GLOphotonics

The Hollow-Core PCF & Photonic MicroCell™ company

Light with Purpose: Harnessing Hollow Core Fiber for High-Precision Micromachining

26th September 2024

EPIC

EUROPEAN PHOTONICS INDUSTRY CONSORTIUM

MULTISECTORIAL PRODUCT MIX

GLOphotonics HCPCF and PMC technology is equally a platform and key-nabling technology.

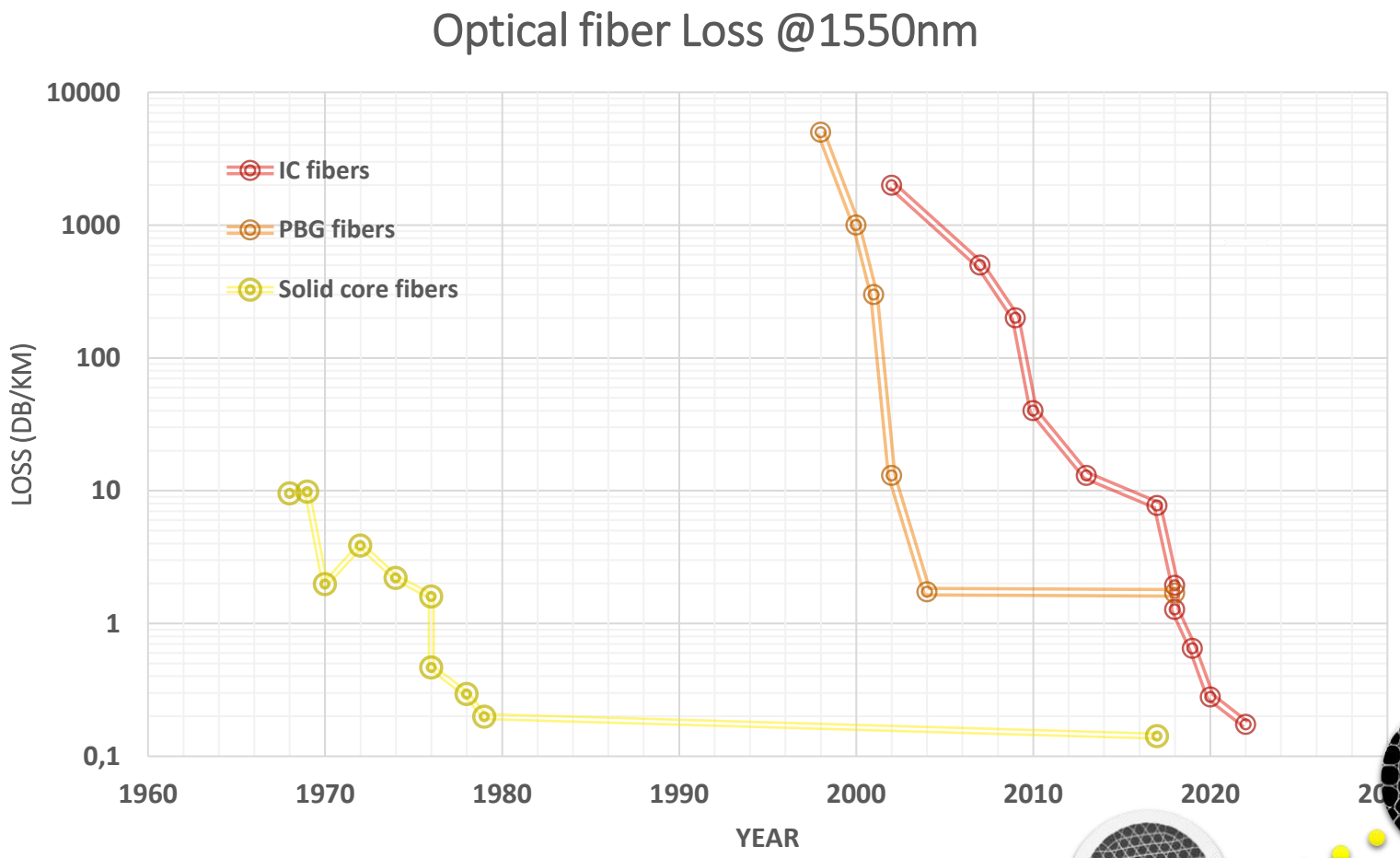
A feature, reflected in GLOphotonics products, service and offering.

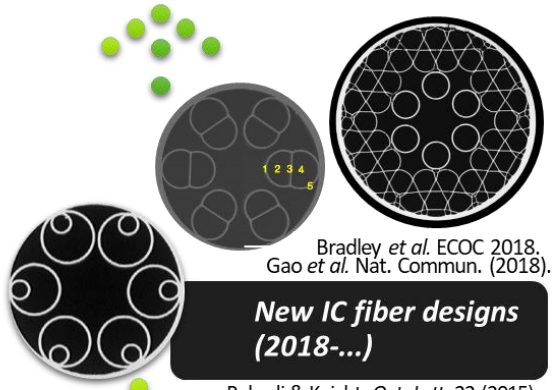
- **HOLLOW CORE PHOTONICS CRYSTAL FIBER & PHOTONIC MICROCELL™**
- **BEAM DELIVERY**
- **PULSE COMPRESSION**
- **FREQUENCY CONVERSION & LASERS**
- **QUANTUM TECHNOLOGY**
- **TELECOM**
- **TECHNOLOGY SOLUTIONS**

Few words about GLOphotonics

- Limoges since 2011
- 15 Employees
- 150m² of clean room
- 1 drawing tower
- Strategic partnership with CNRS (French National Science Agency)
- Manufacturer & supplier of Hollow Core Photonic Crystal fiber solution

Fiber Optic Today : a new paradigm





Bradley *et al.* ECOC 2018.
Gao *et al.* Nat. Commun. (2018).

New IC fiber designs (2018-...)

Belardi & Knight, *Opt. Lett.* 22 (2015)
Poletti, *Opt. Express* 22 (2014)
Amrani *et al.* Light Sci. Appl. 10, 7 (2021)

Pryamikov et al. Opt. Express **19**, (2011).
Vincetti & Setti Opt. Express **18**, (2010).

Single-ring tubular lattice fibers (2011)

A. D. Pryamikov et al. Opt. Express **19**, (2011).

Negative curvature concept (2010)

Wang *et al.*
CLEO 2010, CPDB4.

Wang *et al. Opt. Lett* .36 (2011).

Inhibited coupling (IC) guidance (2002)

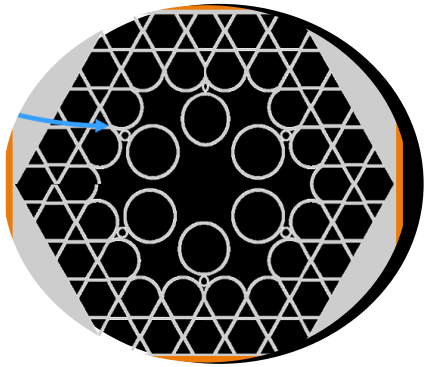
Couny *et al. Science* **2007**, 318, 1118–1121.

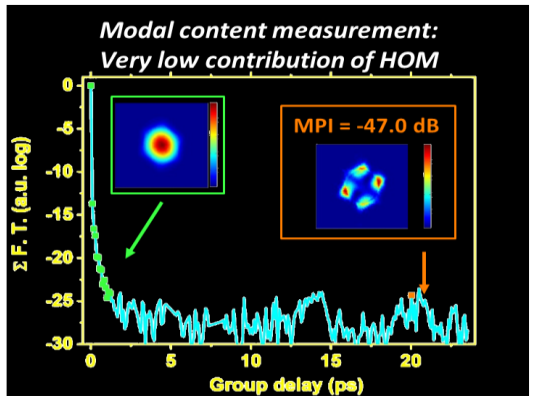
Benabid *et al. Science* **2002**, 298, 399–402.

Loss is great but.. what about other useful feature for Micromachining beam delivery

Single modeness

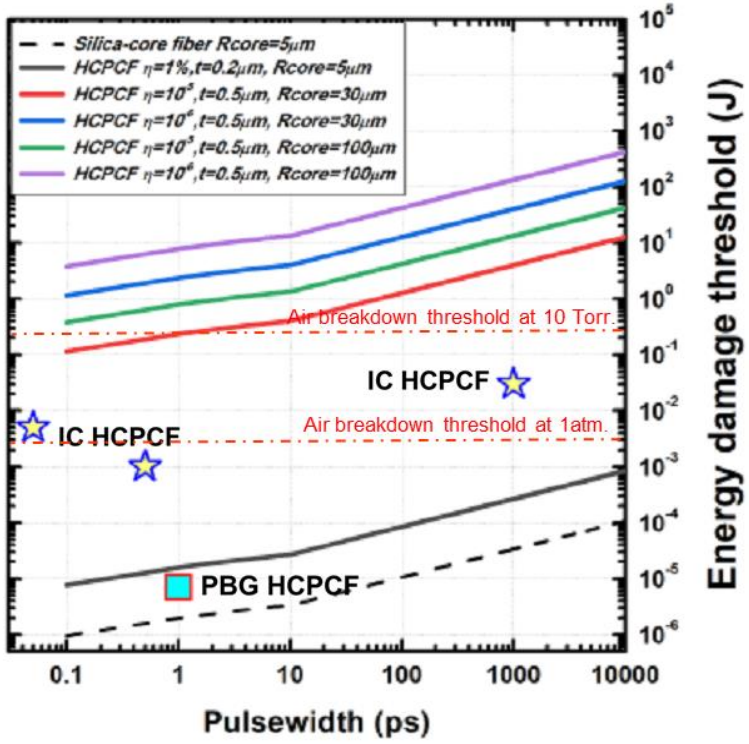
Today standard fiber@1µm is 30dB HOM extinction ratio
But new design are coming





High Damage threshold

LIDT subject to laser beam and coupling condition…below is the perfect matching limit



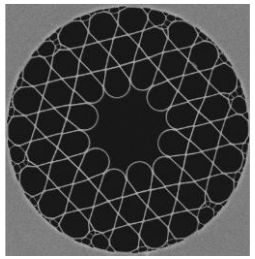
Standard fiber at GLO

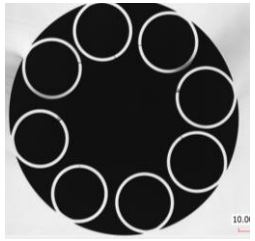
OEM-Fiber

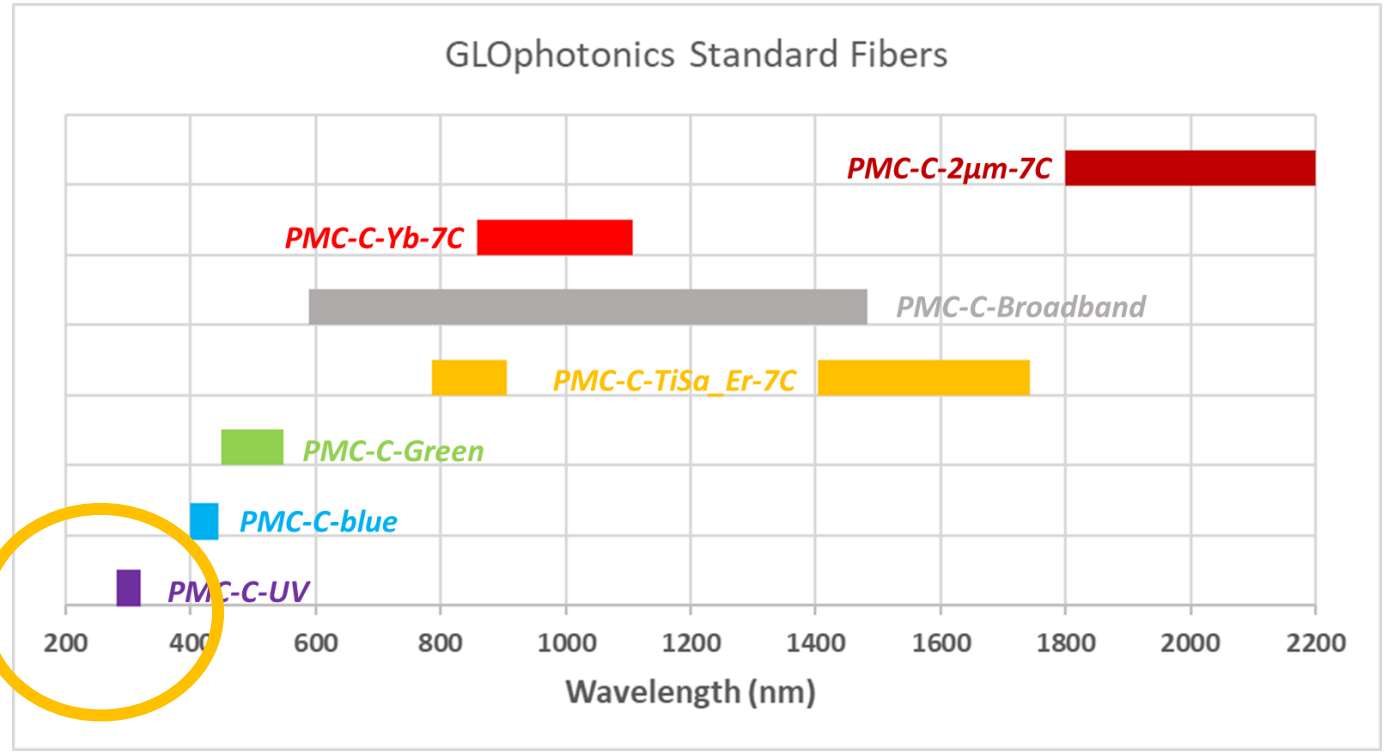
Features
- Hollow-core fiber
- Pure silica microstructured fiber
- Output M^2 <1.2
- Low dispersion : -5/+5 ps/nm.km
- High energy handling
- High average power handling

General Tolerances
- Core size : +/-3um
- OD : +/-3um
- Core concentricity : +/- 1um
- Length tolerance: -0 / +10cm
- Batch mechanical test : 50kpsi

Options
- Special development on request (minimum 500m)

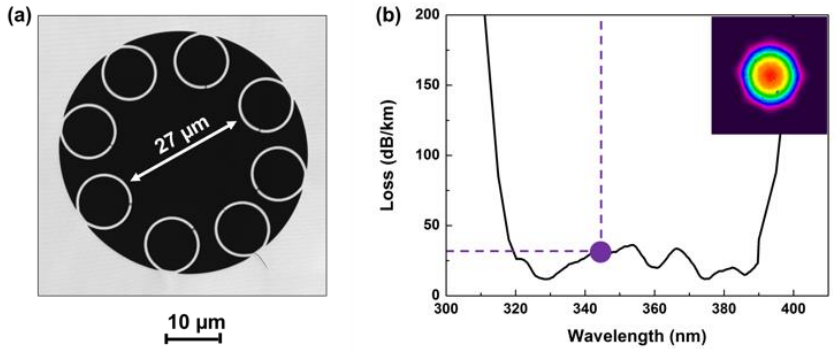


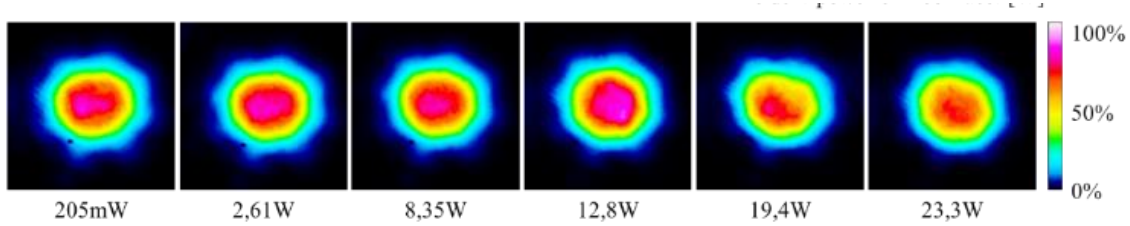


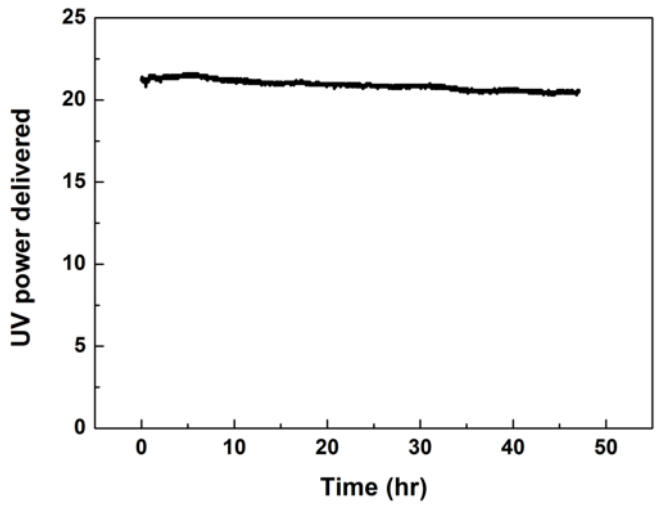


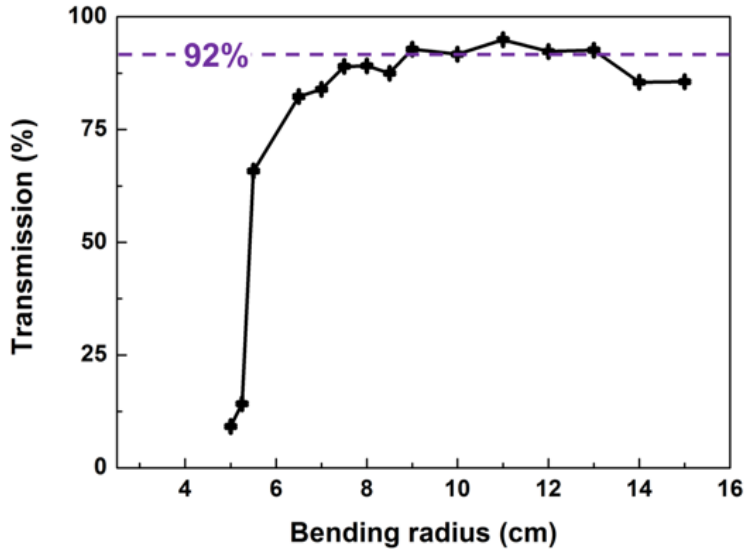
Solarization free UV fiber

343nm (133µJ,10ns,150kHz)



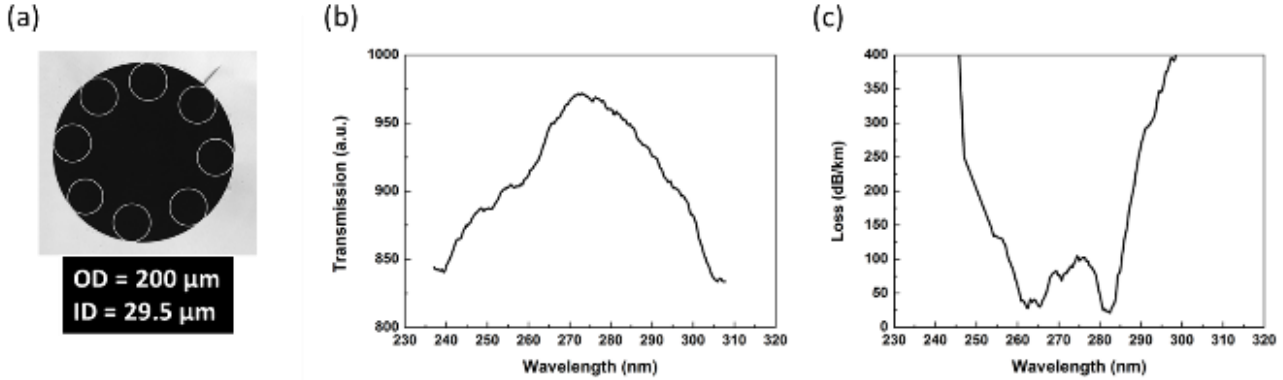




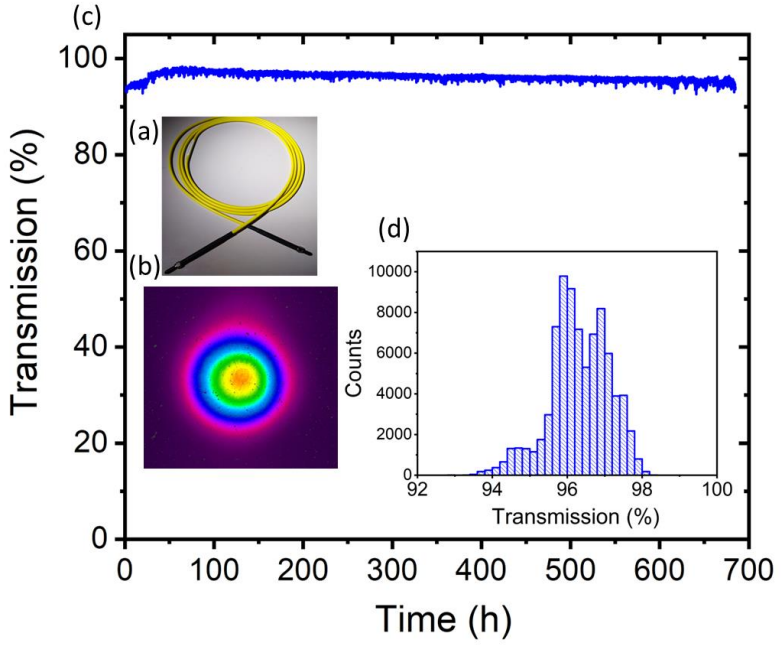


Solarization free UV fiber

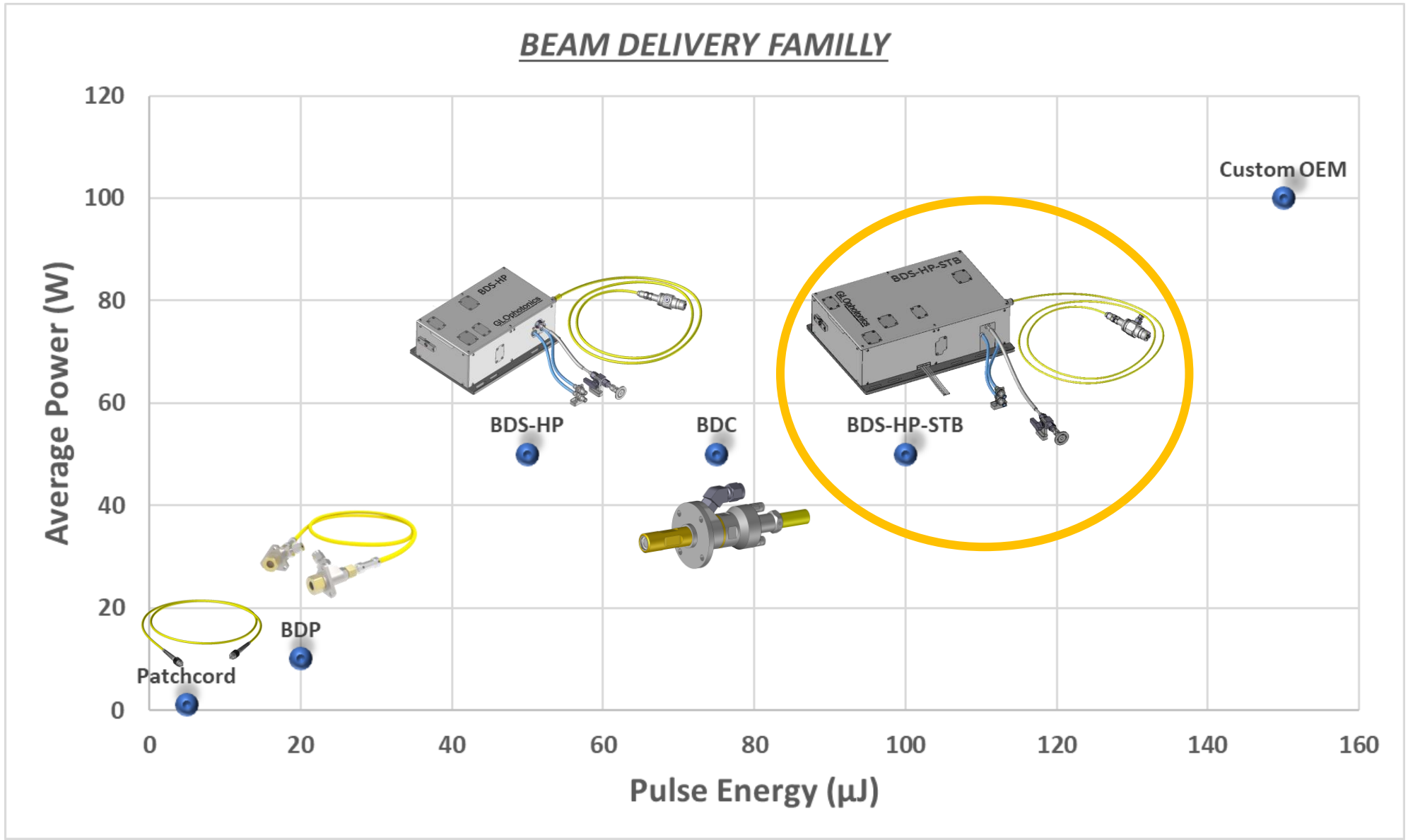
266nm (50µJ,10s,1Hz)



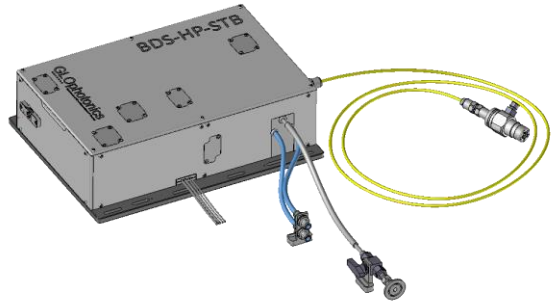
If someone have a fs UV laser I can borrow for a few month ;)

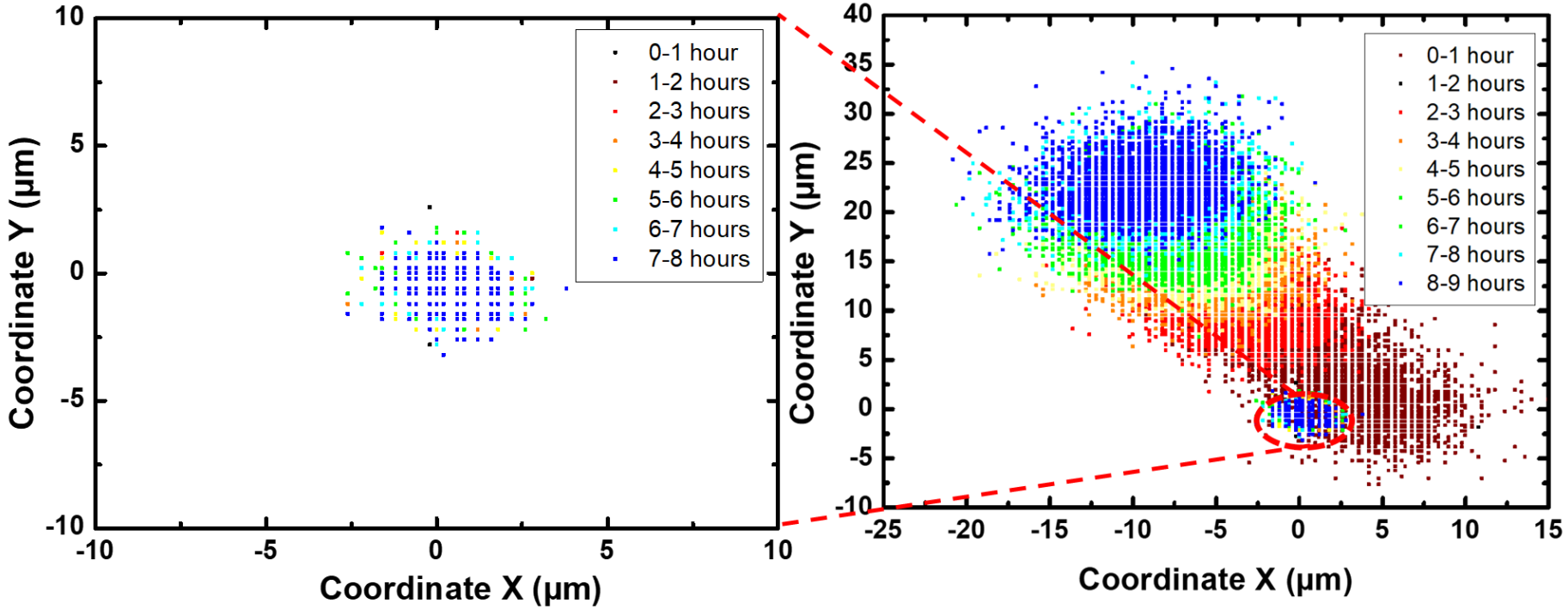


GLO beam delivery offer:

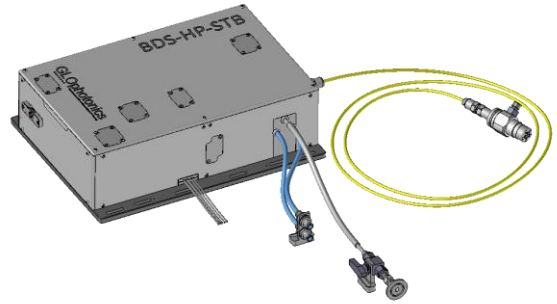


BDS-HP-STB….STB-for input beam stabilization

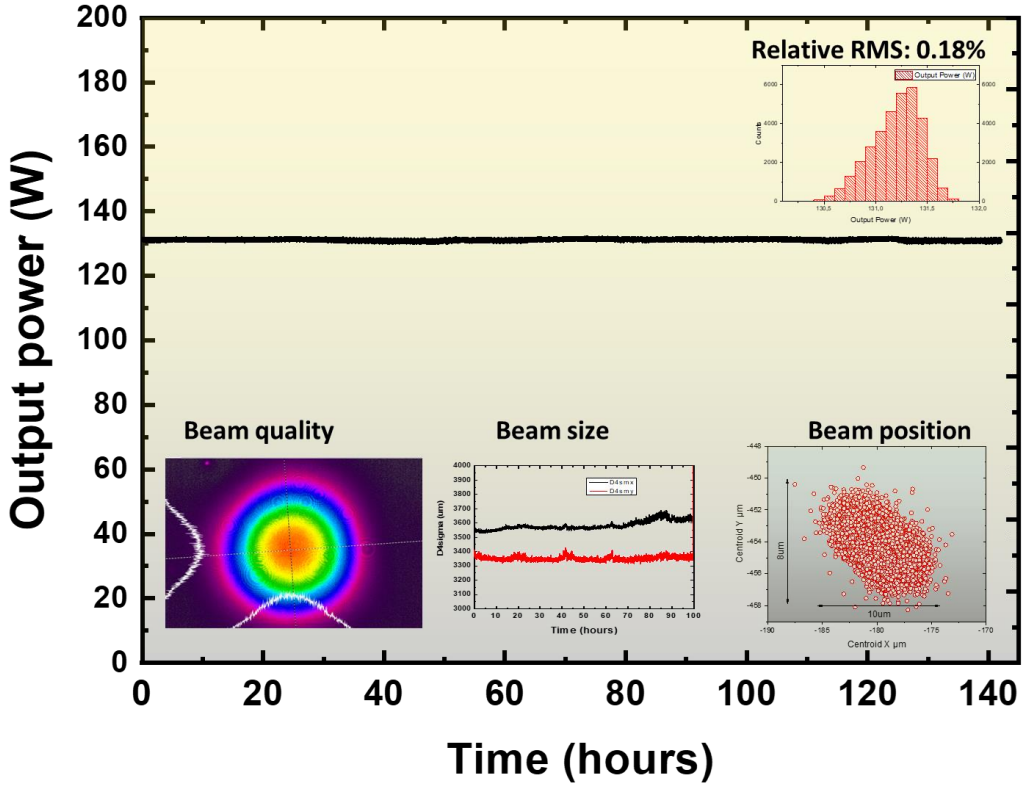




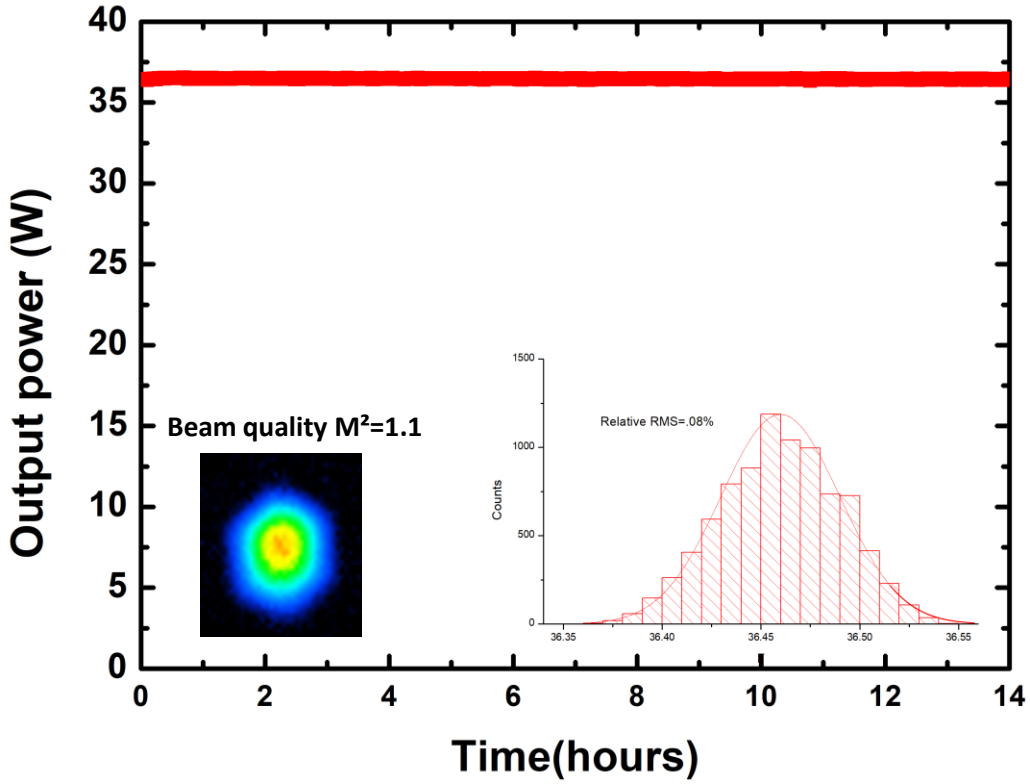
Which is give you output stability



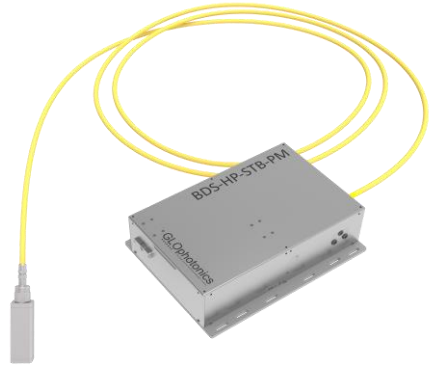
150 CW

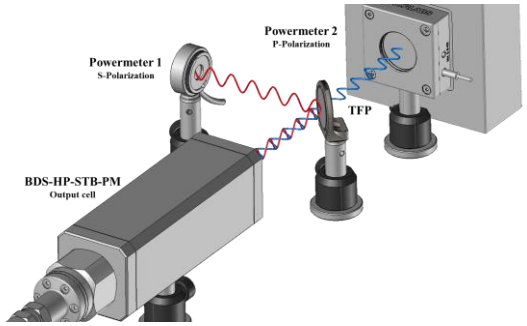


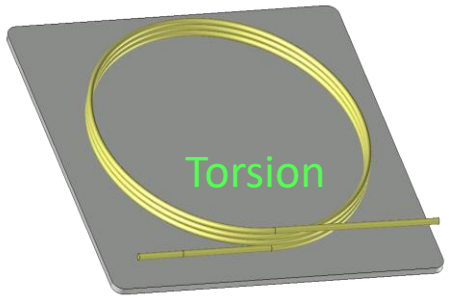
40W , 300fs, 100kHz

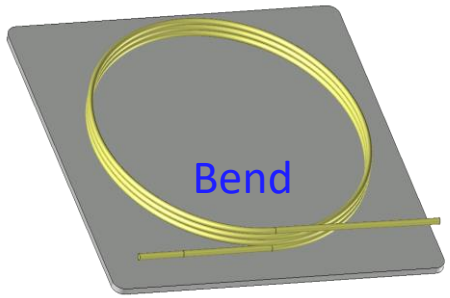


Is PM Ultrafast beam delivery doable?

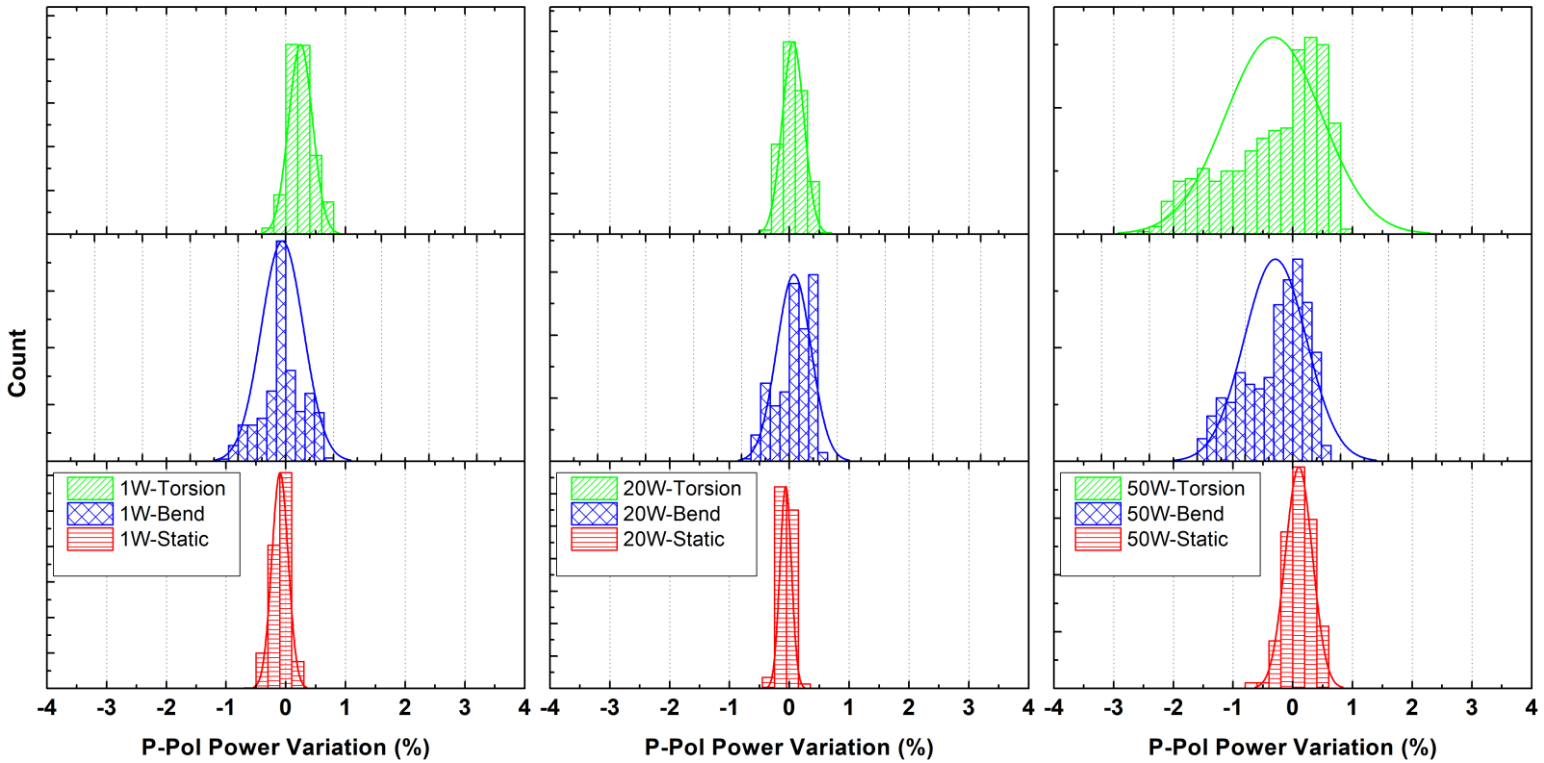






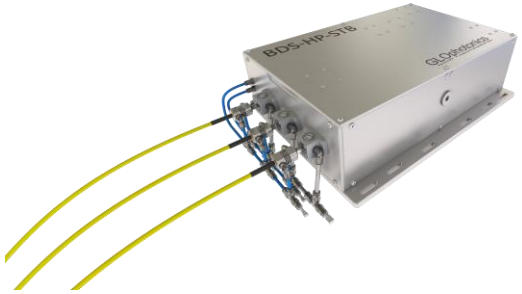


1W / 2µJ — 20W /53 µJ — 50W / 133µJ

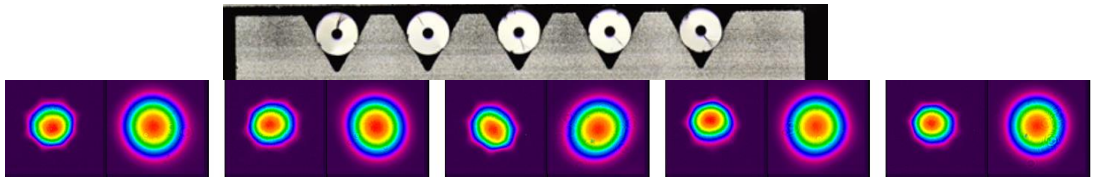


Could we cover other need or add flexibility to micromaching?

- Beam sharing?



- Parallel processing (fiber bundling)?



Axial accuracy <3µm
Longitudinal accuracy <5µm

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Thank you for Attention