# 21 digits.

Difference Frequency Comb




## World record stability...
## ... has never been easier!

Award-winning CERO ("zero-$f_{CEO}$") technology

Download scientific paper!

TOPTICA

**www.toptica.com/dfc**

# DFC CORE +

## Compact high-performance frequency comb



DANGER – VISIBLE AND INVISIBLE LASER RADIATION, AVOID EYE OR SKIN EXPOSURE TO DIRECT OR SCATTERED RADIATION, CLASS 3B LASER PRODUCT, ACCORDING TO EN 60825-1:2014 +A11:2021 / IEC 60825-1:2014

| Specifications | DFC CORE + | |
|---|---|---|
| Center wavelength | 1560 nm (420 nm .. 2200 nm available via extensions, see website) | |
| Comb spacing | 200 MHz or 80 MHz | |
| Laser outputs | 4 or 8, fiber coupled, polarization maintaining, FC/APC | |
| Bandwidth | 20 nm (FWHM; each output) | |
| Power | > 10 mW, each output | > 36 nm (- 10 dB; each output) |
| Offset frequency $f_{CEO}$ | $f_{CEO}$ = 0, by passive stabilization via difference frequency generation | |
| Integrated phase noise $f_{CEO}$ | < 40 mrad [100 Hz..2 MHz], < 65 mrad [70 mHz..20 MHz] | |
| Linewidth @ 1560 nm | < 1 Hz * | |
| Lock bandwidth $f_{rep}$ | 600 kHz* | 10 kHz** |
| Stability | $5 \cdot 10^{-18}$ in 1s *, $5 \cdot 10^{-20}$ in 1000 s* | $1 \cdot 10^{-13}$ in 1 s** |
| Accuracy | $1 \cdot 10^{-18}$ for $\tau$ > 100 s* | $1 \cdot 10^{-14}$ for $\tau$ > 100 s** |
| Frequency reference | optical reference or RF reference (both optional) | |
| Reference input | · 800 MHz for RF reference<br>· 10 MHz with DFC RF<br>· high bandwidth $I_{mod}$ (DC to 10 MHz) for optical reference | |
| Dimensions (H x W x D) | 133 x 450 x 633 $mm^3$, incl. electronics | |
| Cooling requirements | Air cooled | |
| Power consumption | < 110 W | |
| Operating temperature | 21 ± 4 °C | |
| Weight | < 32 kg | |
| Input voltage | 100 - 240 V ~, 50/60 Hz | |
| Control computer | Laptop, Windows operating system, English | |

* Phase-locked to optical reference, ** Phase-locked to RF reference

