Menhir Photonics

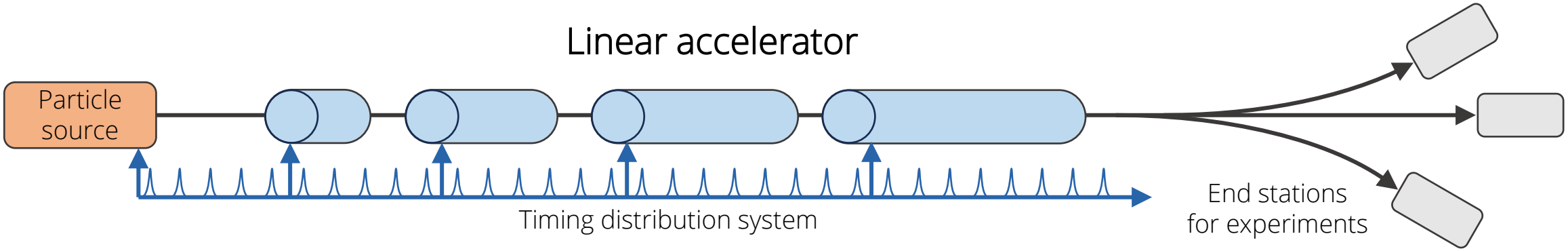
Menhir Photonics
Oscillators for Advanced Timing and Amplifier Seeding

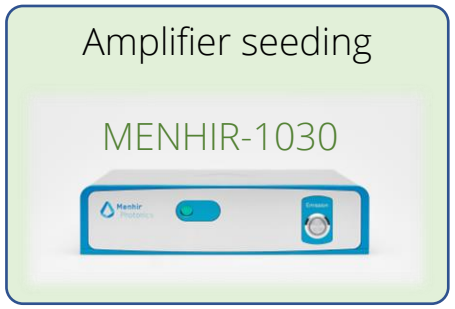
Jonas Heidrich – Product Line Manager

28/10/2024

EPIC
EUROPEAN PHOTONICS INDUSTRY CONSORTIUM

Menhir Photonics lasers in accelerators





➢ Key advantages of Menhir Photonics femtosecond lasers

- Superior low-noise performance
- Repetition rate f_{rep} and f_{CEO} actuators
- Plug-and-play system – highly reliable

Swiss ultrafast laser manufacturer

Menhir Photonics facility located in Zürich - Switzerland

- From design to production
- Own and dedicated ISO-4 cleanroom
- Fast-growing company

Our values

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

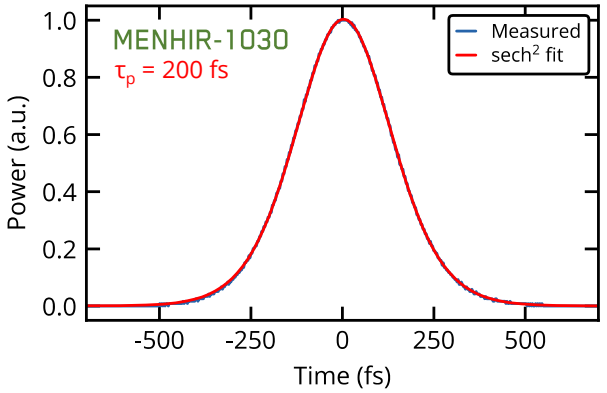
Many research facilities across the world are trusting the MENHIR-1550 or MENHIR-1030

Why Menhir Photonics oscillators?

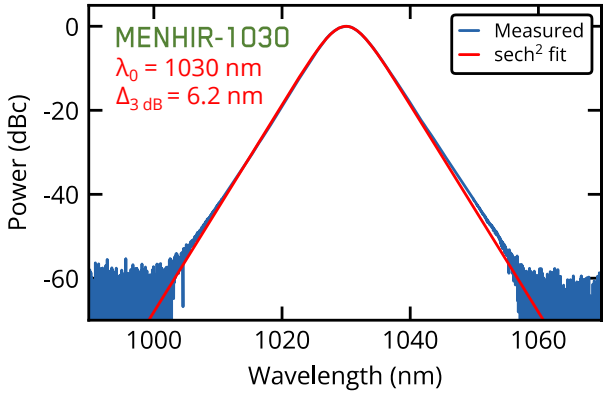
Performance:

- Repetition rate: 40 MHz – 10 GHz
- Clean soliton pulses: < 250 fs
- Wavelength: 1.0 µm at 1.55 µm
- Passively cooled – no chiller required

Pulse duration



Optical spectrum (log)



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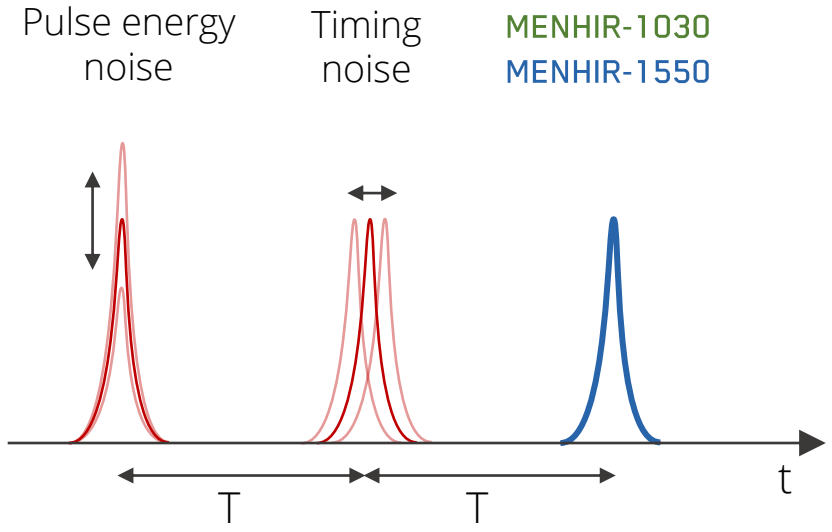
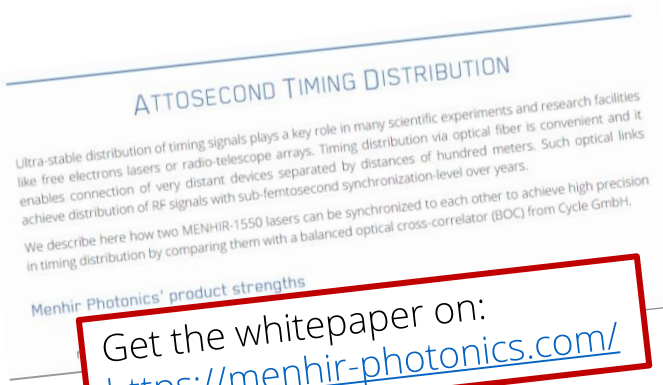
Modular concept

Key advantages

Low-noise performance



- High passive pulse-to-pulse energy stability and timing stability due to innovative architecture
- Enabling precise measurements
- MENHIR-1550 ideal for timing distribution



ATTOSECOND TIMING DISTRIBUTION

Ultra-stable distribution of timing signals plays a key role in many scientific experiments and research facilities like free electrons lasers or radio-telescope arrays. Timing distribution via optical fiber is convenient and it enables connection of very distant devices separated by distances of hundred meters. Such optical links achieve distribution of RF signals with sub-femtosecond synchronization-level over years.

We describe here how two MENHIR-1550 lasers can be synchronized to each other to achieve high precision in timing distribution by comparing them with a balanced optical cross-correlator (BOC) from Cycle GmbH.

Menhir Photonics' product strengths

Get the whitepaper on:
https://menhir-photonics.com/

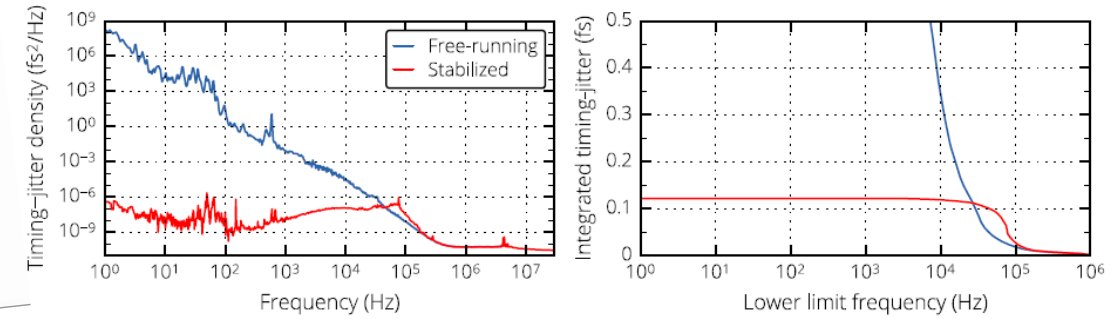
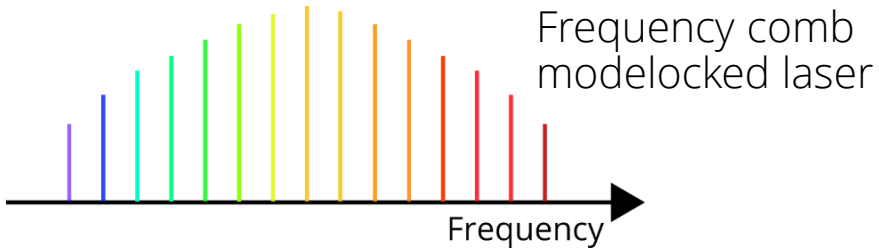


Figure 2 — Timing-jitter density (left) and integrated timing-jitter (right) between the master and the slave laser in free-running (blue) and stabilized (red) conditions. In the range [1 kHz – 1 MHz], relative integrated timing-jitter of 2.64 fs and 0.12 fs are achieved, respectively.

Menhir Photonics Key advantages

f_{rep} and f_{CEO} actuators

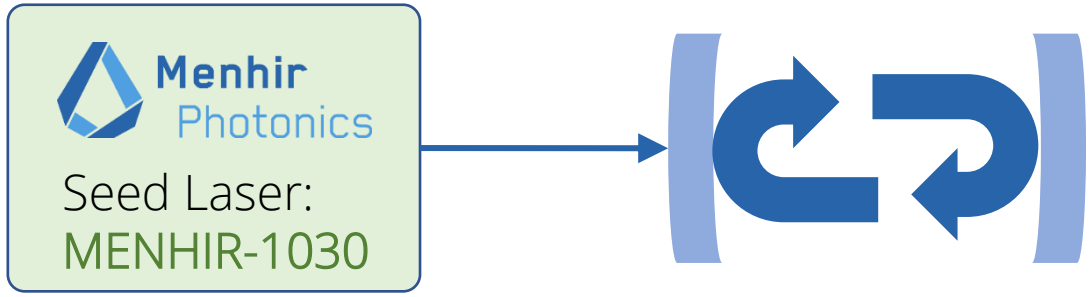
- **Repetition rate** locking to an external reference
- **Carrier envelope offset frequency** access for comb applications



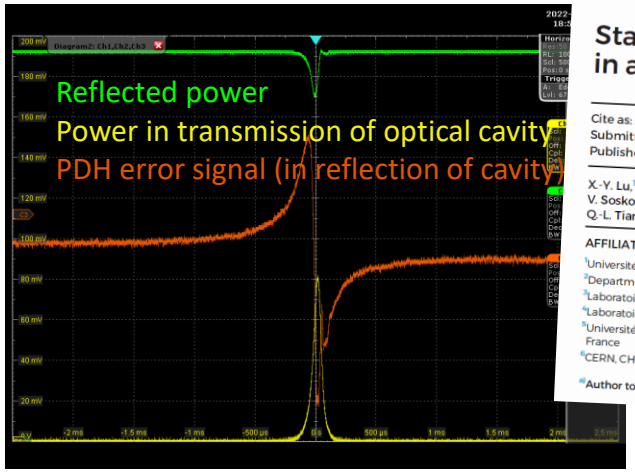
Plug-and-play system – reliable

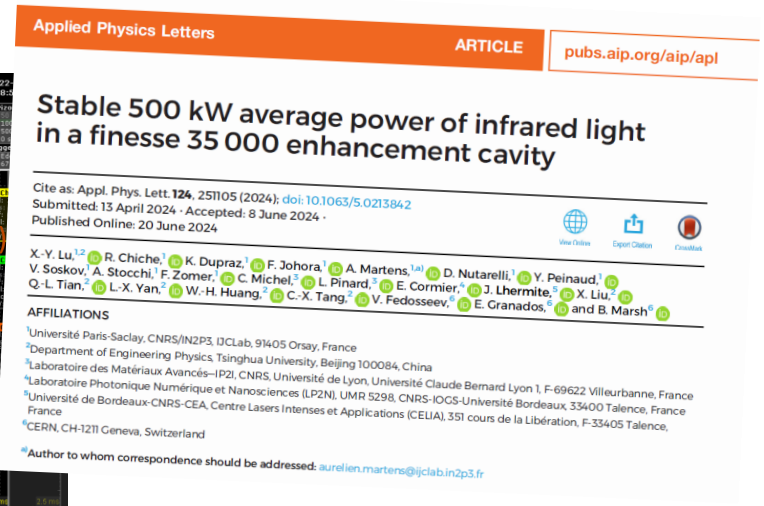
- Easiness of use
- No water cooling
- Maintenance-free

MENHIR-1030 ideal for enhancement cavities



With an ultra-low noise MENHIR-1030





Applied Physics Letters ARTICLE pubs.aip.org/aip/apl

Stable 500 kW average power of infrared light in a finesse 35 000 enhancement cavity

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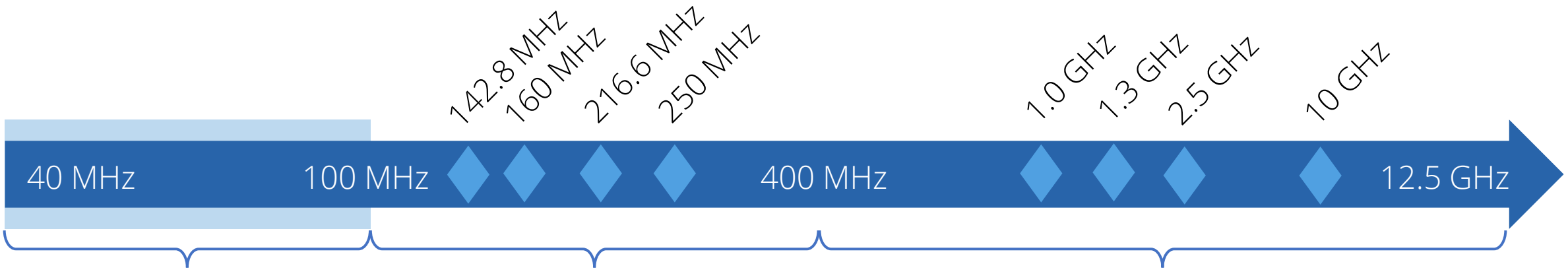
MENHIR-1550 and MENHIR-1030



- Standard wavelength 1550 nm and 1030 nm (others on demand)
- Pulse duration < 250 fs
- High pulse-to-pulse energy stability and low timing jitter

Standard product

Repetition rate range

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Timing Cycle

MENHIR-1550

Amplifier seeding

MENHIR-1030

Please contact us!

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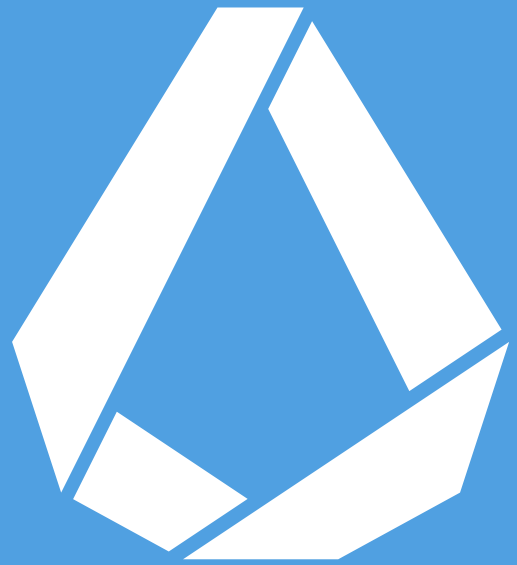

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