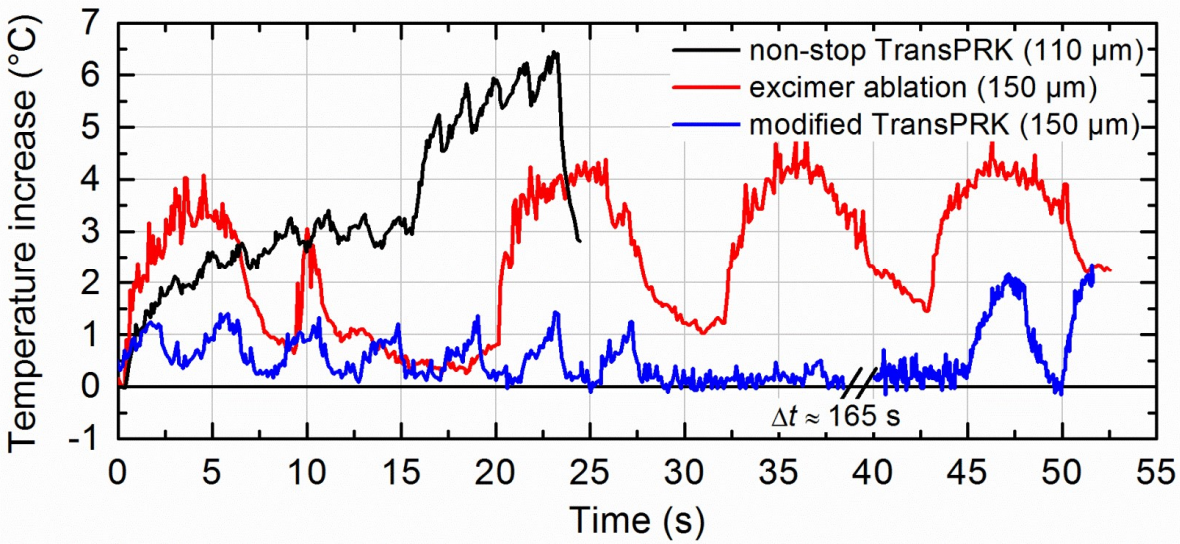




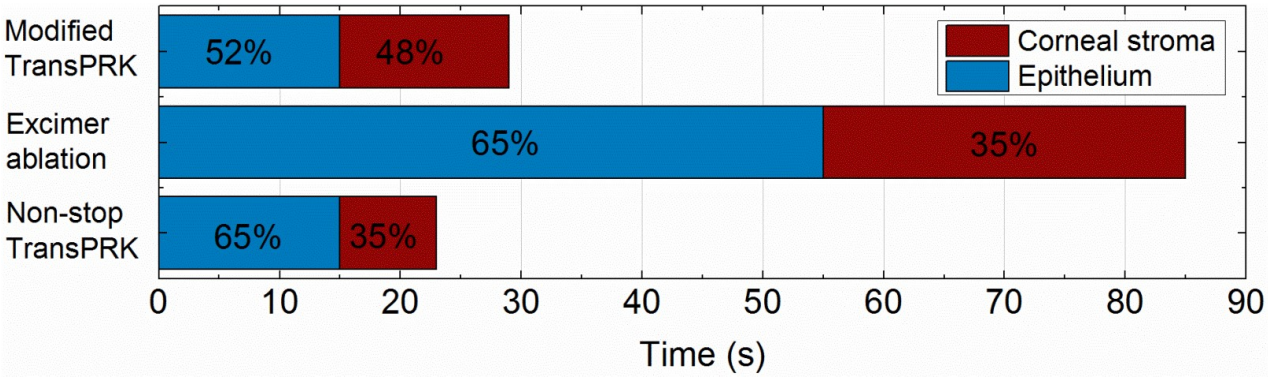


- **193 nm vs. 206 nm -> much lower water absorption.**
- **Excimer vs. fs-UV -> higher frequency, lower spot size, potentially better shape control**
- **Single laser source for fs-IR applications and UV ablation**

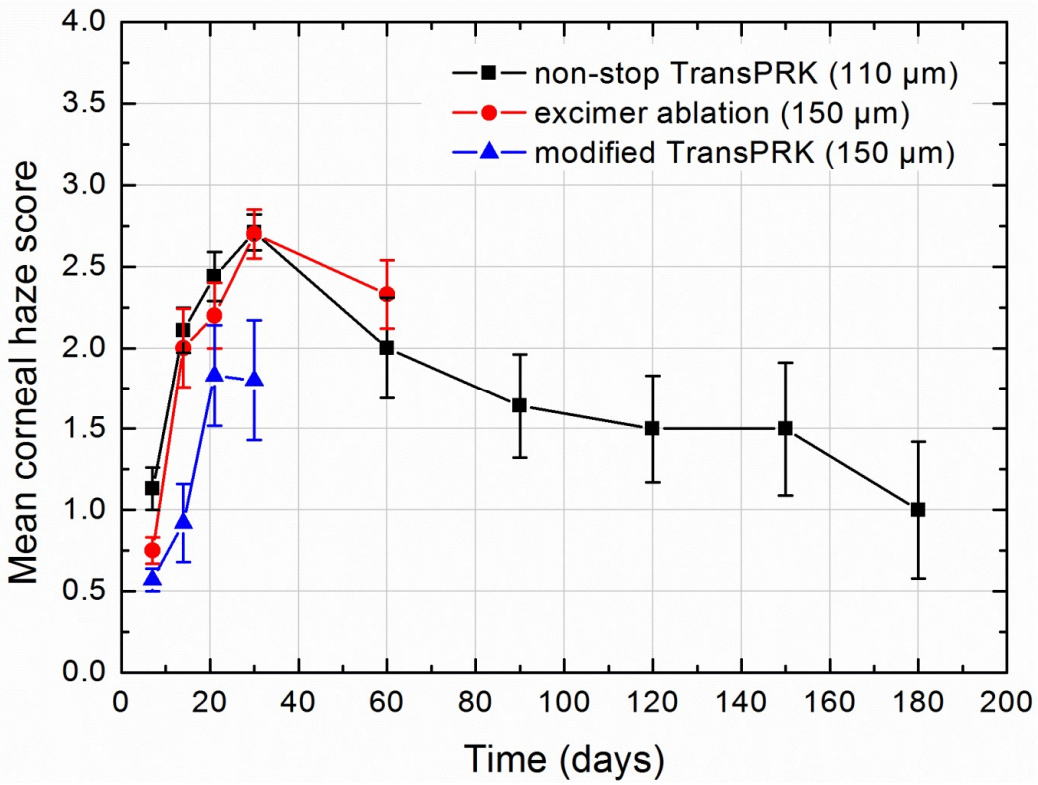
Dynamics of the corneal surface temperature



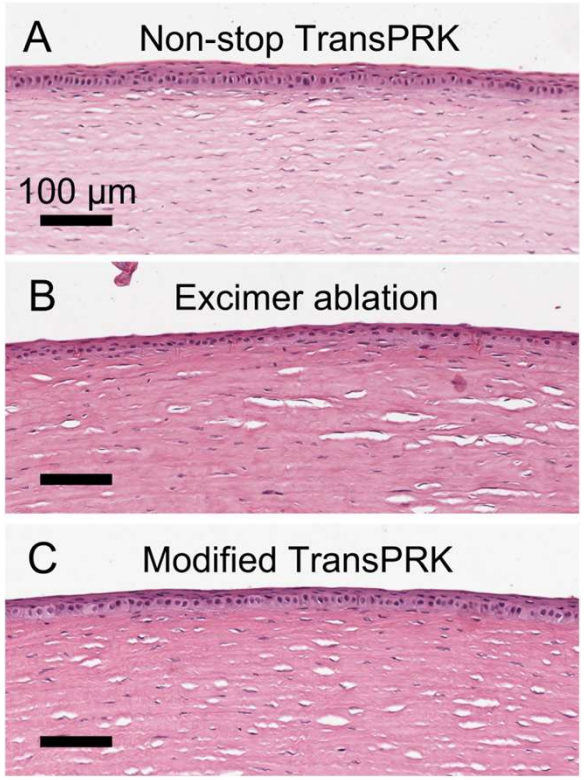
Durations of laser treatments (pauses excluded)



Healing outcomes



Corneal haze was graded according to the Fantes scale[2].



Histological cuts of rabbit cornea, taken one month after laser treatment.

[2]Fantes FE, Hanna KD, Waring GO, Pouliquen Y, Thompson KP, Savoldelli M. Wound healing after excimer laser keratomileusis (photorefractive keratectomy) in monkeys. Arch Ophthalmol 1990; 108:665–675

The EPIC questions

- **On customer side:**
  - **We are looking for brave companies, who would be willing to partner in putting a fs UV ablation system on the market, with potential to make it a single laser source-based system (replacing Excimer + femto)**

- **On supplier side:**
  - **Any experience in long-lifetime UV optics is always interesting.**

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Thank you!

Do you have a femtosecond?

MB@LIGHTCON.COM