high repetition rate

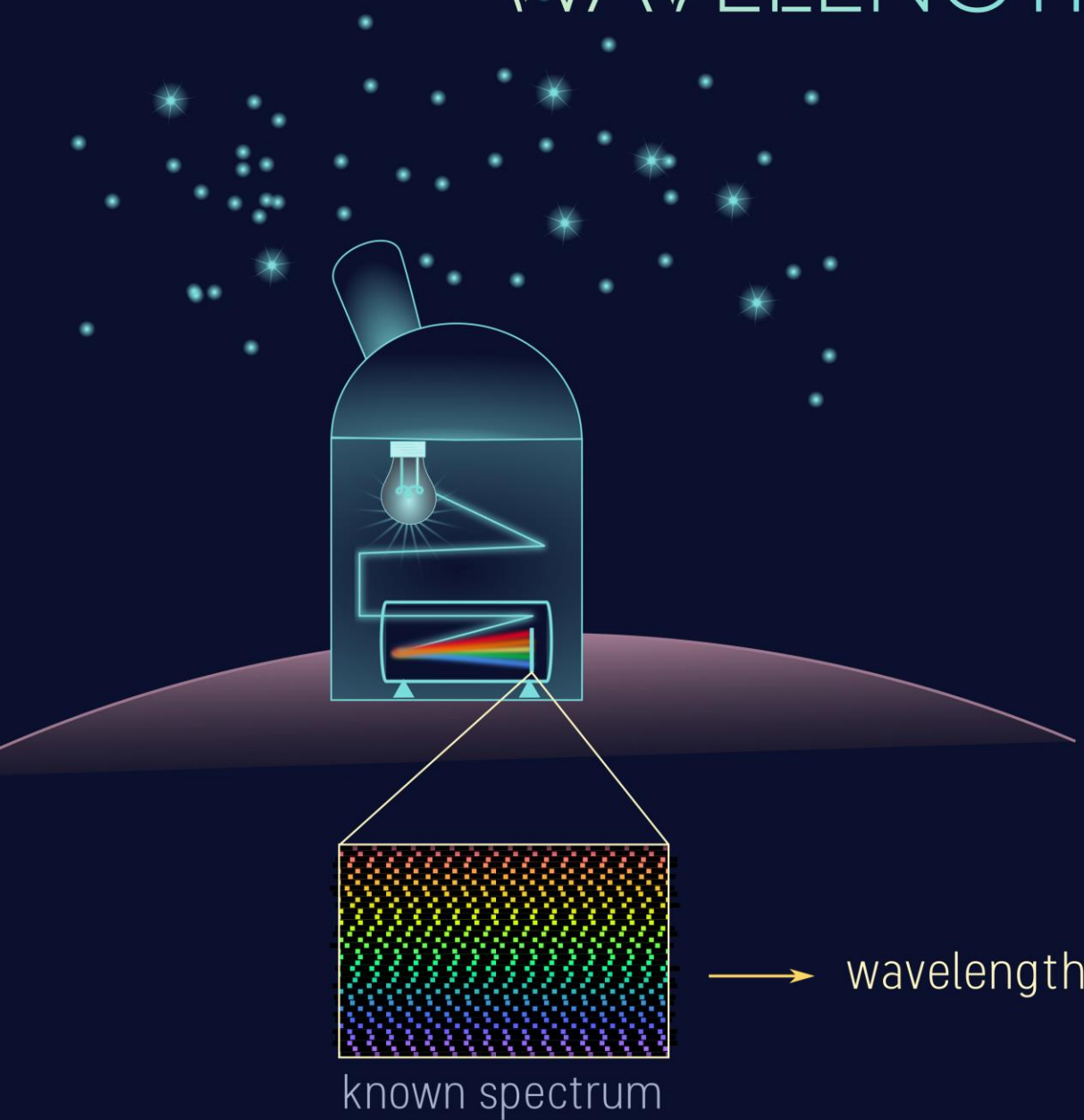
LASER FREQUENCY COMBS

for calibration of VIS and NIR spectrographs

Ewelina Obrzud

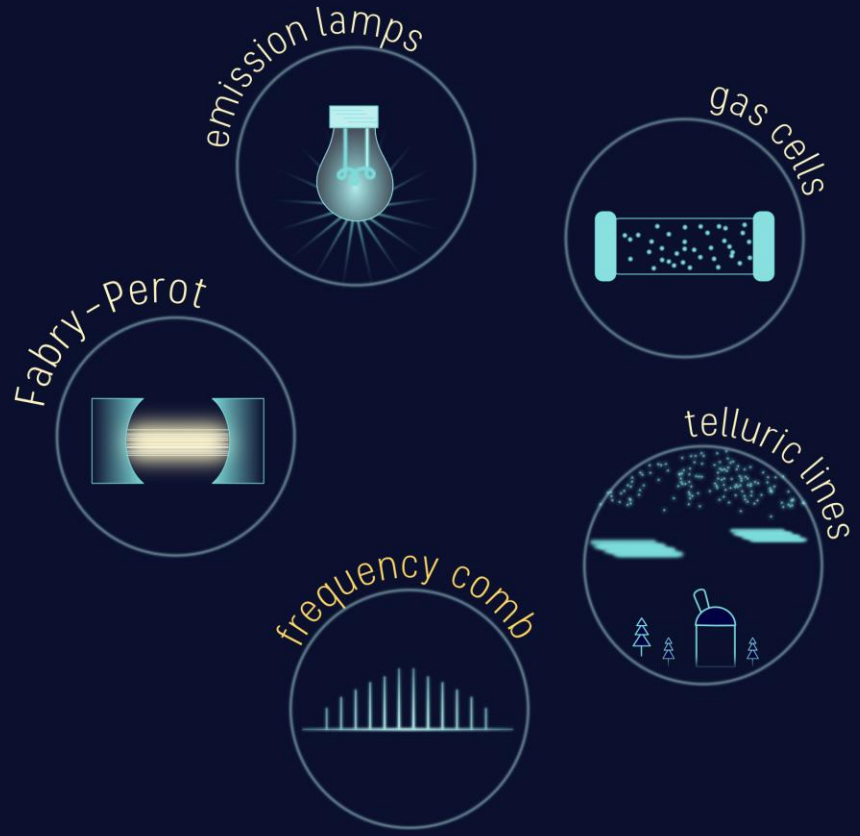
csem

WAVELENGTH CALIBRATION

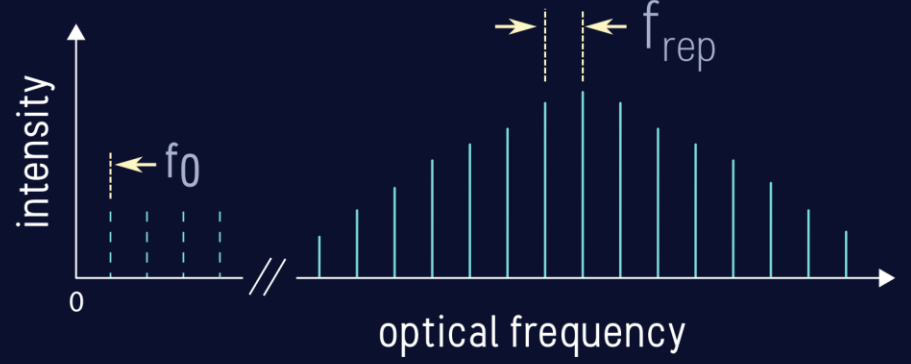


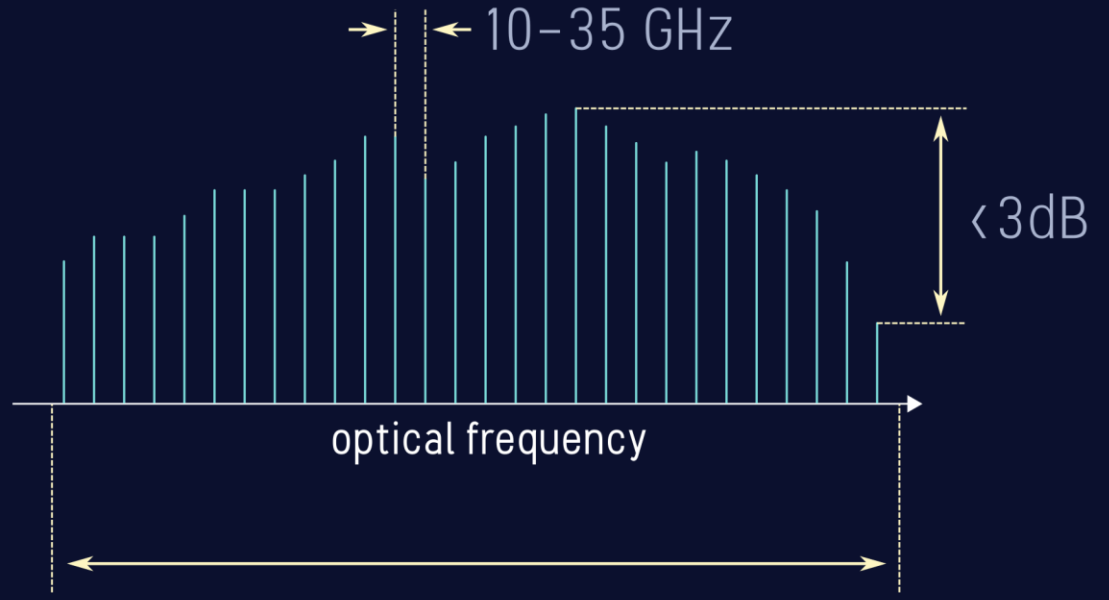
known spectrum

wavelength (pixel)



FREQUENCY COMB → ASTROCOMB





$$\nu_n = n\, f_{rep} + f_0$$

SI second

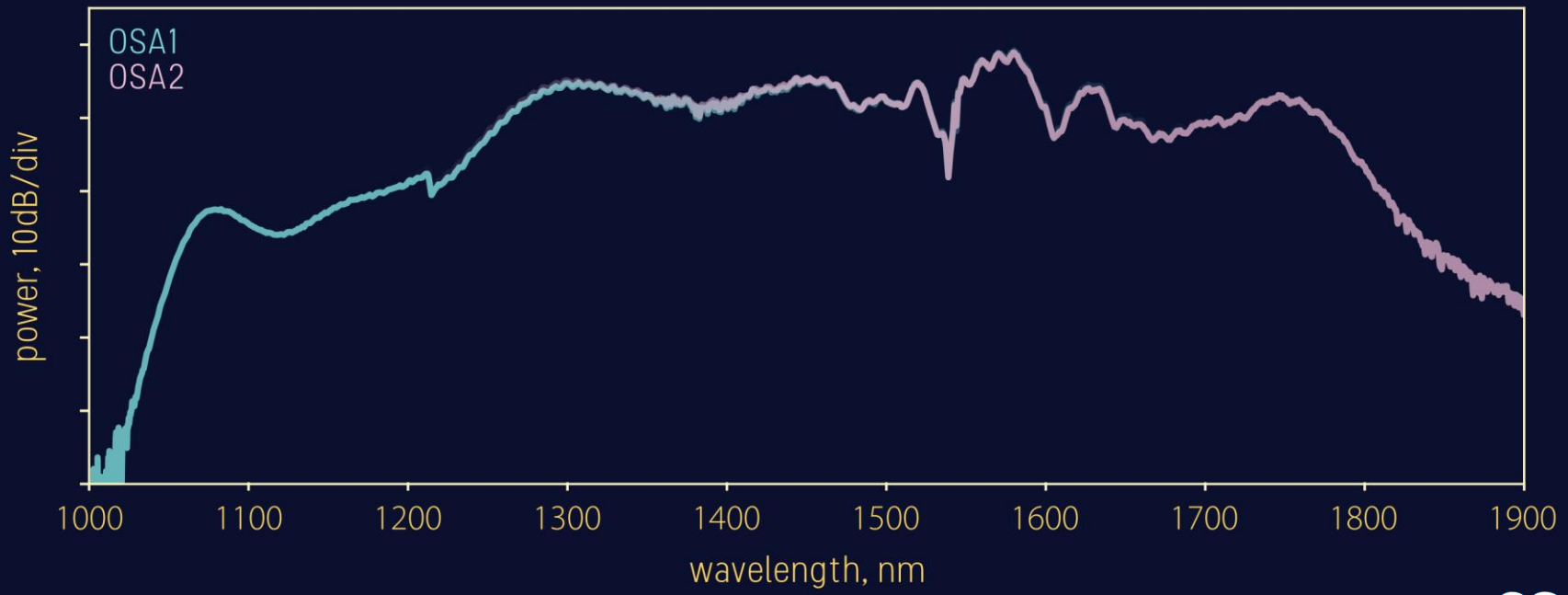
HARPS.....378 – 690nm
ESPRESSO.....380 – 790nm
CARMENES.....520 – 1710nm
HPF.....800 – 1270nm
NIRPS.....950 – 1800nm
SPIROU.....980 – 2350nm

ASTROCOMB NIR

csem

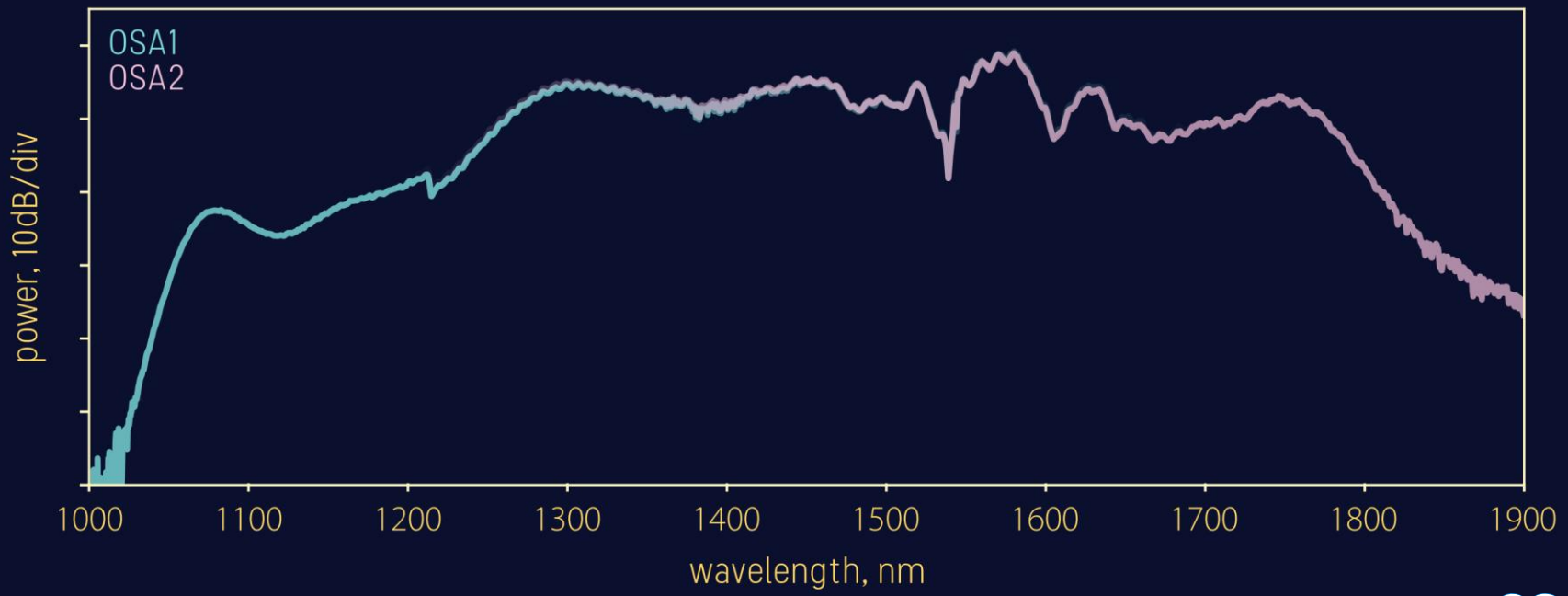
ASTROCOMB NIR

electro-optic oscillator



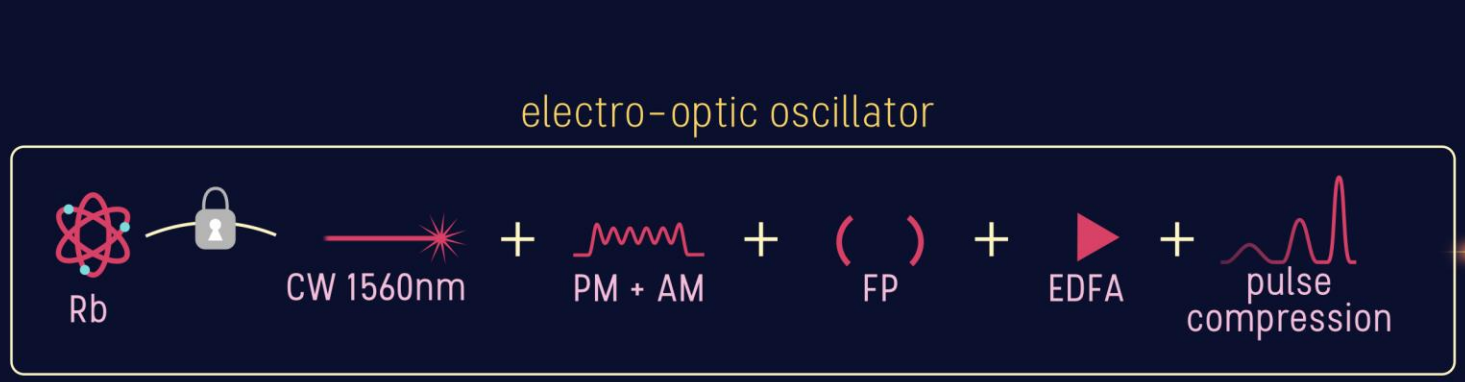
csem

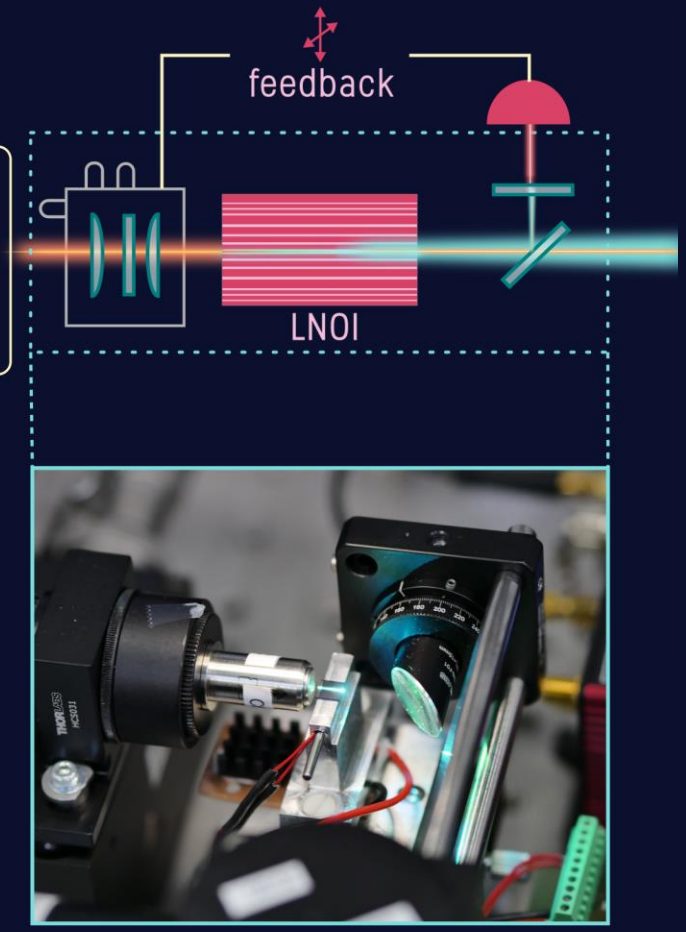
ASTROCOMB NIR



csem

ASTROCOMB VIS





Ayhan et al. APL Phot. (2025) | Schmidt et al. submitted | Obrzud et al. in prep

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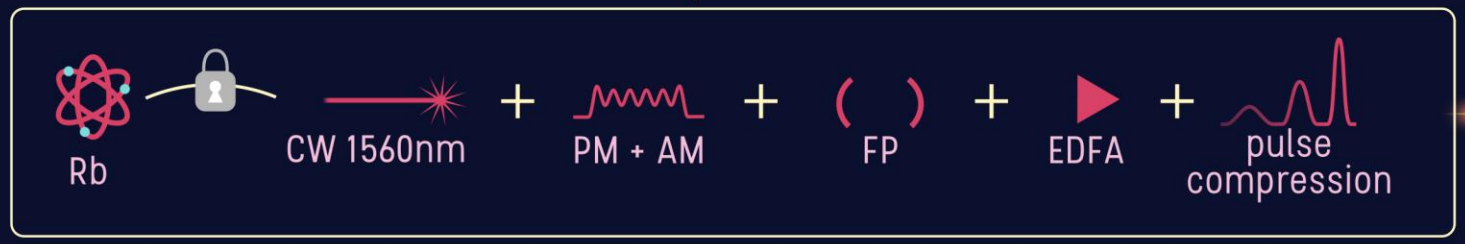
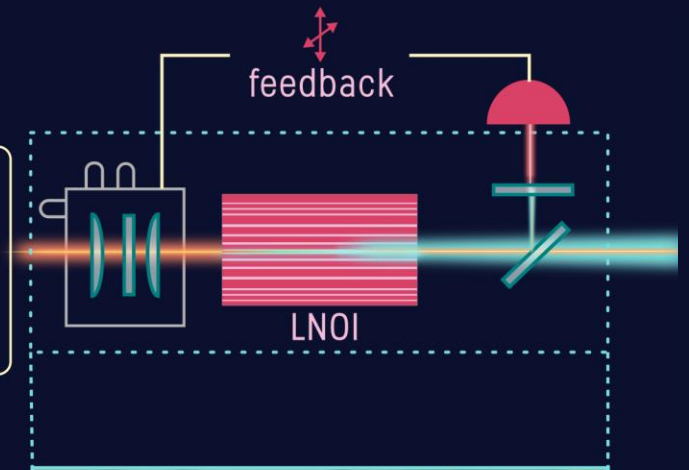
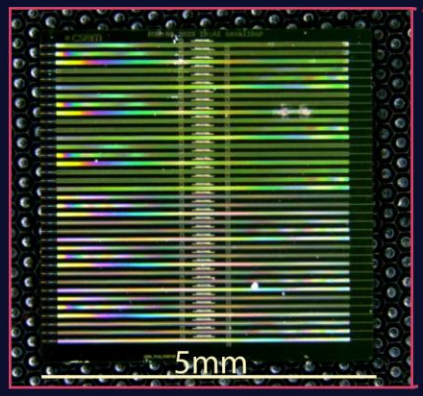
ASTROCOMB VIS

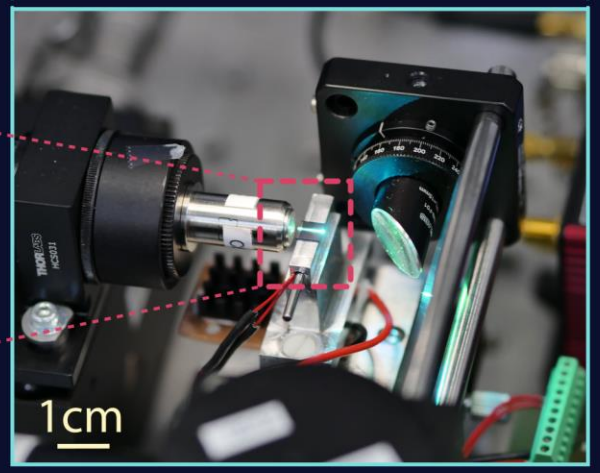
electro-optic oscillator







lithium niobate on insulator



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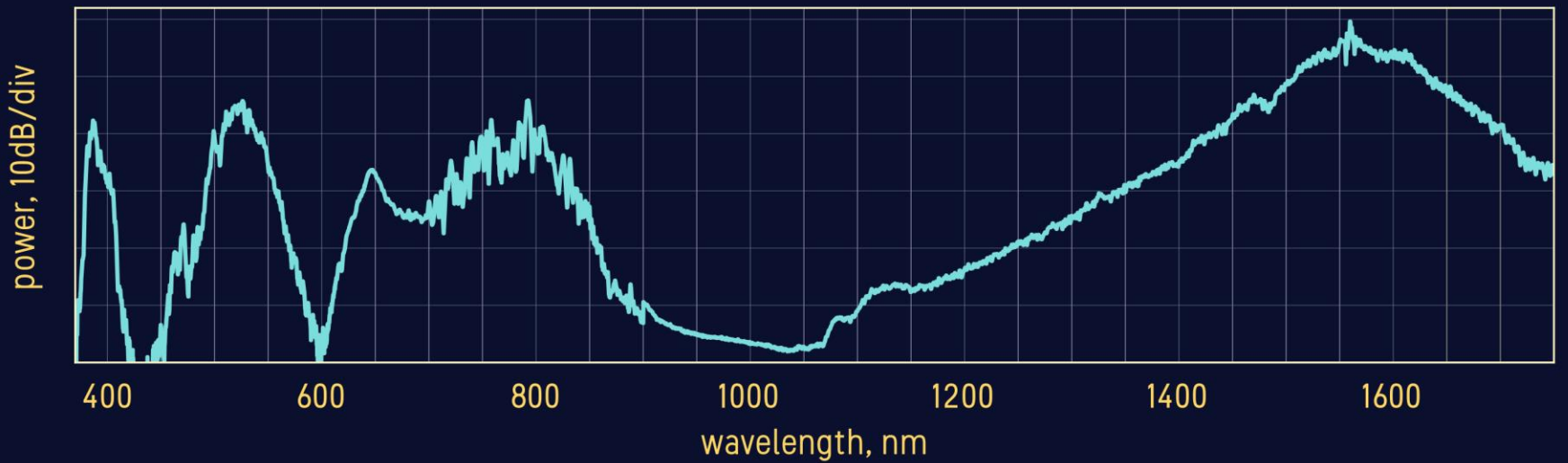
ASTROCOMB VIS



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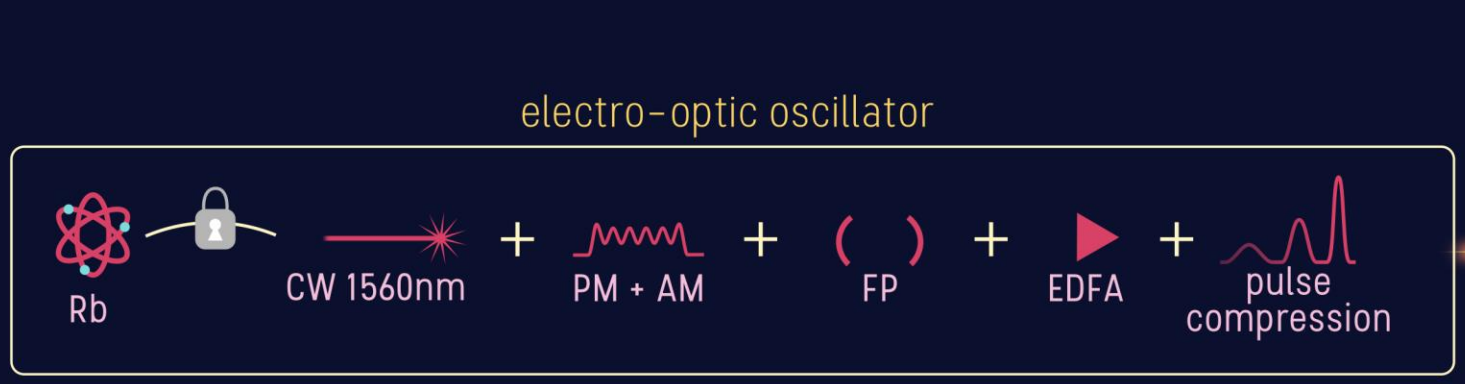
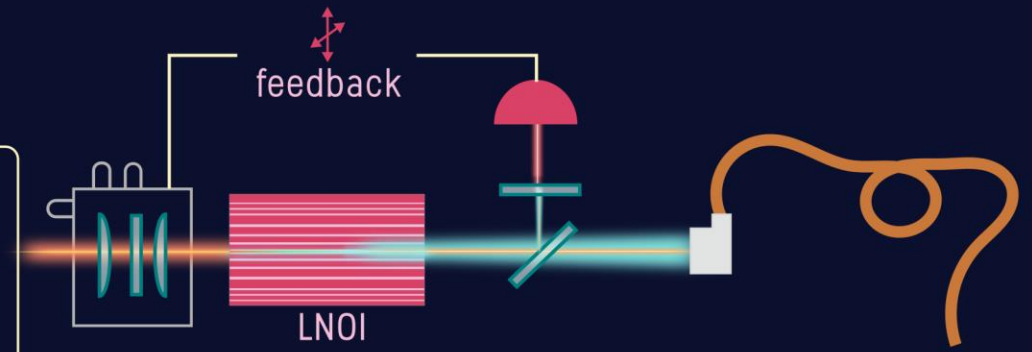
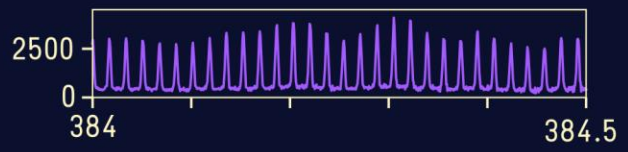
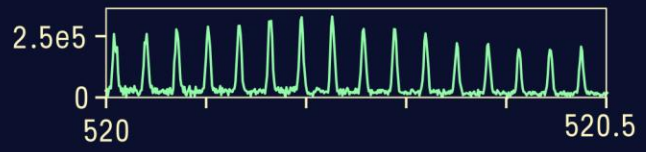
ASTROCOMB VIS

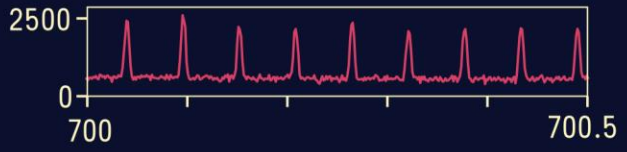


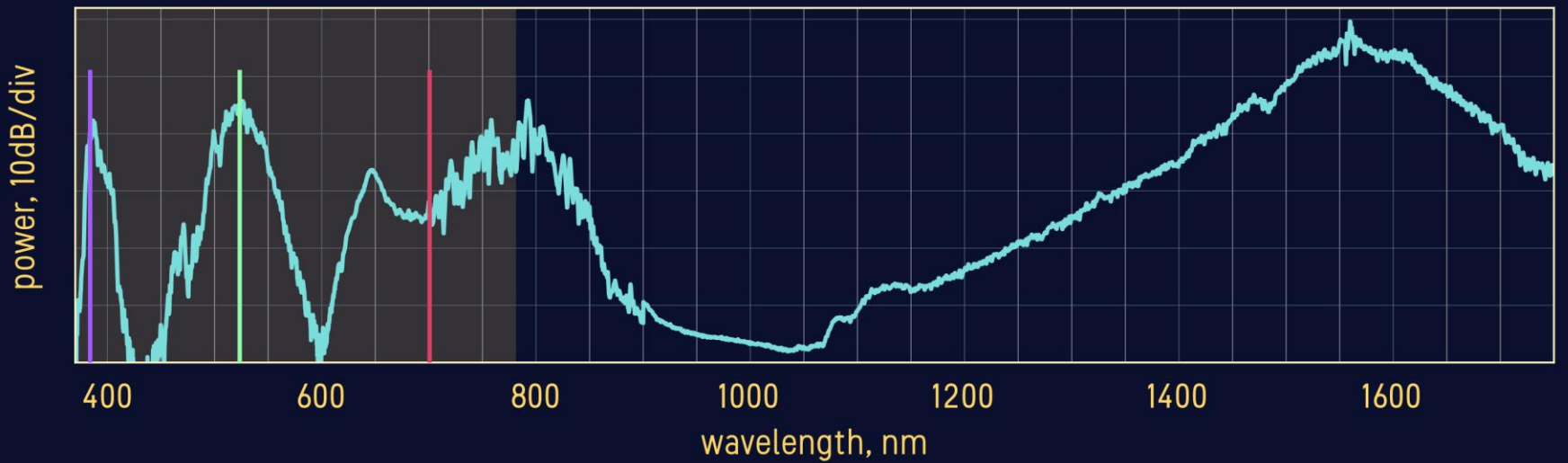


ESPRESSO









Ayhan et al. APL Phot. (2025) | Schmidt et al. submitted | Obrzud et al. in prep

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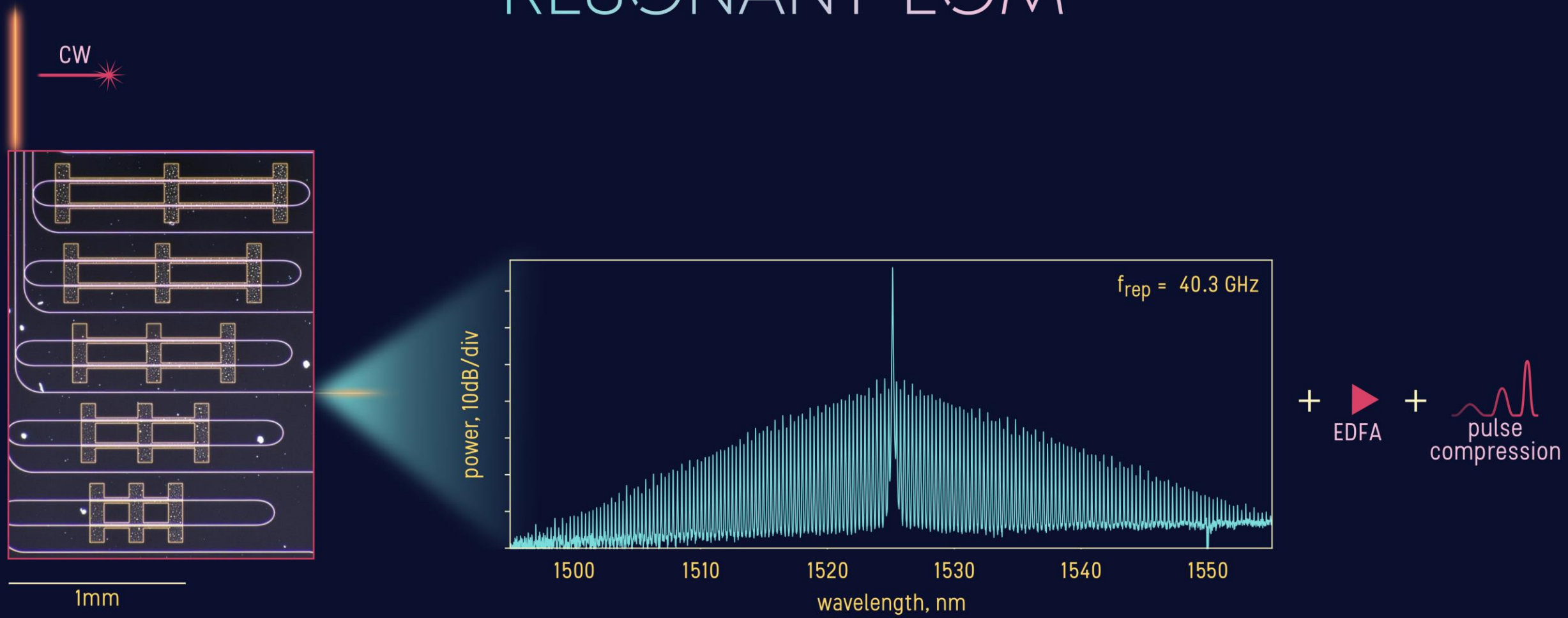
RESONANT EOM



Häusler, Volpini et al. submitted | Volpini et al. In CLEO/Europe 2025 proceedings, paper ch_7_2

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ETZ Zurich