HighFinesse
The Standard of Accuracy

HighFinesse Tutorial

HighFinesse Digital PID Option: Laser Control

HighFinesse Tutorial · Digital PID option · 9-2024

Overview

How to …

… set up the HighFinesse Digital PID Option: Laser Control

This option can be used with TOPTICA lasers controlled by a DLC pro only.
This quickstart guide is intended to give you a brief overview of how to configure the HighFinesse laser control settings. The guide does not replace reading the manual. Make sure you have read and understood it (especially section 3.5) before you start the regulation. Setting voltage bounds incorrectly might cause damage to your laser.

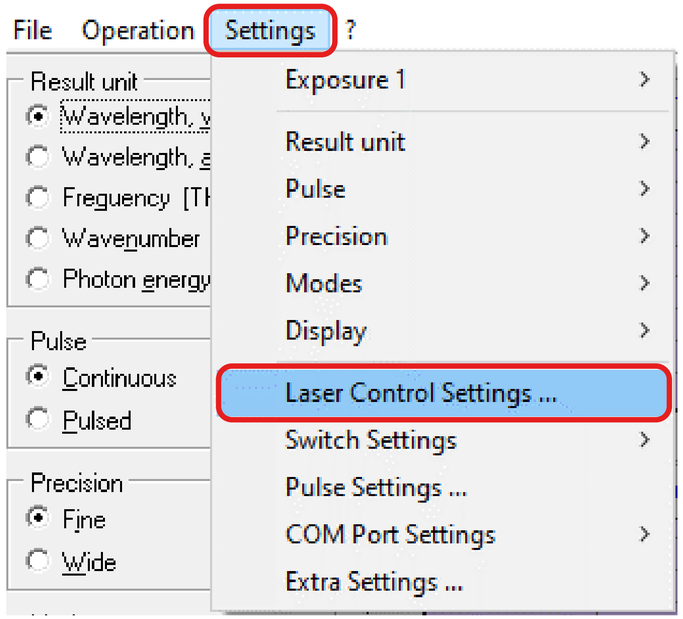
Here we assume that the laser is already successfully connected with a fiber to the wavelength meter. If you have any questions about that refer to the quickstart guide “HighFinesse Wavelength Meter”

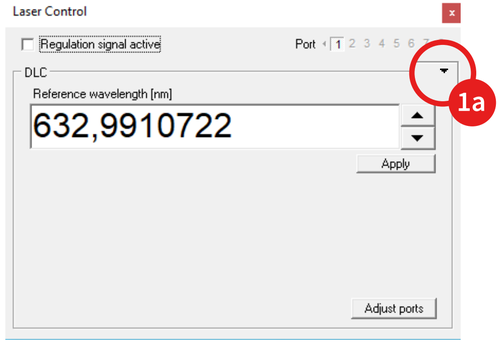
Further information

Quick Start Guide
HighFinesse Wavelength Meter

https://www.highfinesse.com
/en
/support
/quick-start-guide.html

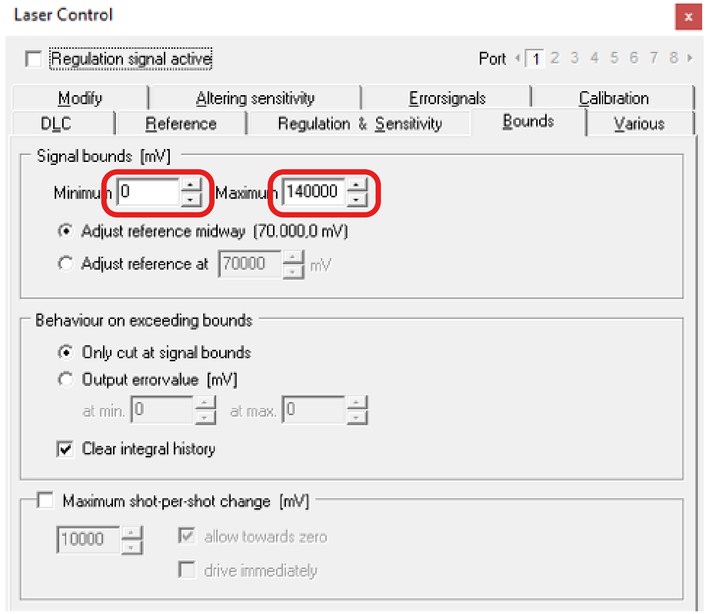
1





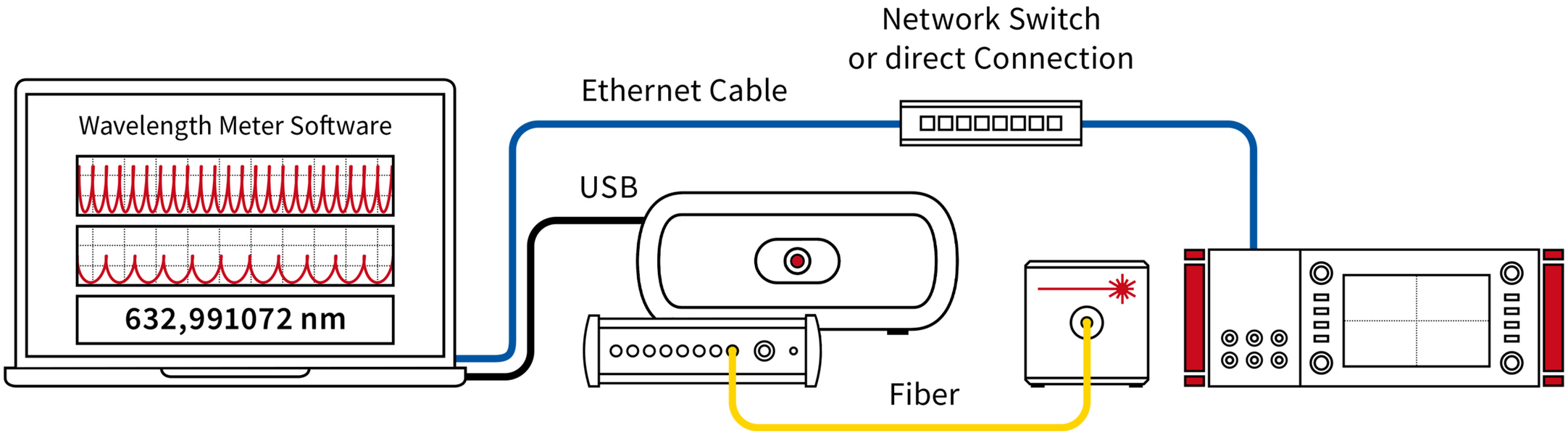
Start the software and set the voltage bounds in the Laser Control Menu such that you can exclude a damage to your laser and make sure the output range is suitable (e.g. as defined by a mode-hope-free scanning range).

2



Click on the black triangle 1a to obtain more settings. Move to the frame bounds to enter the correct bounds.

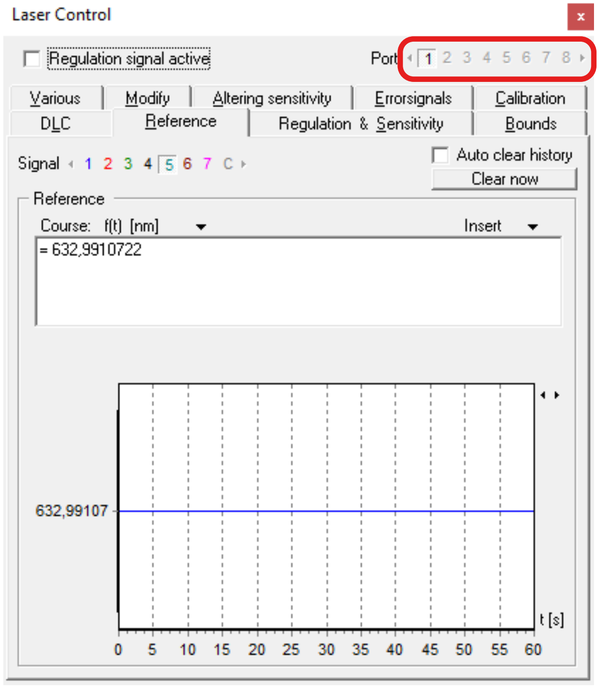
3



Connect the DLC pro Controller and the computer running the wavelength meter software to the same network (UDP has to be allowed for automatic recognition).

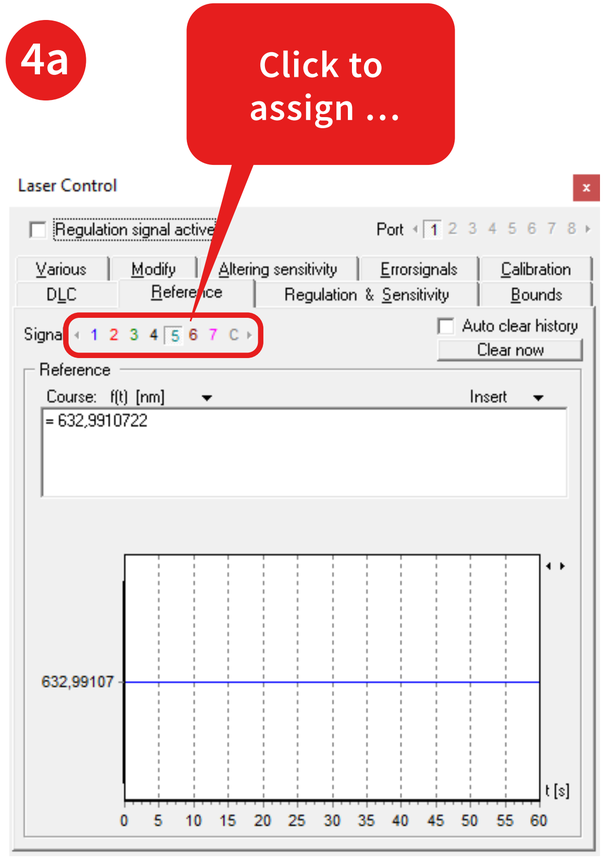
In restrictive network it might be necessary to **specify the IP address and the port of the DLC pro Controller** (Standard port: 1998) in the **“Adjust ports” menu → “Additional IPs”.**

4 Using multiple channels simultaneously



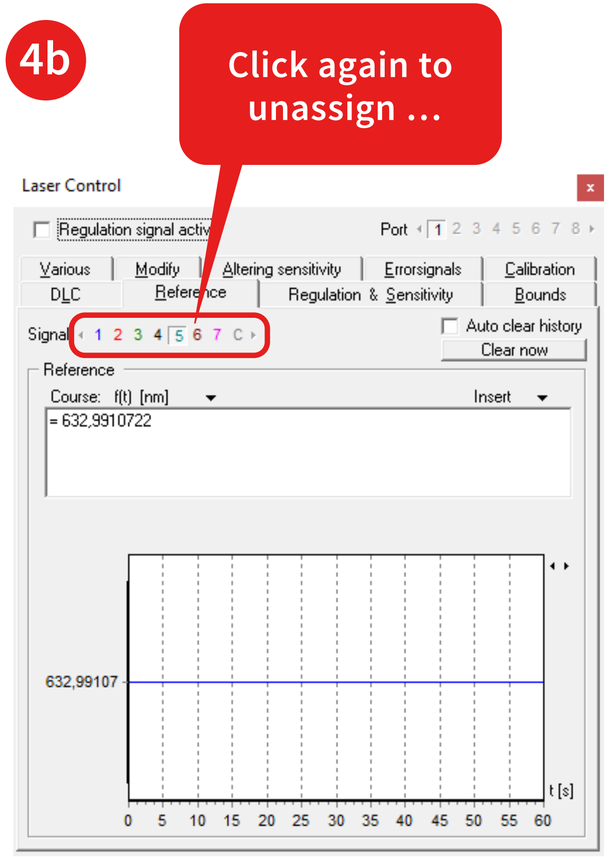
Choose the port where the digital signal will be put out by **clicking on the black numbers.**

4a



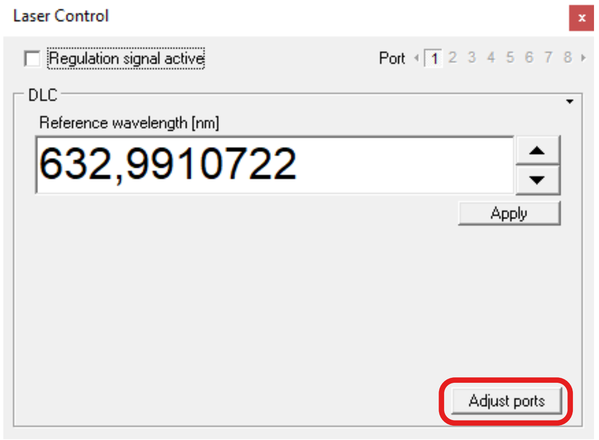
Then **click on one of the colored numbers** to **assign the switch signal to the port.**

4b

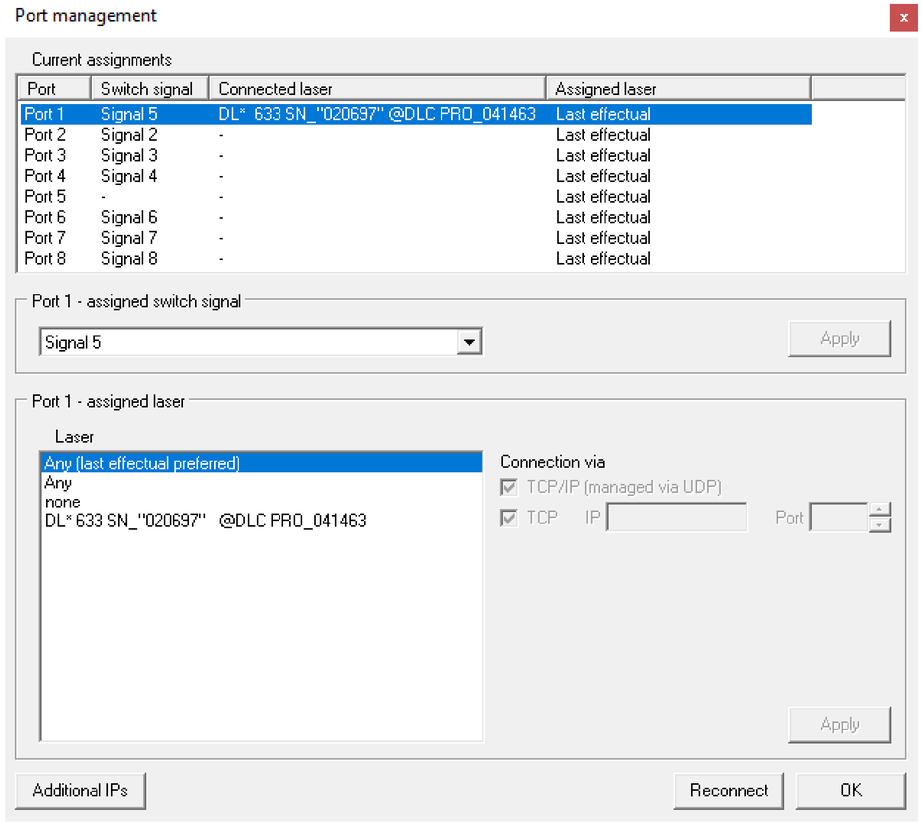


You can **unassign it by clicking on the same number again**. In the example the Switch signal 5 is assigned to port 1.

4c



You can use the “**Adjust ports**” menu for **assigning the lasers to the ports.**



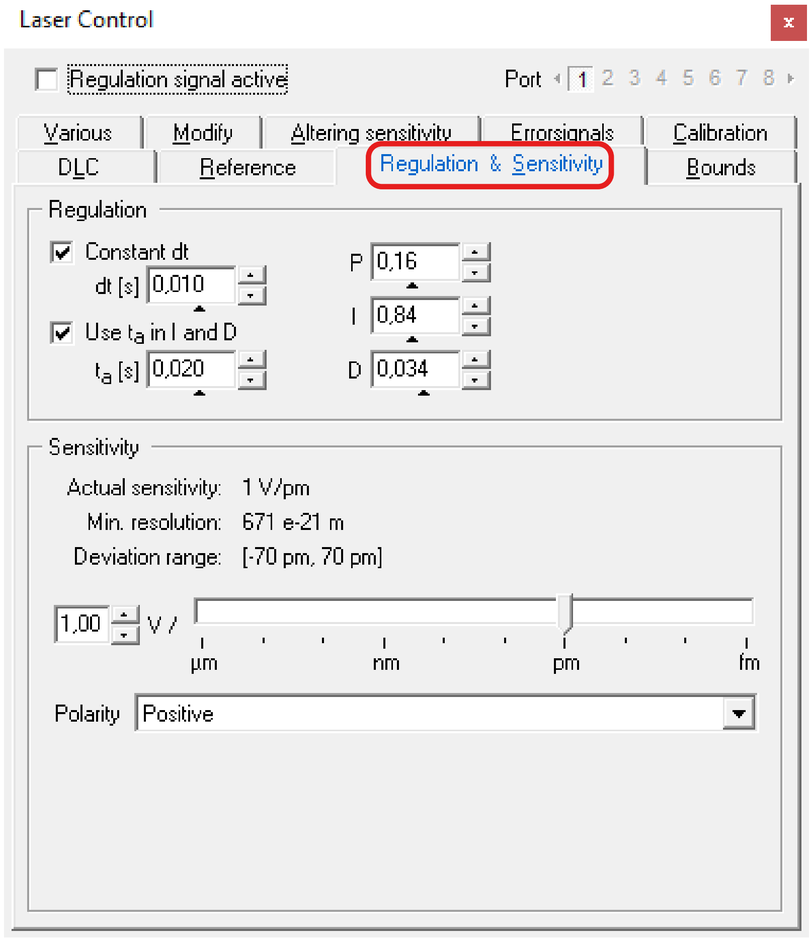
In this example, the **light output of the laser** is connected to **channel 5 on the switch.**

Both channel 5 and the correct laser are assigned to digital Port 1.

5

Use the **PIDSim2 Tool** to simulate good starting parameters.

Alternatively, you can set PID parameters manually in the laser control settings/frame: **“Regulation & Sensitivity”.**



6

Start …

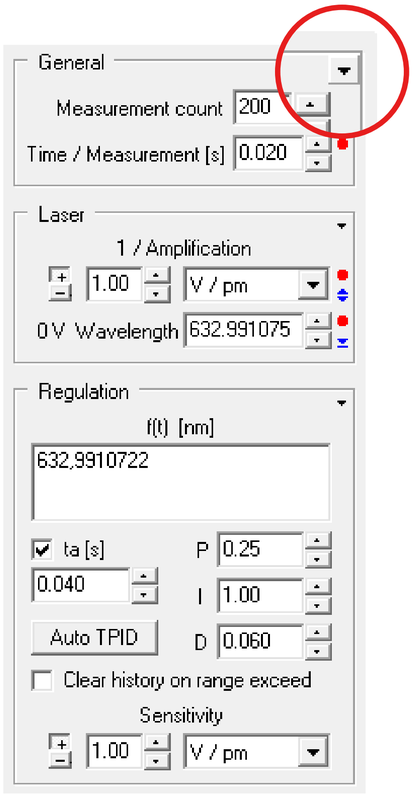
PIDSim2.exe
Type: Application

Start the PIDSim2 application located in the path …

Installation Path of the Wavelength Meter Software
\Tools
\PIDSim2.exe

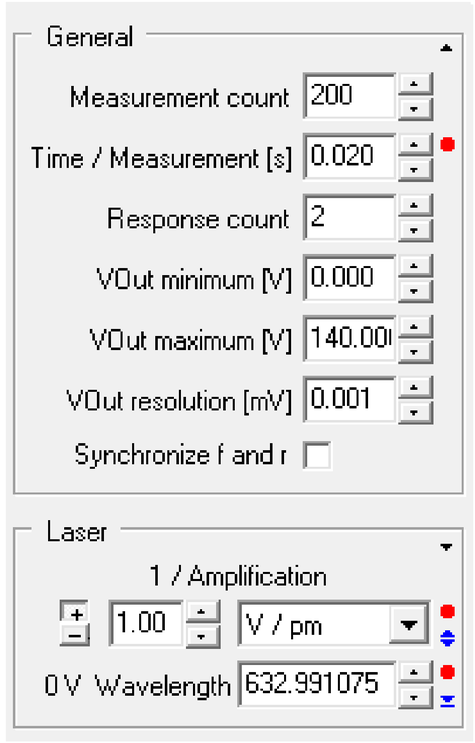
… and make sure you can measure.

7



Clicking on the **small black triangle** will enable more settings.

7a PIDSim2 Settings



Now you can **make your settings** for simulation.

Measurement count:
number of points in the simulation.

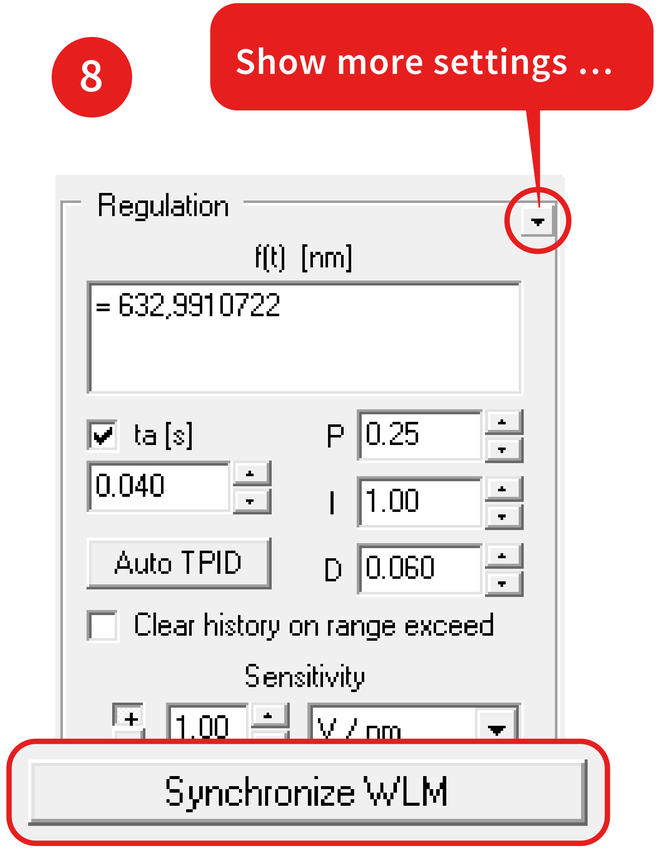
Time/Measurement [s]:
get this live from the wavelength meter by clicking on the red dot and confirm by clicking on the checkmark.

Response Count:
2 for single channel, 1 for multichannel measurements.

Set the **minimum and maximum output** according to your system (voltage bounds set in 1.).

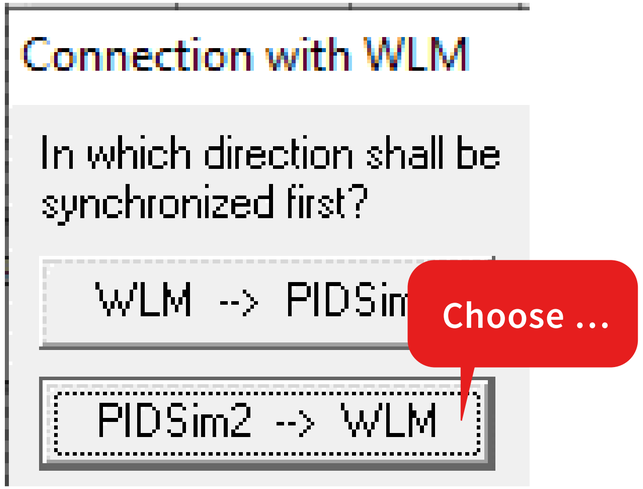
Set the **resolution** to obtain a realistic simulation of your system.

8



The tool can be used as a **pure simulation** tool **or synchronized to the wavelength meter software** running in parallel.

8a

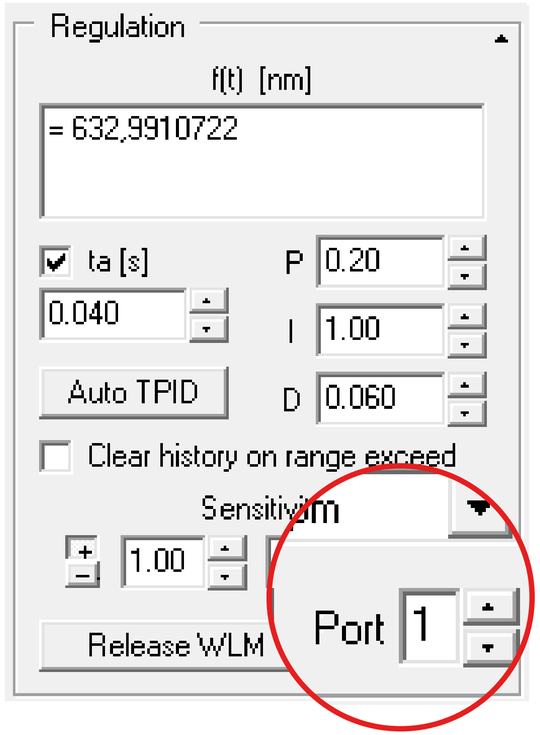


Choose to **synchronize the PIDSim2** in the **section regulation.**

Choose **PIDSim --> WLM.**

You can **alternatively also transfer all settings** you have made from the wavelength meter to the PIDsim2 tool.

8b



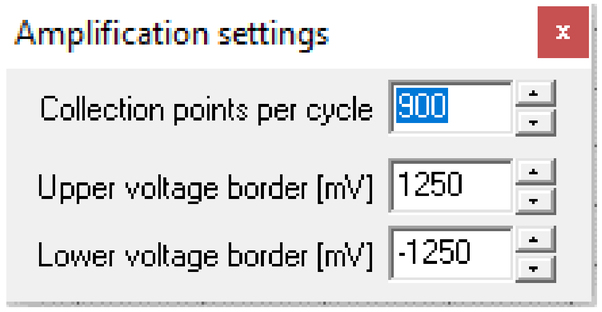
After that **set the port** that you would like to adjust.

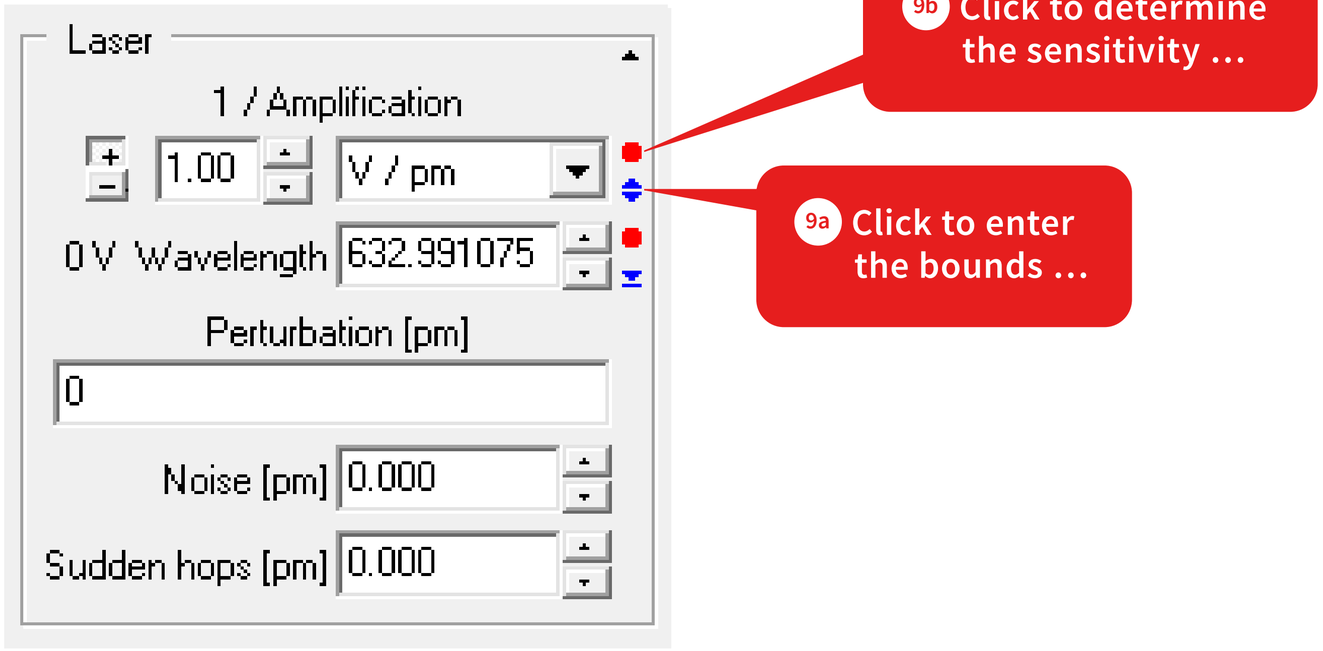
9

Click on the blue triangles to enter the bounds 9a (range should be smaller or equal to the bounds in 1.) and number of collection points used for calculation.

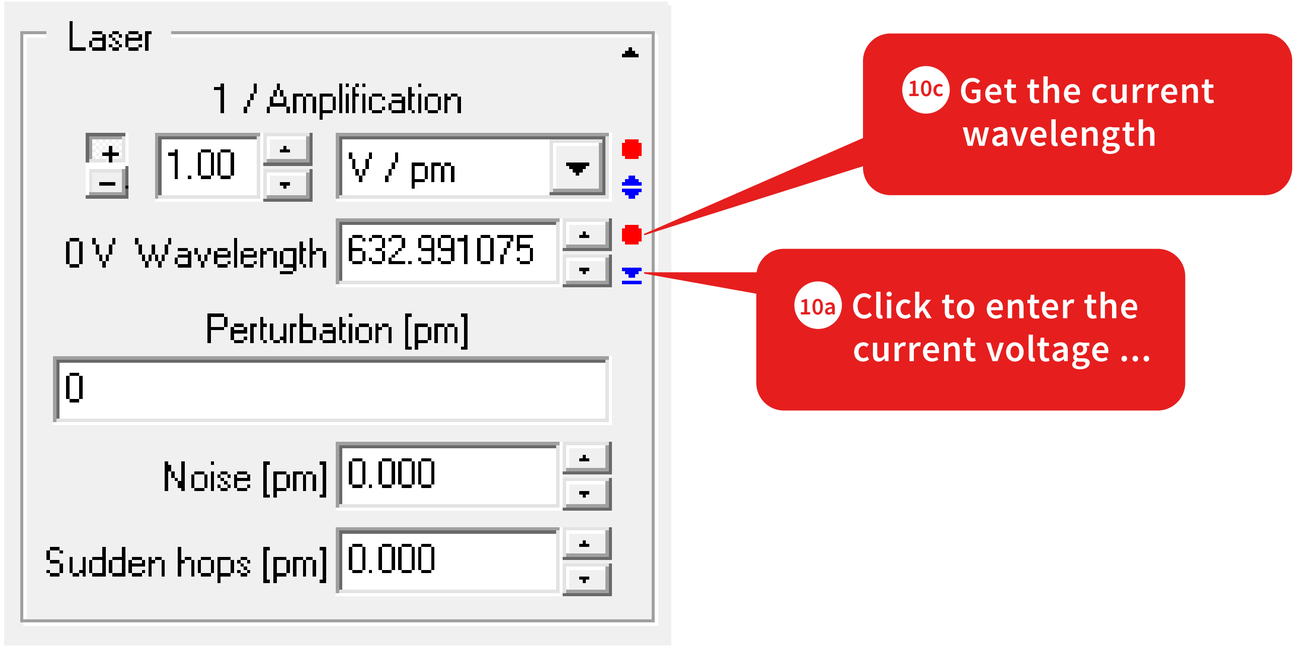
Then click on the red dot 9b to automatically **determine the sensitivity.** Once this is determined transfer the result to the frame “Regulation” and enter it as the “Sensitivity” of the laser.

Caution: this will vary the output voltage, so a safe choice for the bounds is important.





10

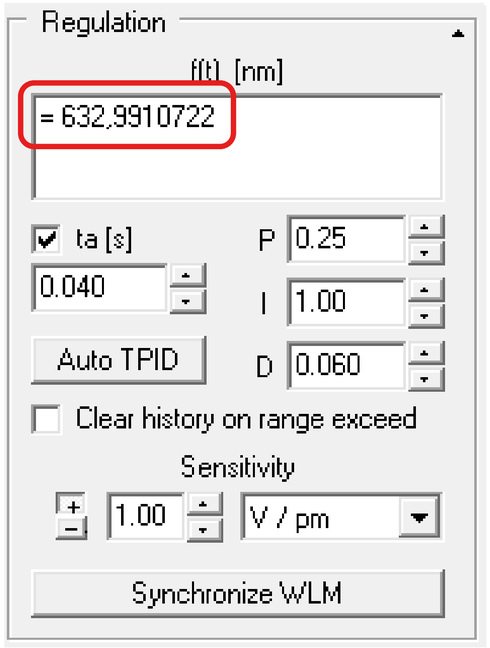


Click on the **blue triangle** 10a.

Enter the **current voltage** 10b.

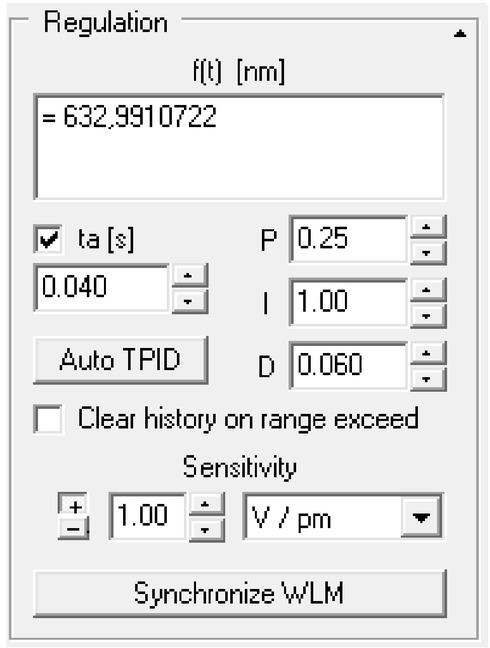
Get the corresponding wavelenth by **clicking on the red dot** 10c.

11



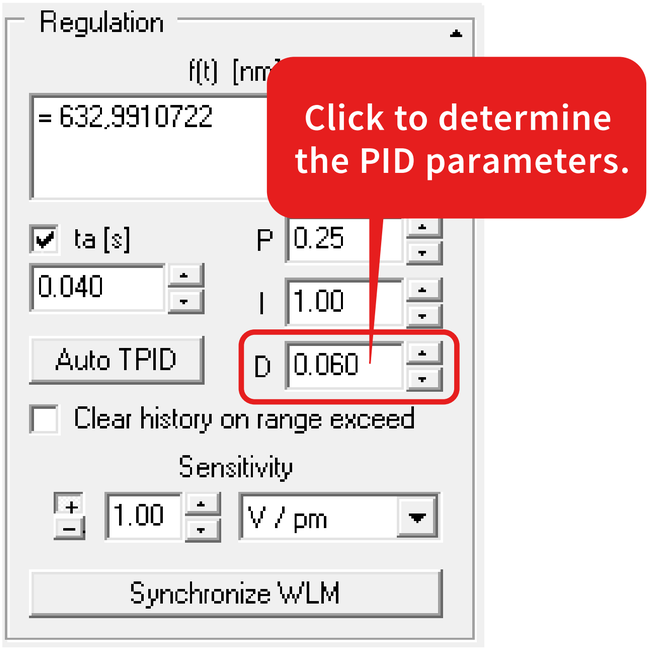
Enter a target **wavelength or a function**.

11a



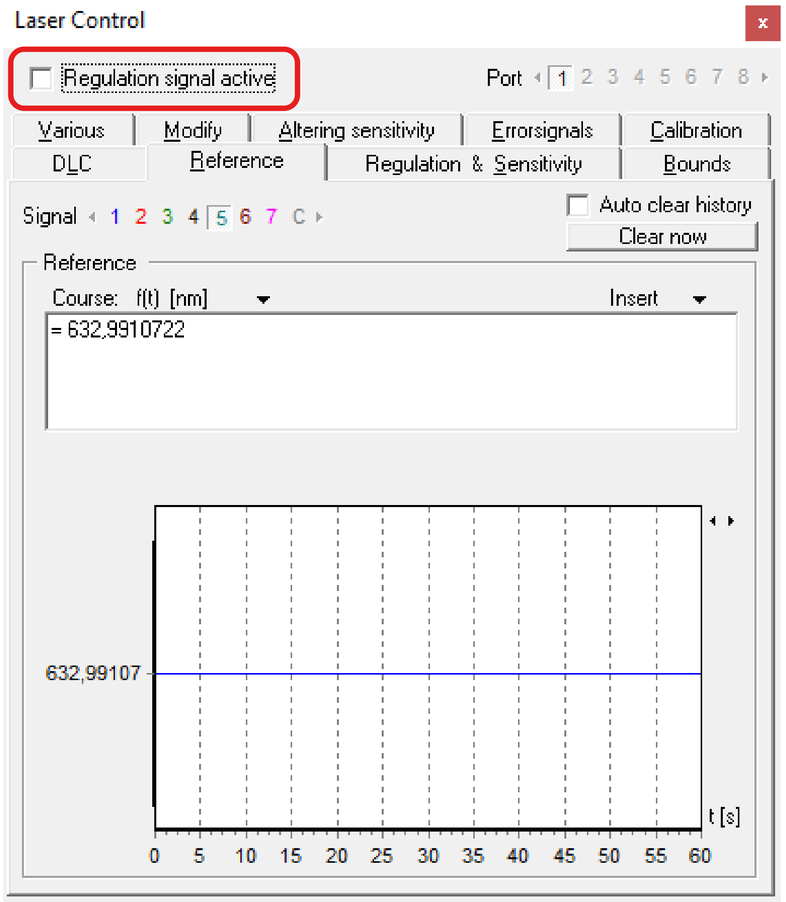
In this example the laser should be **stabilized at 632.9910722 nm.**

11b



Press **“Auto TPID”** to determine the PID parameters. **Finally, you can close the PIDSim2.** Now the system should be ready for a test.

12



For this **start the Regulation.**

You can **optimize the regulation** further by **using the LongTerm application** and **minimizing possible unwanted effects by altering the PID parameters.**

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The Standard of Accuracy

HighFinesse GmbH
Neckarsulmer Straße 5
72072 Tübingen, Germany

+ 49 (0) 7071 - 53 918 0
info@highfinesse.com
www.highfinesse.com

Find further information on products, data sheets and distributors on our website