

## Test of a Photo Diode for the Swiss Light Source 2.0

**Professor:** Prof. Edoardo Charbon [edoardo.charbon@epfl.ch](mailto:edoardo.charbon@epfl.ch)  
Dr. Rasmus Ischebeck [rasmus.ischebeck@psi.ch](mailto:rasmus.ischebeck@psi.ch)

**Project Type:** Master Project  
**Location:** Microcity, Neuchatel or Paul Scherrer Institut, Villigen  
**Start Date:** Flexible

### Description:

The Swiss Light Source SLS 2.0 at the Paul Scherrer Institut is a state-of-the-art synchrotron ring which will go into operation in 2025. We are aiming at the measurement of the length of the electron pulses in the storage ring, in order to understand the beam dynamics, and to maximize the beam lifetime.

To this goal, we want to characterize a photodiode with 50 GHz bandwidth. The photodiode is connected to an amplifier, which in turn feeds several bandpass filters. A relative measurement of the frequency content in the bands will allow us to infer the pulse length of the optical signal.

In a later stage, we are planning to install this diode in the accelerator facility, and couple synchrotron radiation into this diode. The output of the bandpass filters will then be digitized at baseband, with the 500 MHz repetition rate of the electron pulses.

Your tasks will be to set up this diode with a picosecond laser, to measure the instrument response function, and to assess the concept of measurements in different frequency bands to determine pulse length.

Your master's thesis will be carried out working with a team of scientists and engineers at PSI and at EPFL. The work can be carried out at EPFL, or at PSI in Villigen.

