Quantum Cascade Solutions

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Datasheet for HHL-230

Recommendations:

Please read the User Manual and have a look at the FAQ at
http://www.alpeslasers.ch/?a=142

WARNING: Operating the laser with higher current or voltage than specified in this document may cause damage and will result in loss of warranty, unless Alpes Lasers has permitted to do so!

WARNING: Beware on the polarity of the laser. This laser has to be powered with negative pole on the pin 7 and positive pole on the pin 4. To use with a power-supply ILX Lightwave LDX-3232 or equivalent.

WARNING: Avoid bending module by applying too much torque on mounting screws. Keep temperature change rates below 10 degrees per minute.

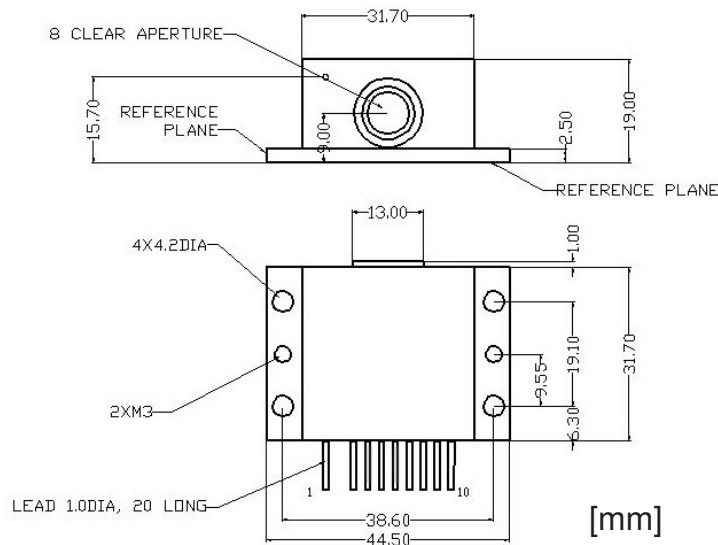| MODULE PIN-OUT	Pin n°
TEC (-)	1
Nonexistent	2
Resistor	3
Positive contact of the laser	4
Temperature sensor	5
Temperature sensor	6
Negative contact of the laser	7
Not connected	8
Not connected	9
TEC (+)	10

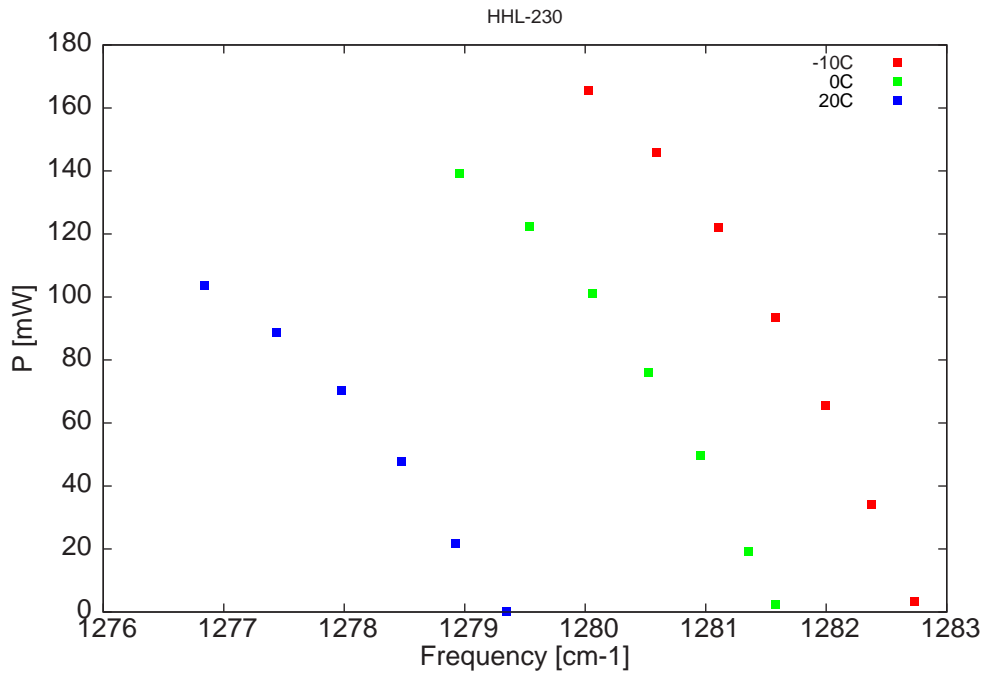Figure 1: Support mounting for HHL-230 (specifications of the HHL-L module)

Figure 2: Output power as a function of the singlemode emission frequencies and temperatures
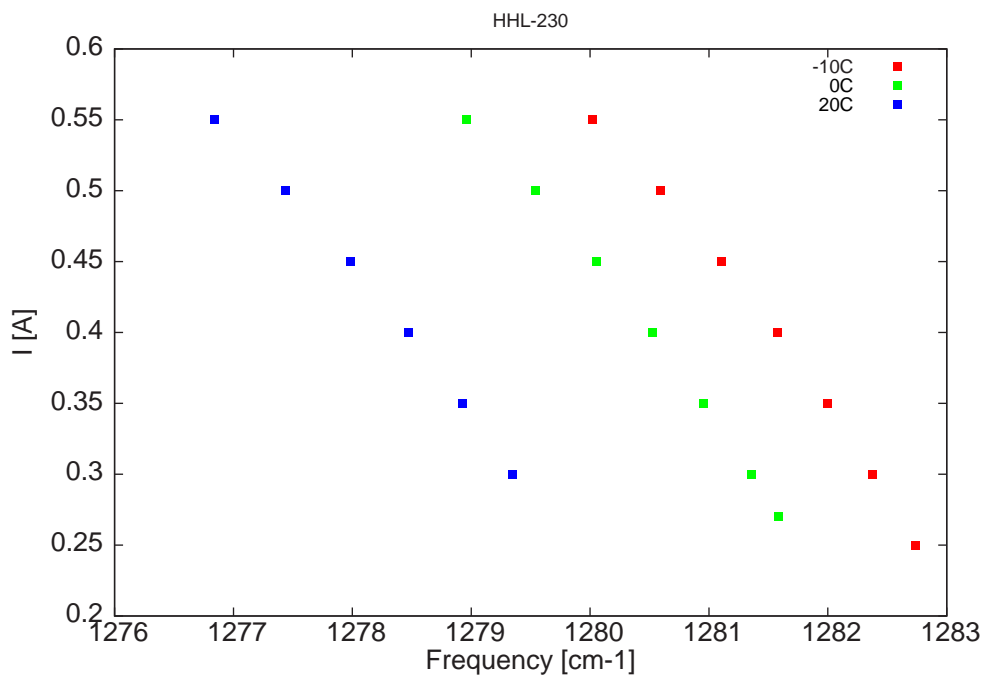

Figure 3: Applied DC current as a function of singlemode emission frequencies and temperatures

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λ[nm]	ν[cm^{-1}]	P[mW]	Temp[°C]	U$_{LASER}$[V]	I[A]
7795.8	1282.7	3.2	-10	8.5	0.25
7798	1282.4	34	-10	8.8	0.3
7800.3	1282	65.5	-10	9	0.35
7802.9	1281.6	93.7	-10	9.3	0.4
7805.8	1281.1	122.1	-10	9.6	0.45
7808.9	1280.6	145.8	-10	9.8	0.5
7812.4	1280	165.6	-10	10.1	0.55
7802.9	1281.6	2.5	0	8.4	0.27
7804.2	1281.4	19.1	0	8.6	0.3
7806.7	1281	49.6	0	8.9	0.35
7809.3	1280.5	75.9	0	9.2	0.4
7812.2	1280.1	101.2	0	9.4	0.45
7815.3	1279.5	122.3	0	9.7	0.5
7818.9	1279	139.3	0	9.9	0.55
7816.5	1279.3	0.1	20	8.4	0.3
7819.1	1278.9	21.7	20	8.7	0.35
7821.8	1278.5	47.9	20	8.9	0.4
7824.8	1278	70.2	20	9.2	0.45
7828.2	1277.4	88.7	20	9.5	0.5
7831.8	1276.8	103.8	20	9.7	0.55

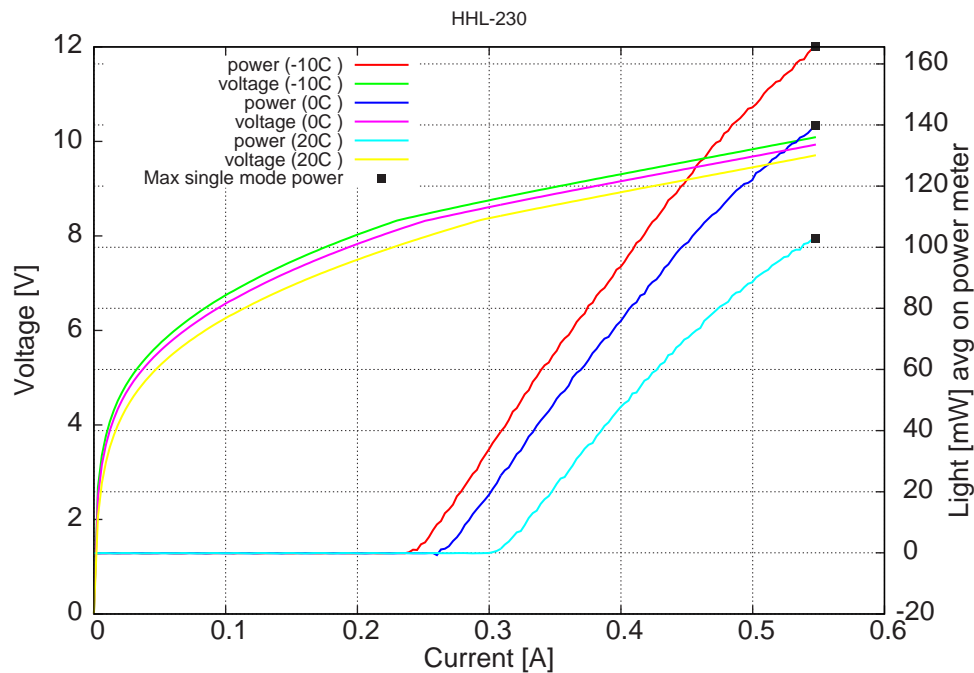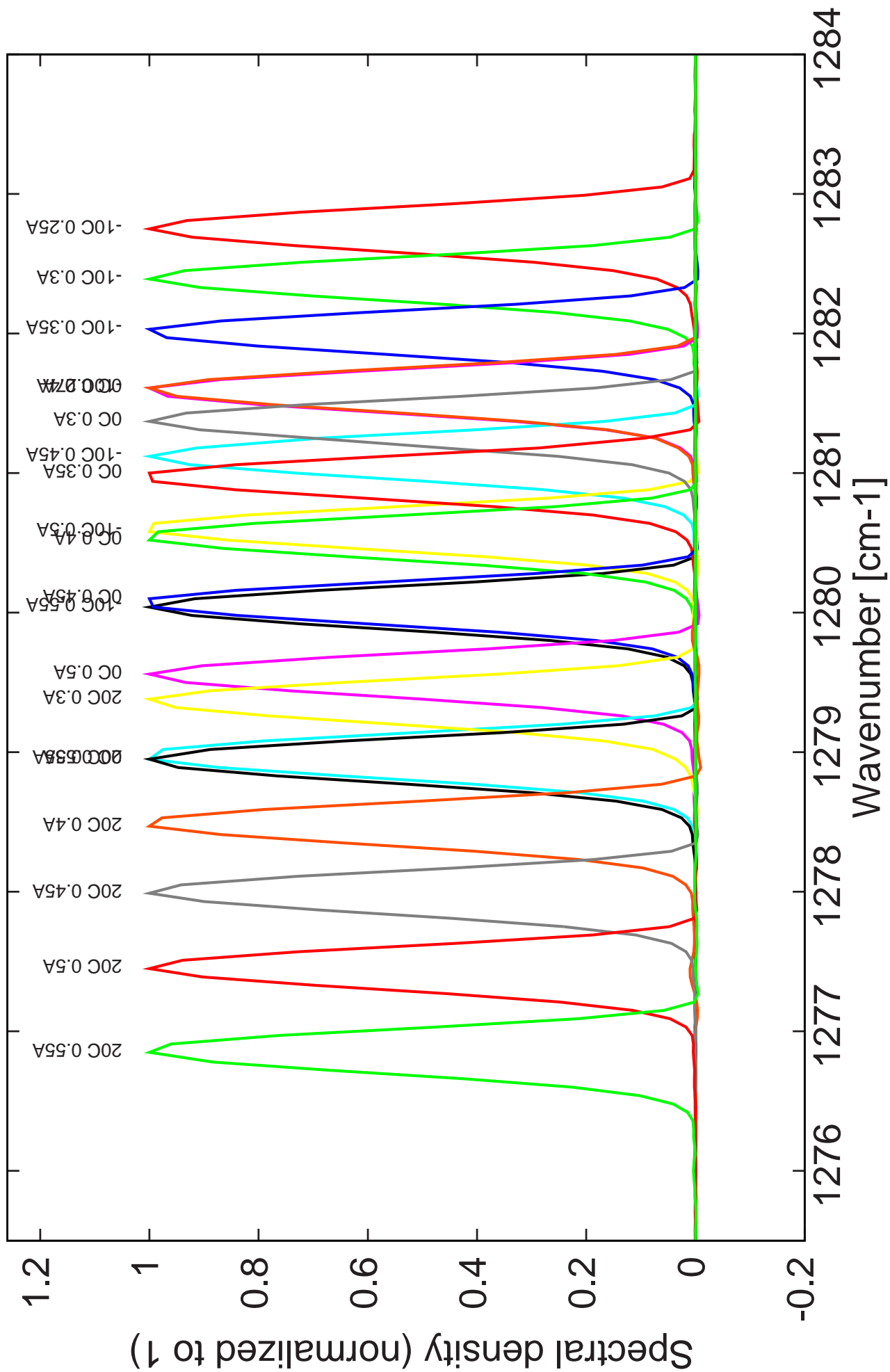Table 1 : singlemode optical output power as function of operating parameters

Figure 4: voltage and avg power vs current in continuous-wave operation (the solid squares indicate the maximum singlemode emitted power)

Note: at -10C: Ith=240mA / Vth= 8.4V (2-wires measurements). Maximum operation current: 0.55A for all temperatures.

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Figure 3: spectra at different temperatures for various DC currents (monomode)

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Resistor geometrical parameters

h_R [μm]	w_R [μm]	d_{AR} [μm]	n [cm^{-3}]	L [mm]	w_{AR} [μm]
2	6	3	2e16	2.25	13.5

Table 2 : Resistor geometrical parameters

Resistor tuning characterization

I_R [A]	V_R [V]	ν [cm^{-1}]	Pw [mW]	I_L [mA]	T [C]
0.000000	0.149000	1278.033125	109.900	550	10
0.461000	2.573000	1277.249750	97.700	550	10
0.580000	3.265000	1276.948500	92.700	550	10
0.664000	3.787000	1276.586875	87.800	550	10
0.731000	4.235000	1276.285500	82.900	550	10
0.786900	4.639000	1275.923875	78.600	550	10
0.837000	5.027000	1275.622625	73.800	550	10
0.881100	5.391000	1275.261000	68.400	550	10
0.921100	5.745000	1274.899375	63.200	550	10
0.958000	6.091000	1274.537875	58.300	550	10
0.992100	6.431000	1274.176250	53.200	550	10
1.024000	6.770000	1273.814750	47.800	550	10
1.054100	7.108000	1273.453000	42.200	550	10
1.083000	7.456000	1273.031250	36.700	550	10
1.110000	7.806000	1272.549125	30.800	550	10
1.136100	8.167000	1272.127250	24.360	550	10
1.160000	8.520000	1271.645125	17.990	550	10
1.184000	8.901000	1271.102750	11.840	550	10
1.207100	9.294000	1270.500125	4.730	550	10

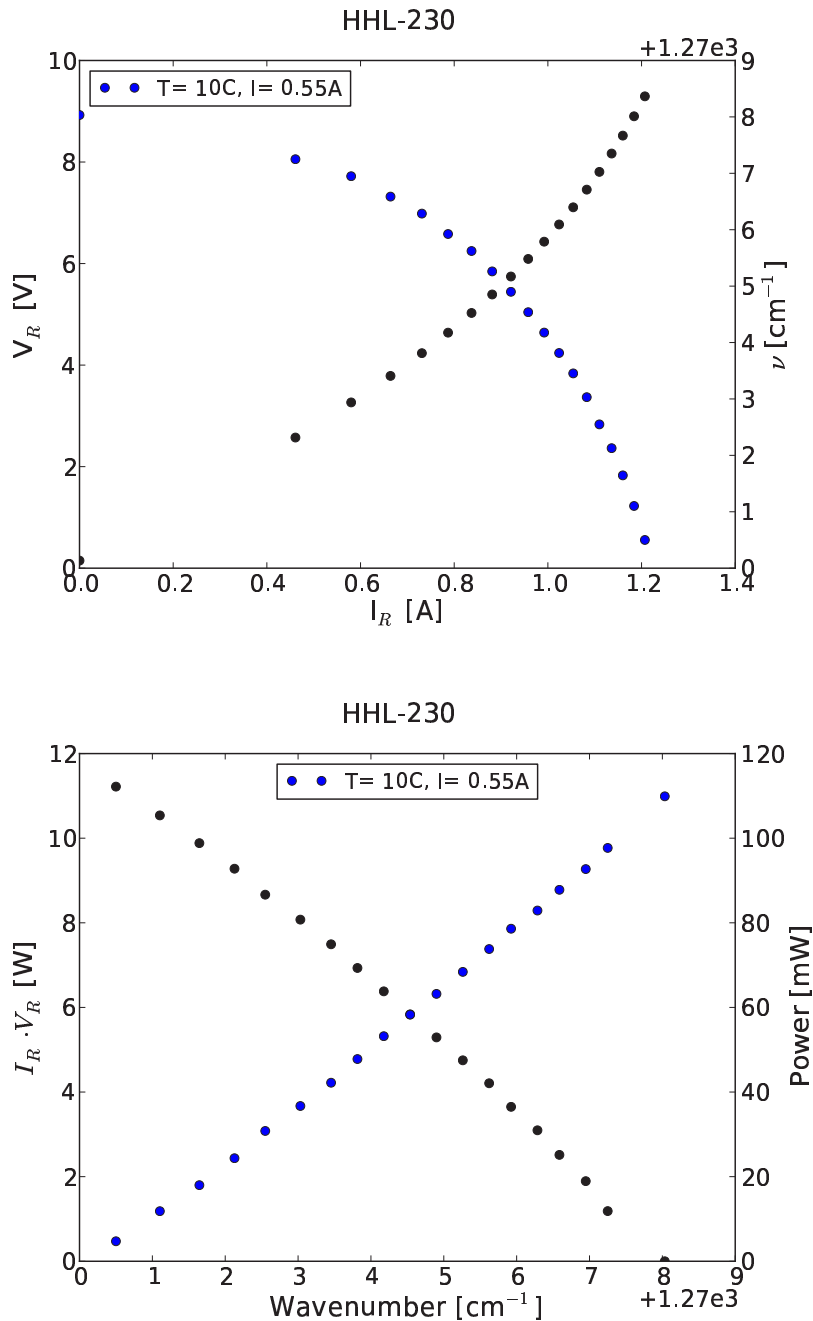Table 3 : singlemode optical output power and wavelength as function of operating parameters

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Figure 5: Submount temperature 10C and laser current I_{Las}=550mA. Top: Resistor voltage vs resistor current (left axis) and emission wavelength tuning vs resistor current. Bottom: Electrical dissipation in the resistor vs the emission tuning(left axis) and the optical power vs the wavelength tuning.
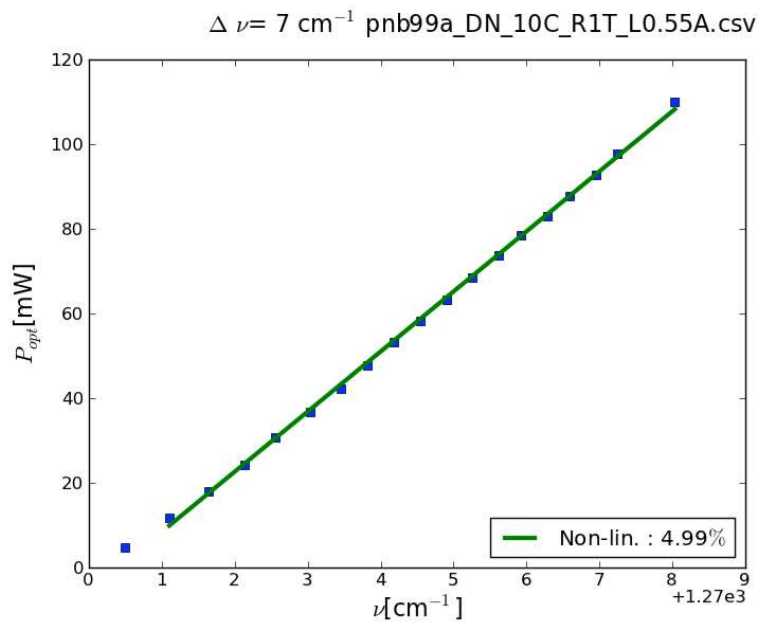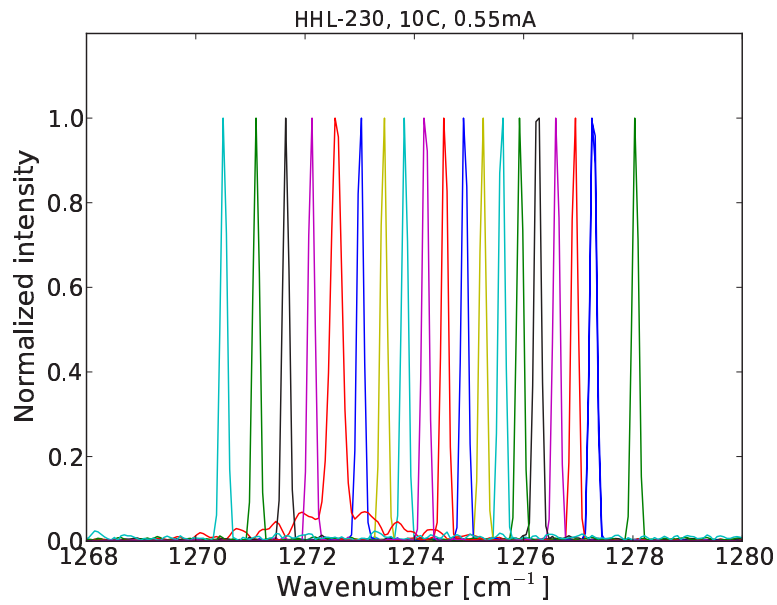
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Figure 6: Top: Optical spectra as function of the resistor currrent. Bottom: Optical power as function of the emission wavelength at 10C. Using a linear fit a non-linearity as low as 4.99% has been observed.