



## Direct CPA-free Pulse Amplification

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Menhir Photonics facility located in Zürich - Switzerland

- From design to production
  - Own and dedicated ISO-4 cleanroom
  - Fast-growing company
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- Many customers across the world are already using the MENHIR-1550 or MENHIR-1030



Our key values

- Robust and reliable femtosecond lasers
- Turnkey and easy-to-use systems
- Customer satisfaction



Joint demonstration between Menhir Photonics and neoLASE

MENHIR-1030  
Femtosecond pulsed laser



- Robust and reliable turnkey system
- Excellent passive power stability
- High beam pointing stability

neoYb  
Amplifier modules

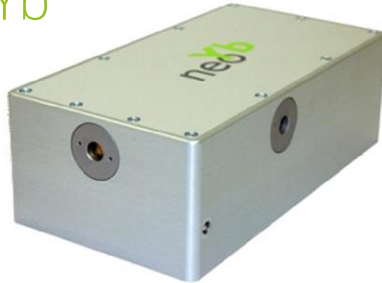


- Free-space or fiber-coupled modules
- High single-pass gain
- CPA-free amplification

MENHIR-1030



neoYb



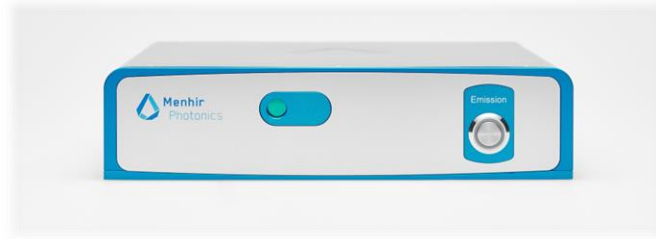
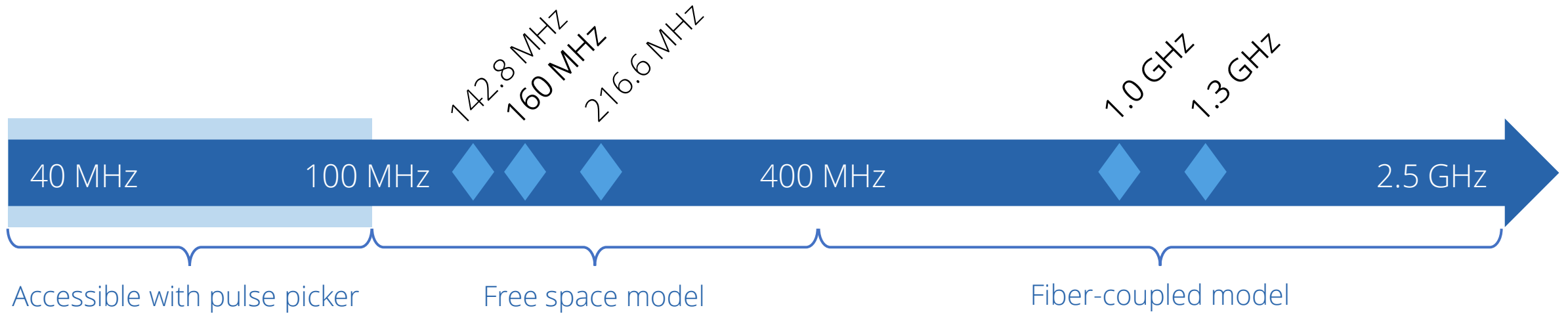
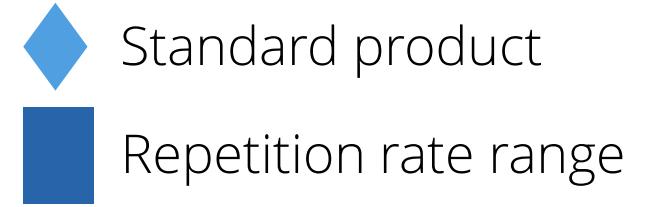
## Advantages

- CPA-free – no compression
- Compact all-in-one modules
- Cost-effective modular approach

## Key results in 3 steps:

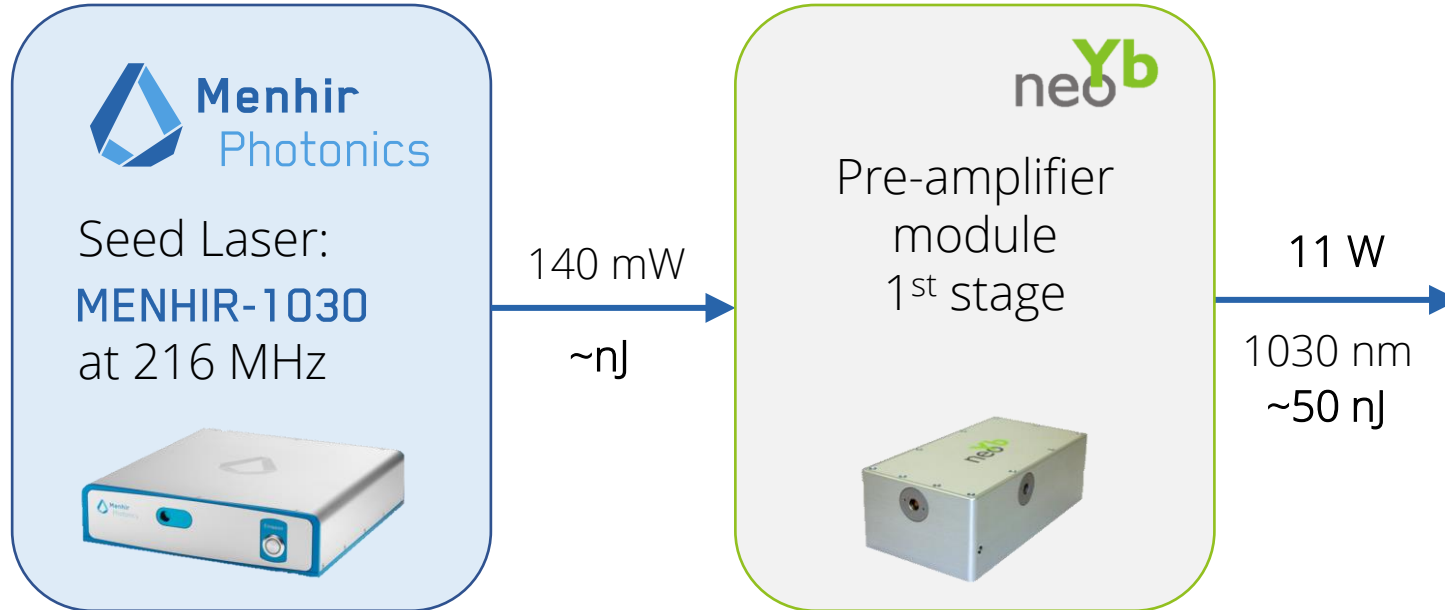
- >50 W average output power
- Microjoule level pulses
- Low noise amplification

# Step 1: MENHIR-1030 seeder

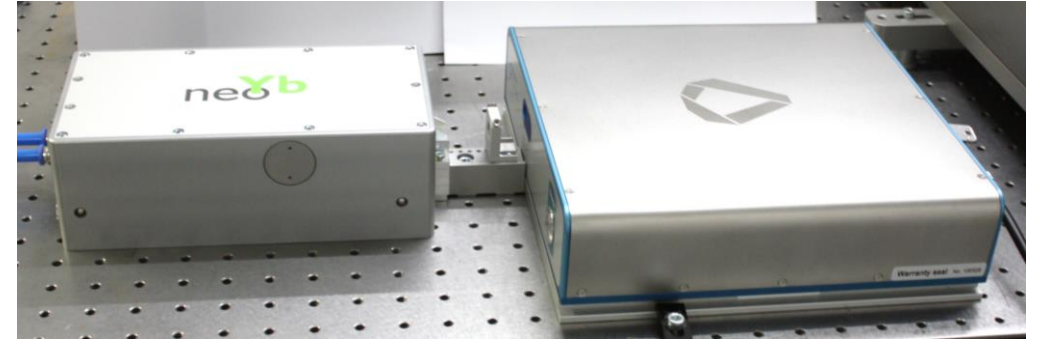


- Standard wavelength 1030 nm (1025 – 1053 nm on demand)
- Pulse duration < 200 fs
- High pulse-to-pulse energy stability and low timing jitter

MENHIR-1030 + neoLASE neoYb amplifier:

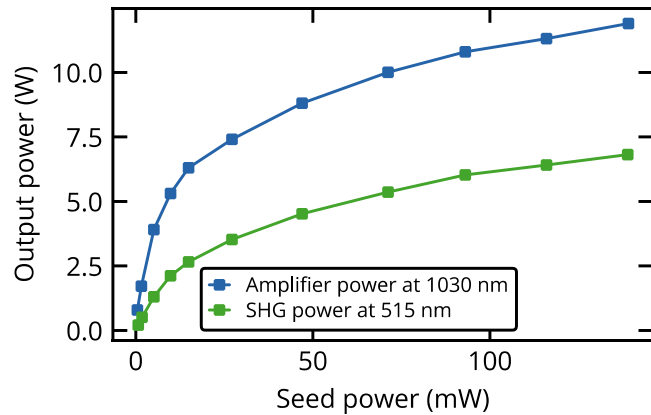


- One-stage: 11 W
- Supported duration < 500 fs, chirped < 1 ps
- High beam quality:  $M^2 < 1.11$
- Conversion to 6.5 W at 515 nm

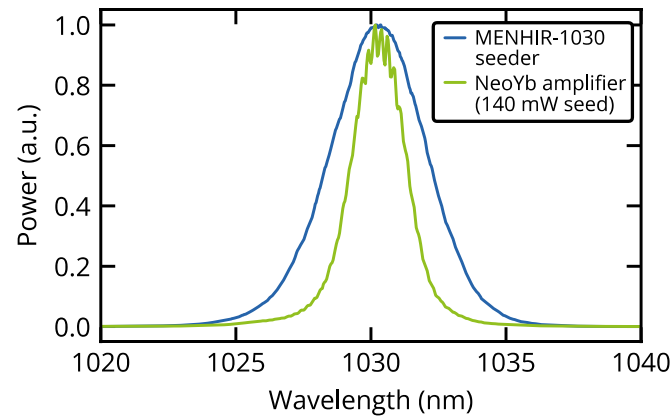


MENHIR-1030 with one-stage neoYb amplifier

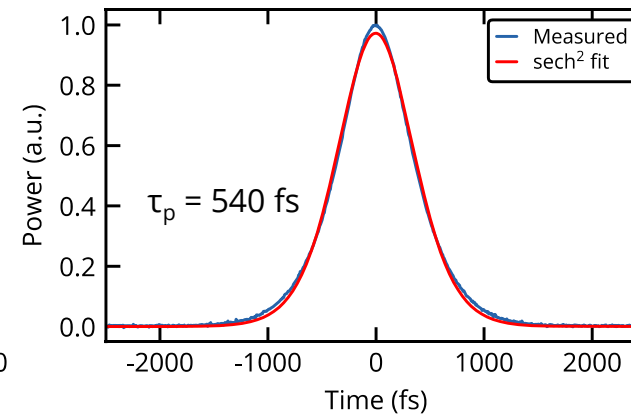
Saturation curve



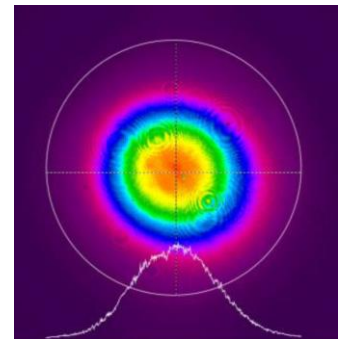
Optical spectrum



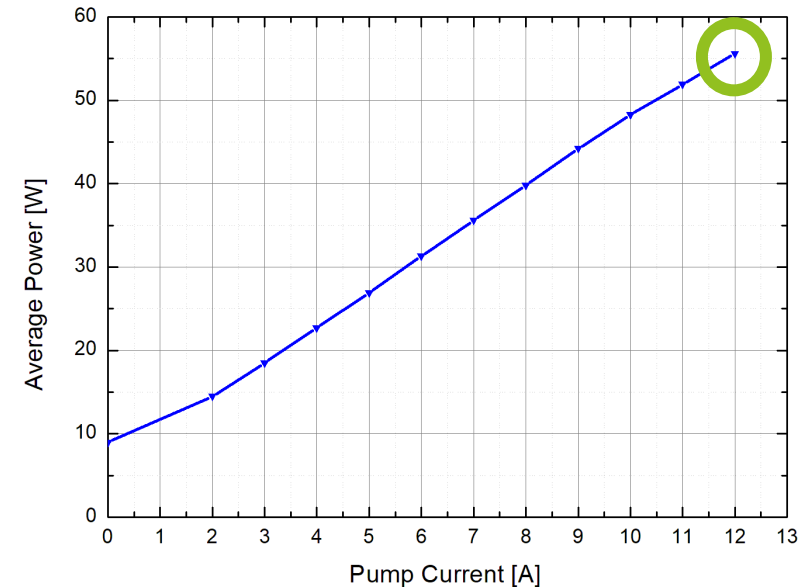
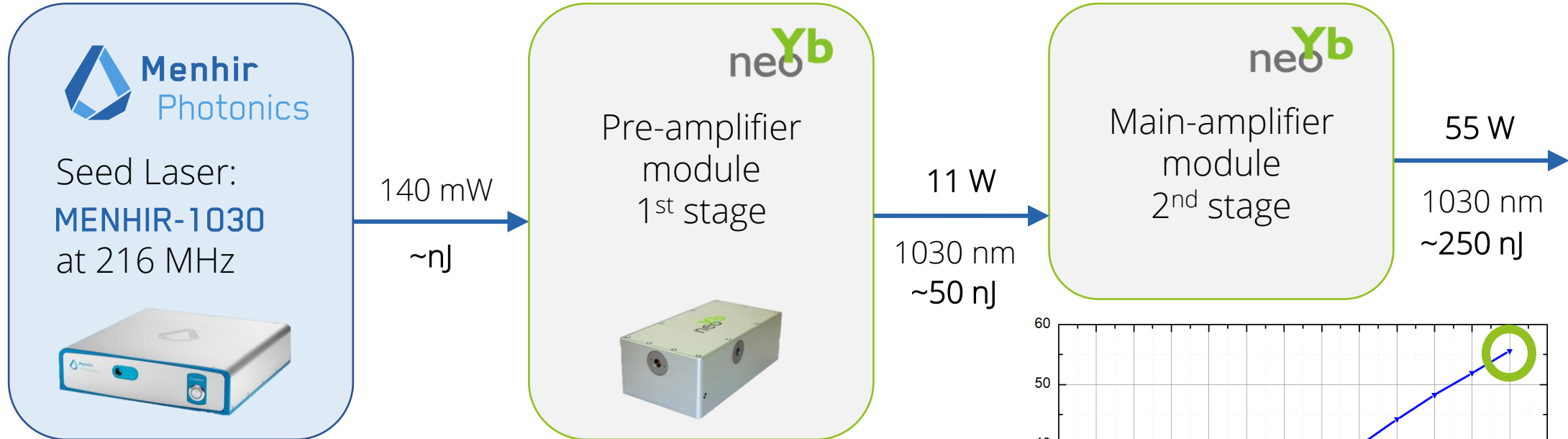
Autocorrelation at 11 W



Beam quality



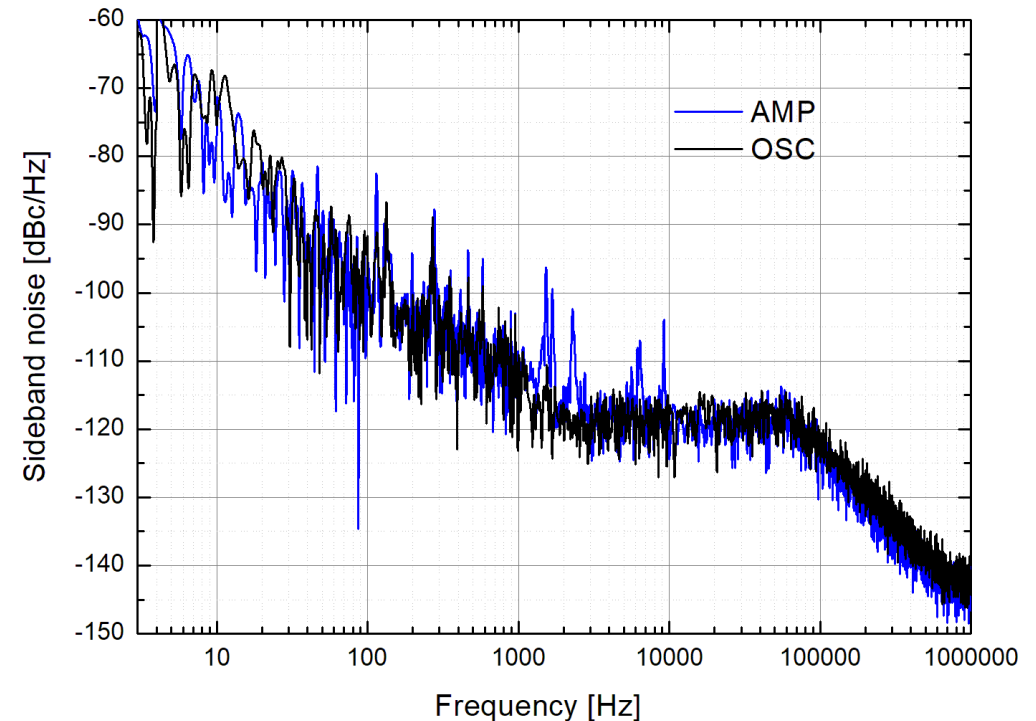
MENHIR-1030 + 2x neoLASE neoYb amplifier:





- Amplifier operated with 140 mW seed at full amplification at 11 W
- Low noise level of the MENHIR-1030 seeder is maintained
- Integrated noise < 0.1 % [10 Hz – 1 MHz]

Relative intensity noise (RIN) at 216 MHz



## Summary

- >50 W average output power
- Microjoule level pulses
- Low noise amplification

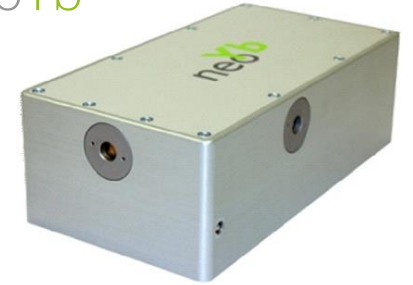
CPA-free, compact and cost-effective amplification for

- FEL photocathode lasers
- Enhancement cavity experiments
- GHz burst or pulse stacking lasers
- More...

MENHIR-1030



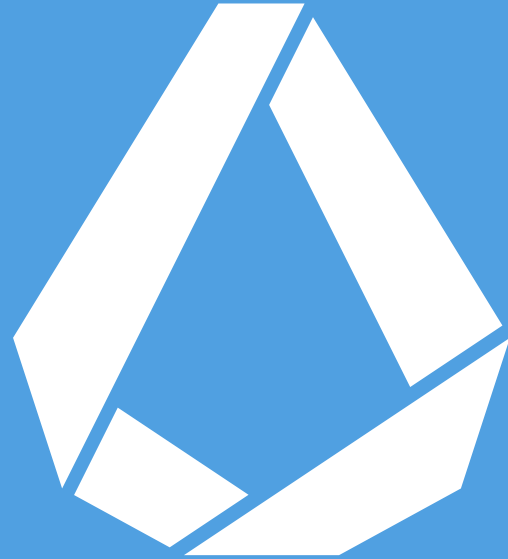
neoYb



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