285 nm-Laser (S-MOT)

The 285 nm Laser consists of a two-stage frequency doubled, raman-fiber-amplifier MOPA. The raman-fiber-amplifier is seeded by a diode laser.

- Laser-Diode current: 280 mA @which settings?
- Seed power (is displayed in the *FLPM RMU CCT 1.1.0.0* program): ~ 20 mW

Turning on the Laser

- Enable main-switch. Now set the key to standby.
- Wait for the LED to change the color from orange to green to orange (~15 seconds after turning on). Turn the key now.
- Start the program *FLPM RMU CCT 1.1.0.0* and select the checkbox of *Laser Enable*.
- The *Power Setpoint* **must stay** at *0.500 W*
    - Optimize fiber coupling to *Iodine Spectroscopy*. Transfer-efficiency > 70%
- Change *Power Setpoint* for 285nm SHG operation
    - *2 - 2.500 W* for *100-150 mW* directly after 285 nm SHG.
    - Do not exceed much more than *3.5 W*
- Flush the SHG with oxygen, by opening the bypass for roughly 10 seconds.
- Scan the SHG and optimize the incoupling and crystal position
- Lock the SHG, the voltmeter should display a value around 115 mV (@ 2 W Power Setpoint)
- Activate the powerstabilization

Turning off the Laser

- Unlock the laser in DigiLock
- Now just turn off the main-power on the laser
- Disable oxygen to 285nm SHG.

Locking to Iodine-Spectroscopy

- Start *DigiLock-Module Server* and connect to *S-MOT-Laser*
    - Push *Scan on* and *AutoLock*
    - Change the *Offset Value* to 0 V
    - Change the frequency with the piezo on the toptica rack electronics to be close to the iodine resonance (check with wavemeter)
    - Change the *Setpoint* (under *AutoLock*) to be in the middle of the error signal. Check, if the crosshair snaps to the slope.

- Move the crosshair to the second slope, rightclick on press *PID: Lock to Slop*.

- **Troubleshooting**
  - If signal in DigiLock-Software does not update/ signal is frozen → click the sampling checkbar to activate
  - If signal in DigiLock-Software does not show the usual error-signal at correct frequency, but is saturated at left and right edge of the frame (see picture) → Check the ref input for the lock-in-amplifier (near the iodine spectroscopy). Probably the input signal is too low. It should be slightly higher than 2 V (~2.2V works fine).

Lasersystem - Typical power values

The 285nm SHG was build by Jan Friebe and is described in his diplomathesis.

570 nm-Laser

- Outputpower after cube to 285 nm-SHG: ~ 1.2 W @ 2.5 W 1140nm pump
- Operationpower: < @ 3 W
- Max outpupower: ??? W @ ??? W

Iodine spectroscopy

500 mW pump of the yellow laser

- Infront fiber: ~ 38 mW
- After fiber: ~ 29 mW @ 0.500 W (= 400 mV @ 0.500 W) [efficiency ~ 70 %]

Normal operation (2-3 W)

- After fiber: ~ 100 mW

- At iodine cell: 20-40 mW

285 nm-SHG

- Outputpower: ~ **100+ mW** @ 2.000 W
- Stabilized power (infront AOM): **80-90 mW**
- Power behind the AOM: **43** mW @ 2.000 W (efficiency ~ 50 %)

- Power for the Zeaman-slower: **10 mW**

- Power behind the mystical mirrow: **30 mW**

From:
https://iqwiki.iqo.uni-hannover.de/ - **IQwiki**

Permanent link:
https://iqwiki.iqo.uni-hannover.de/doku.php?id=groups:mg:experiment:laser:285nmlaser

Last update: **2022/04/06 05:51**