R&D facility for 2 µm optical characterization

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Motivation

The proposed laser wavelengths for next generation GW detectors are 1550 nm and 2 µm.
The option of using 2 µm lasers has been proposed just recently and while the research for the 1550 nm has been going on already for a while, for the 2 µm R&D is required to study the optical properties and to optimize the performance of all optical devices that are part of the detector.

The optical lab will be built with the main purpose of development and characterization of optical devices for next generation gravitational wave detectors.

The facility

The optical lab will be located at the Proeftuin Campus of Ghent University (Building N3).

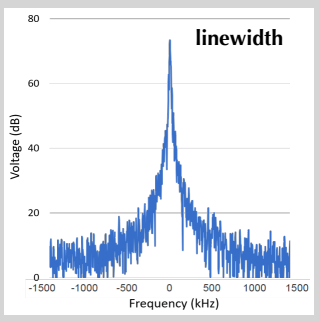
A **laminar flow enclosure** with fan filter unit and air control monitor will be installed to ensure a clean environment. The clean area dimensions will be approximately 2.1m x 3.1m.

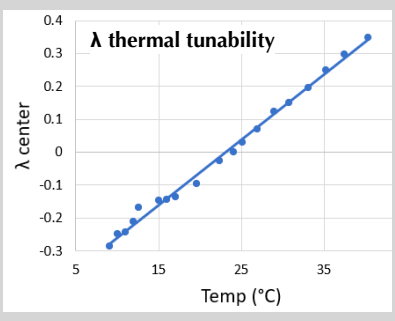
The optical table will be equipped with 700 mm tall **active isolator legs** in order to reduce seismic noise.

The lab will be provided with a very **stable laser source** and devices for optical measurements and characterization.

The laser

- Model: Cybel ORION-2000
- Type: CW fiber laser
- Wavelength: 2090.0 ± 0.1 nm
- λ thermal tunability: ± 0.4 nm
- Linewidth: 10 kHz
- Output power ≥ 2 mW
- RIN (for f > 10kHz) < -150 dBc/Hz
- Fiber type: PM
- PER > 23 dB
- Integrated output isolator: 25 dB





pictures credit: https://cybel-llc.com

Current status

- Some seed funding is being used for the purchase of the first equipments.
- The laser has been ordered with expected delivery by the end of October.
- A few proposals have been submitted in order to have additional and substantial funds. The outcomes of the applications will be known by December 2022.

Future plan

- The first project planned for the lab is the characterization of the **OMC for ETpathfinder**. A PhD student is planned to be hired to work on this project.
- In the near future the characterization of **photodetectors** is also planned.
- The lab will be available to other groups for testing. Please get in touch if you are interested.

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