

Project title

Development of a heterodyne detection system

Your mission

The project dedicates to the development of a heterodyne detection system to measure the spectrum of incident light. The setup contains a monochromatic reference laser which is mixed with the (unknown) light under test on a photodetector. The detector converts the combined light beam into an ac-voltage whose frequency and amplitude depend on the characteristics of the two input laser beams. Precise knowledge of the frequency and the amplitude of the reference laser then allows the characterization of the laser under test by measuring the ac-voltage.

The project aims to firstly demonstrate a reliable characterization of arbitrary light under test and subsequently optimization. This includes a systematic study of the measurement characteristics for different hardware and software configurations.

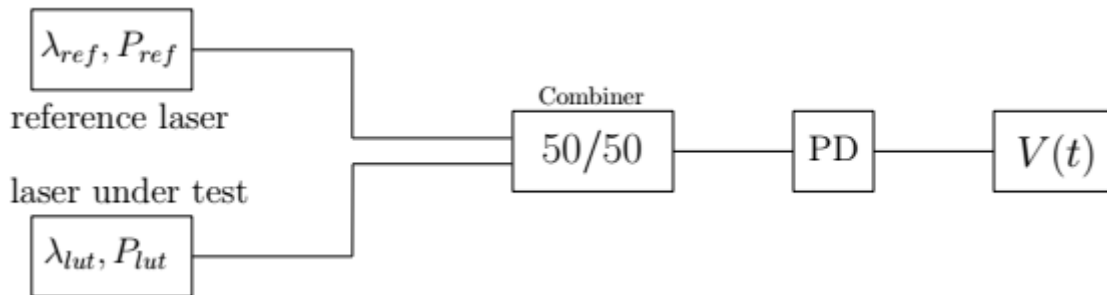


Figure 1. Exemplary set-up of the heterodyne detection system using a well-characterized reference laser, a combiner, a photo detector (PD) and a voltage measure unit to measure the spectrum of the laser under test.

What you will learn about

- Experience with fiber-based optical setups and handling of the generated microwave readout signal.
- Automatization of the measurement routine using Python scripts.
- Application of signal processing methods to interpret the measurement results.

Contacts

Interested candidates please send your CV and transcript of records to Gabriel Jülg at Gabriel.Juelg@epfl.ch and Prof. Cristina Benea-Chelmus at cristina.benea@epfl.ch.