



Work Status for the Photonics DP2-447 Laser

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Caltech

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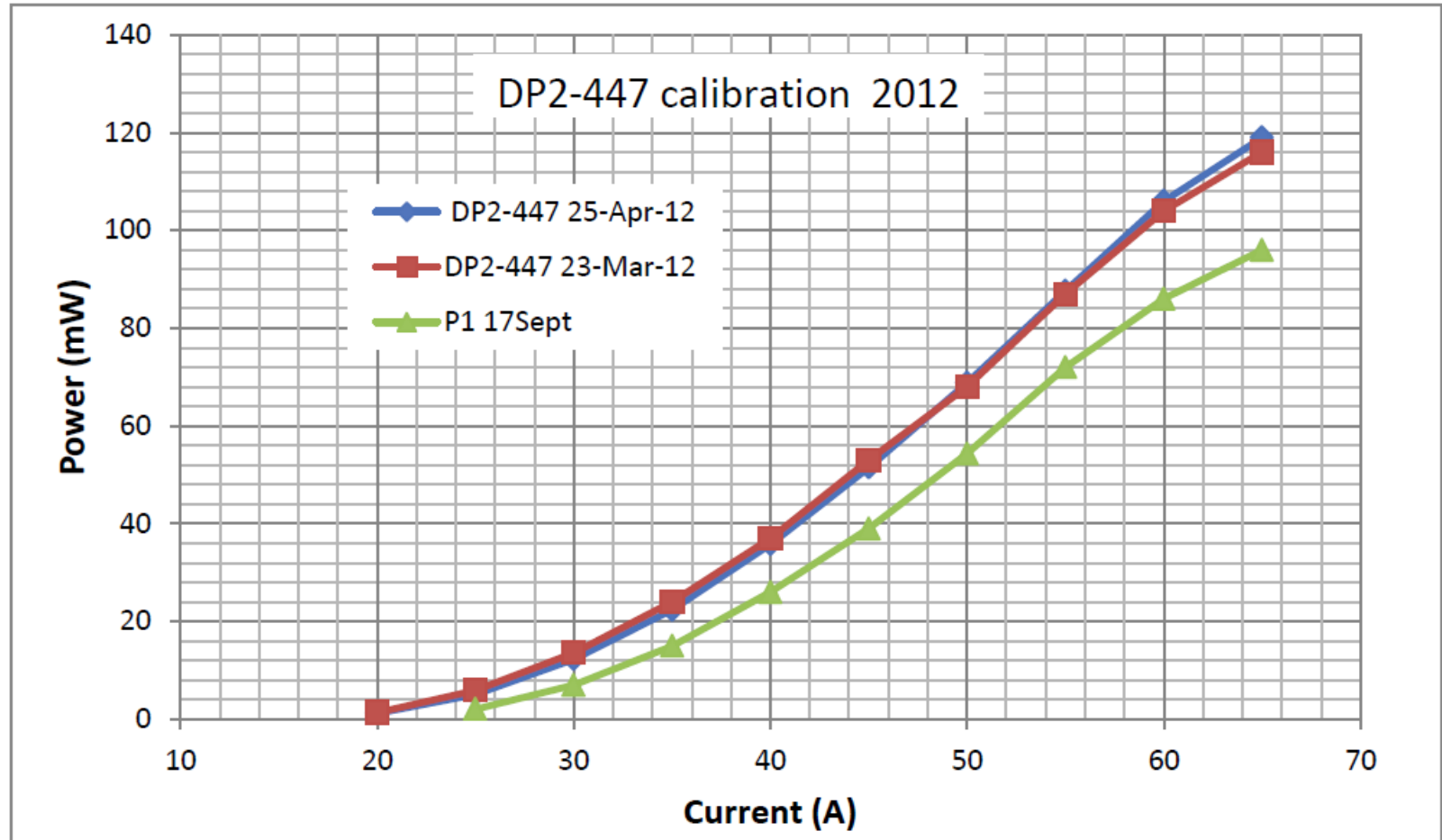
Summary of DP2 Diagnostics

- The laser power was found ~20% lower than April.
- The lasing threshold was found about 1A higher than April, indicating a low efficiency of the laser cavity.
- The output power (800 nm) of the two pump diodes vs. pump current was measured. The results are consistent with that measured at Photonics, indicating that the pump diodes are OK.
- The output window was uninstalled and checked. The power difference is <1%, indicating that the window is good.
- The temperatures of SHG and THG crystals and the Chiller were fine tuned in $\pm 1^\circ\text{C}$, the change of output power is within 3%. The default settings ($T_s\text{-SHG}=50.8^\circ\text{C}$, $T_s\text{-THG}=49.9^\circ\text{C}$, $T_s\text{-chiller}=25^\circ\text{C}$) are still at the best.
- Conclusion: There is a damaged piece of optics in the laser cavity.

After six months the DP2 laser head needs a warranty service

Power and Lasing Threshold

20% lower power & 1 A higher lasing threshold



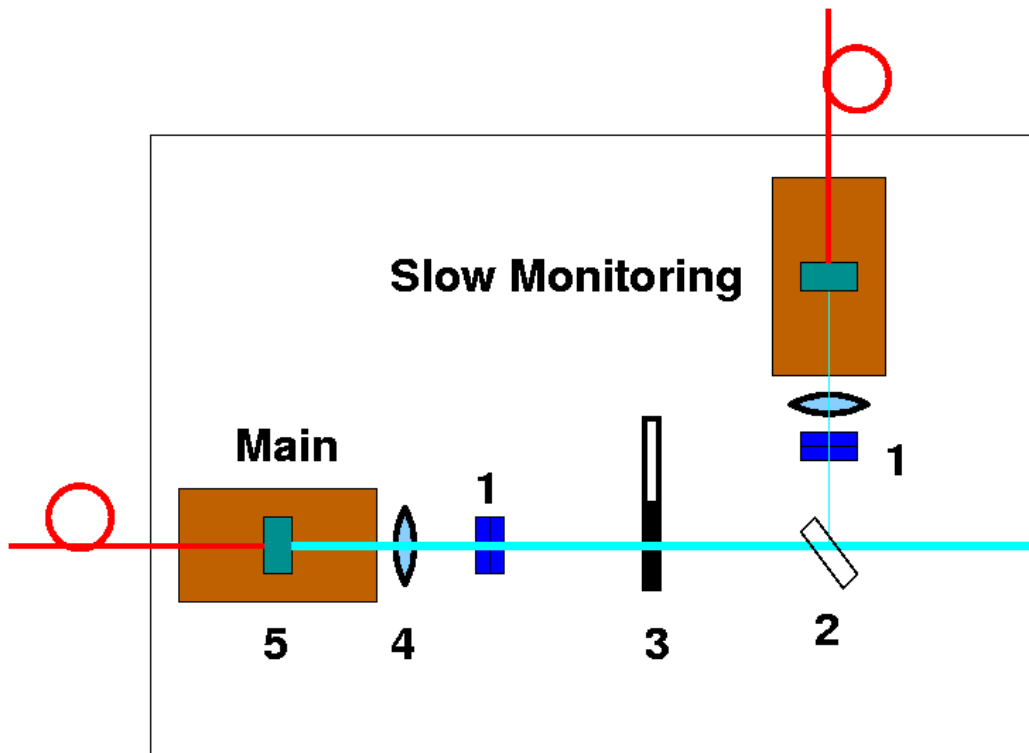
Diode IR Power Measurement

No difference as compared to Photonics Data

Current (A)	Diode 1	Diode 2
7	T	T
10	14.5	13.2
15	120	115
16	136	131
20	205	196
25	283	269
30	363	343
35	440	417
40	521	489
45	600	562
50	677	635
55	758	707
60	837	778
65	915	847

Simplify the Down-Stream Optics

- Two fold mirrors are removed.
- The Dichroic filter (FD1B) is replaced by colored glass fiber (FGB37).
- The attenuator wheel was found damaged and removed. A replacement wheel will be purchased later on.
- This configuration provides a stable slow monitoring for software feedback.



- 1: Colored Glass Filter**
- 2: Beam Sampler**
- 3: Beam Shutter**
- 4: Fiber Coupling Lens**
- 5: Fiber Coupling Stage**

Photonics Industries

DP2-447

Software Improvement by Kejun Zhu

- The readout of the temperatures of SHG and THG crystals in the laser DAQ program has been verified by manually changing the temperature.
- Two more parameters, 1) REQUEST ACTUAL CURRENT MEASUREMENT, 2.) REQUEST FLOW RATE, have been implemented into the laser DAQ program.
- Ongoing are the implementation of a software feedback code. The test of the simplified ancillary optics is under way. If successful, we'll try to implement the software feedback today.

To-Do-List for the Rest of This Week

- Implement software feedback, which should be able to stabilize the DP2 output for the next few months.
 - To further understand possible contamination of the second harmonic at ~ 670 nm, DP2 laser pulse spectrum with and without blue filters will be measured.
 - To understand the correlations between the pulse width at 10% and the pulse energy a pulse energy scan will be carried out.
 - Install and test the external warming unit of the chiller.
 - Maintain Quantronix lasers, check spare parts and make decisions on additional spare parts to be procured for runs until 2013 LS.
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