Potential 2nd order spectrum using the OL490 light source:

# Material list

G & H OL490 light engine:

* Wavelength range of 380-780nm
* Xenon light source

PhotoResearch PR730 spectroradiometer (380nm to 780nm)

Ocean Optics QE65 Pro spectrometer (200nm to 1100nm)

# OL490 light guide as microscope illumination + PR730 fiber detector in the eyepiece tube

For an input wavelength smaller than 390nm, there is a 2nd peak that’s detected (twice the original wavelength) (Figure 1 and 2)



Figure 1: OL490 at microscope light input, PR370 fiber at eyepiece tube, inputs from 380nm to 780nm in steps on 10 nm, measurements from 380 to 780 in steps of 1nm.



Figure 2: OL490 at microscope light input, PR730 fiber at eyepiece tube, inputs from 380nm to 390nm in steps on 1 nm, measurements from 380 to 780 in steps of 1nm

# OL490 light guide + PR730 fiber detector at both ends of a 2” tube

2nd order peak, this rules out the microscope optical train, Figure 3



Figure 3: OL490 fiber and PR730 fiber at both ends of 2" tube, inputs from 380nm to 390nm in steps on 1 nm, measurements from 380 to 780 in steps of 1nm

# OL490 light guide + PR730 with lens detector in a 2” tube

2nd order peak, this rules out the fiber detection attachment, Figure 4.



Figure 4: OL490 light guide + PR730 with lens connected using a 2" diameter tube, inputs from 380nm to 390nm in steps on 1 nm, measurements from 380 to 780 in steps of 1nm

# OL490 light guide + QE65 fiber detector at both ends of a 2” tube

2nd order peak, this rules out the microscope optical train, Figure 5



Figure 5: OL490 fiber and QE65Pro fiber at both ends of 2" tube, inputs from 380nm to 390nm in steps on 1 nm, measurements from 380 to 780 in steps of 1nm

# OL490 light guide + TopCon SRUR1L with lens output in a 2” tube

No second order peaks, Figure 6



Figure 6: OL490 light guide + TopCon SRUR1L with lens connected using a 2" diameter tube, inputs from 380nm to 390nm in steps on 1 nm, measurements from 380 to 780 in steps of 1nm

# Conclusion

Contrary to what I thought initially, the OL490 light engine does not generates second order spectra.

PR730 generates second orders peaks between 760 and 780 nm for inputs wavelengths 380 to 390 nm. These ranges correspond to tails of the color matching functions though which have small values.