

Supplementary materials for “Spectral fingerprint of laser emission from rhodamine 6g infused male Indian peafowl tail feathers”

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This PDF file includes scanning electron microscope (SEM) images, optical microscope images, pump laser timing information, fluorescence data for rhodamine 6g (R6g) in a 70/30 ethanol/water solution, images of dye-cycled Indian peafowl eyespots, and additional emission spectra.

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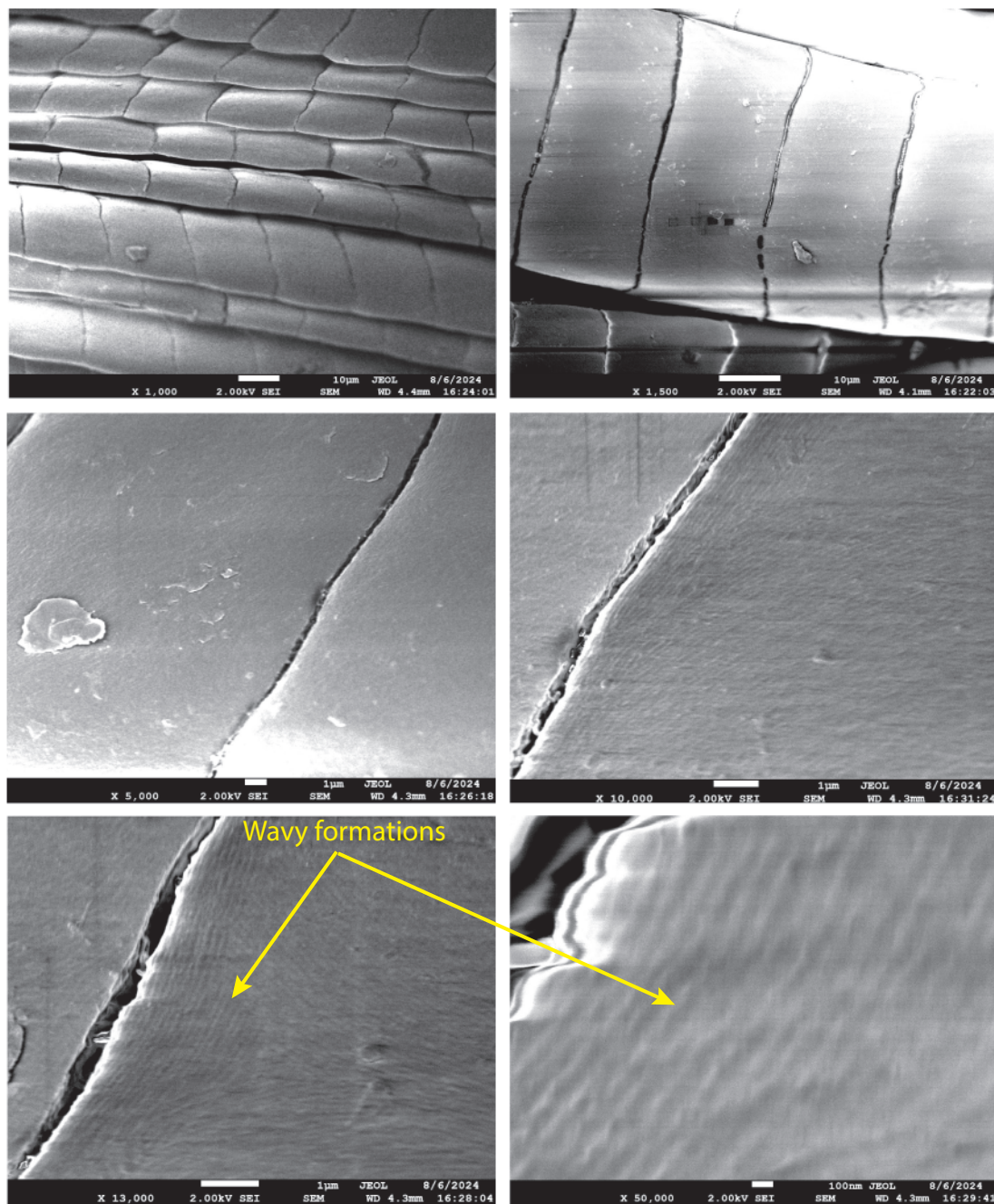


Figure S1: SEM images of a peacock feather's barbules at different scales. We see wavy formations, but they are not attributed to the laser emission observed in the main article. The rods covered by the sheath that result in structural color are also not attributed to the laser emission observed in the main article.

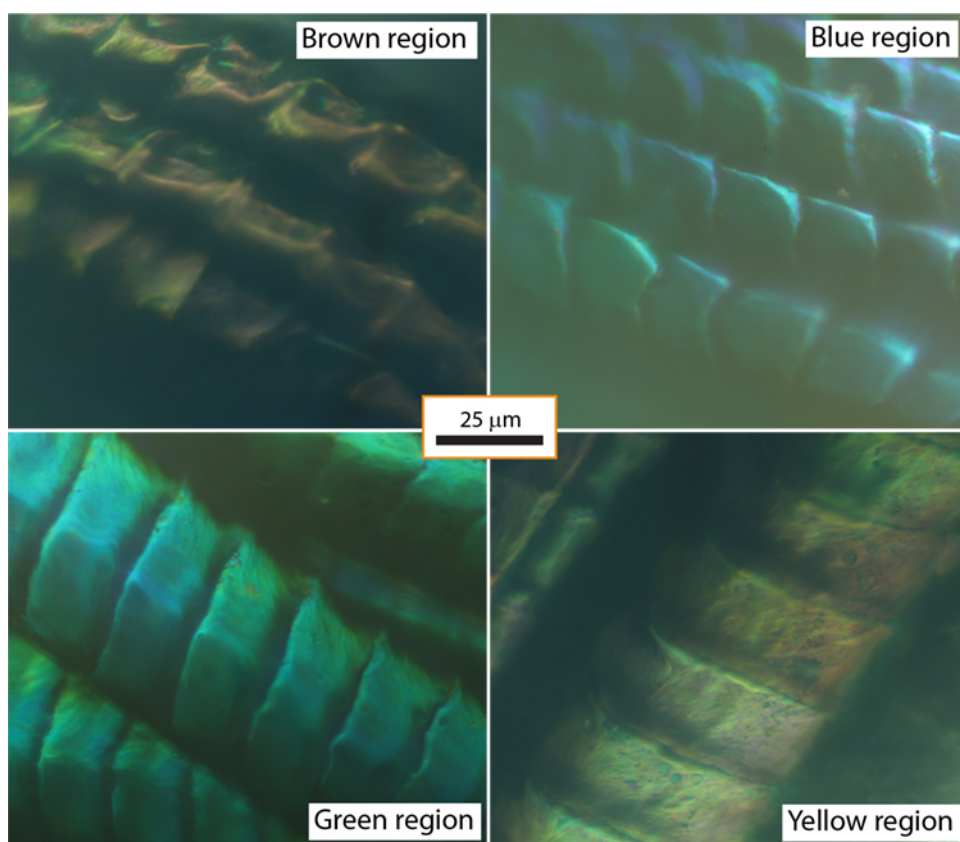


Figure S2: Optical microscope images of the barbules from different color regions.

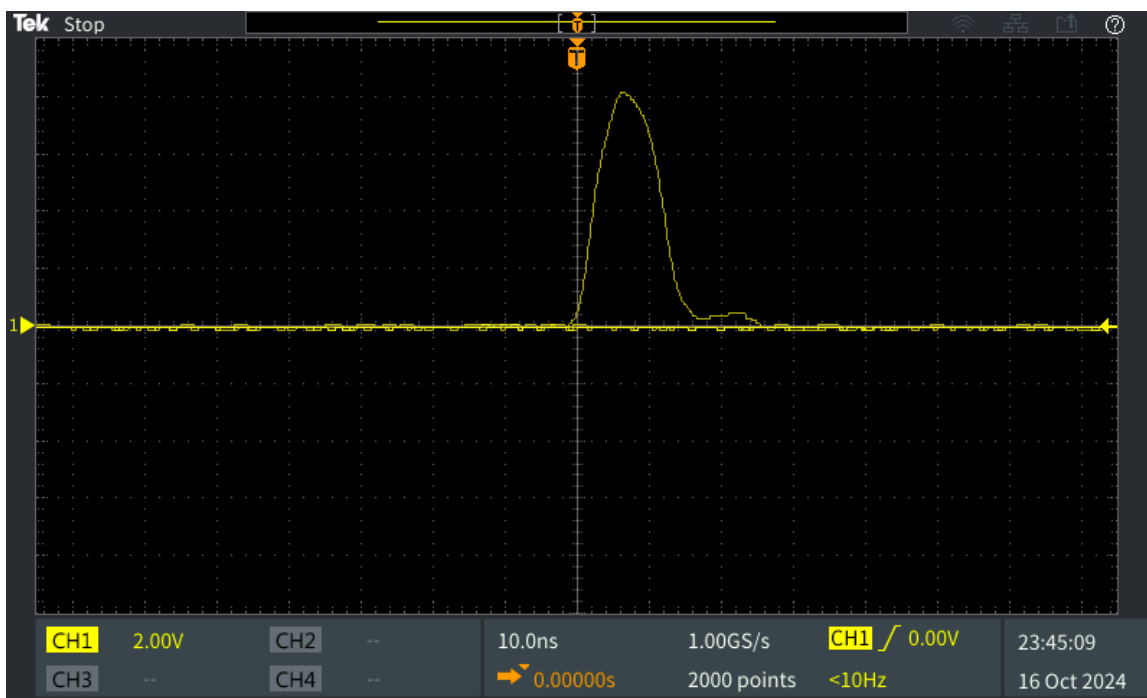


Figure S3: The output timing of the frequency doubled Nd:YAG laser for a Q-switch timing setting of “250.” The data was collected using a fast photodiode and a 200 MHz oscilloscope.

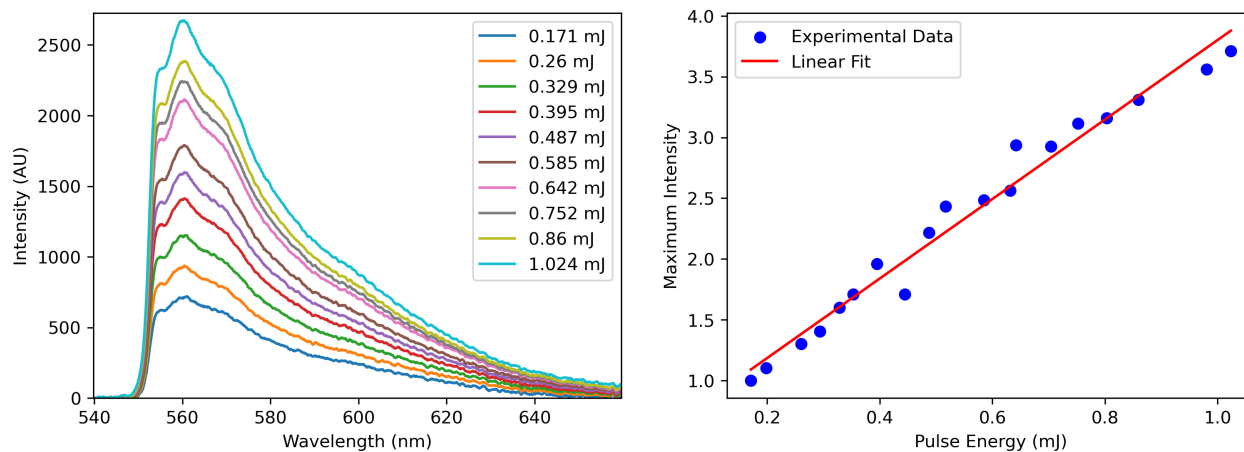


Figure S4: The fluorescence data for a pristine R6g-doped solution of 30% water and 70% ethanol.

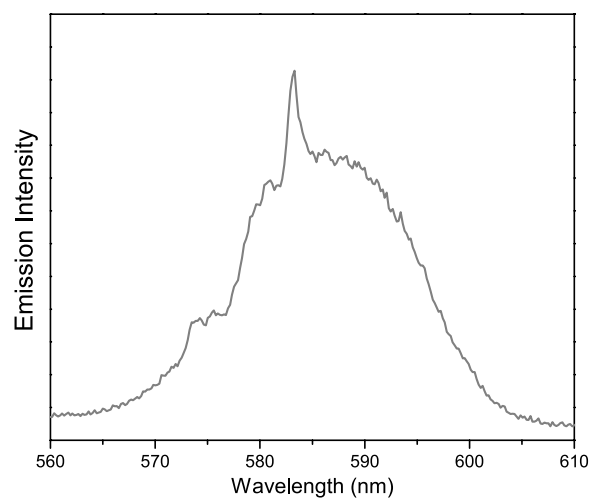


Figure S5: Emission from an different Indian peafowl tail feather after dye cycling. This feather was free standing with no substrate behind it.

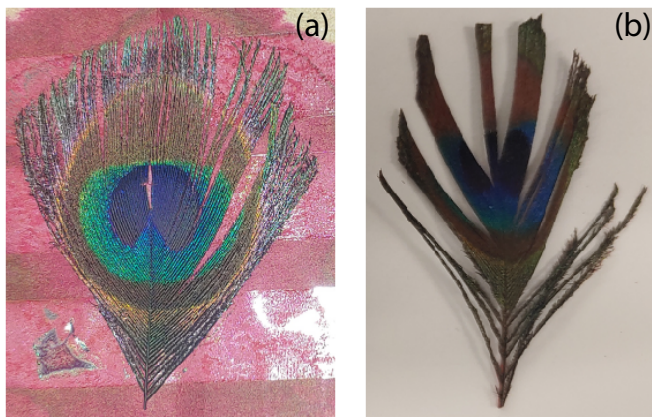


Figure S6: Images of two dried peacock feathers after dye cycling. The feathers are either (a) mounted on a substrate or (b) free standing.

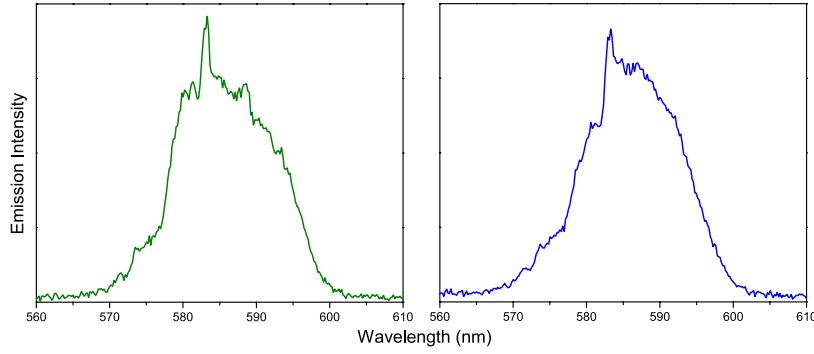


Figure S7: Results collected by Florida Polytechnic University students in their Experimental Techniques in Engineering Physics (PHY 3840L) course. The objective was to read the preprint titled “Spectral fingerprint of laser emission from rhodamine 6g infused male Indian peafowl (*Pavo cristatus*) tail feathers,” process samples, and collect emission spectra. The results from the class show strong emission peaks at 583nm with small peaks beginning to appear in the spectra at 574 nm. Samples were prepared during the first two-hour lab session. A less complicated optical setup was constructed and spectra were recorded during the second two-hour lab session.

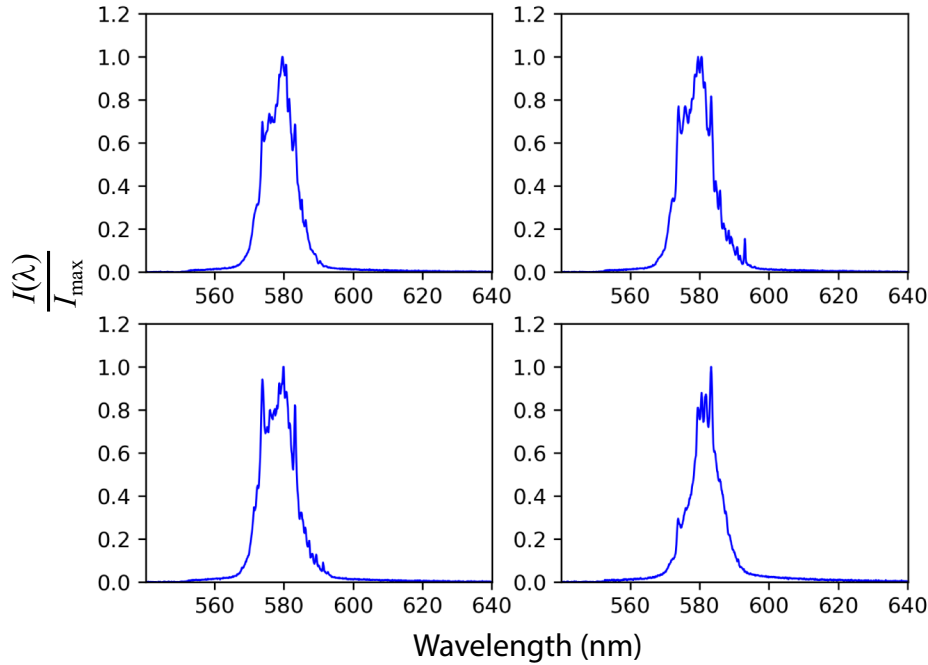


Figure S8: Spectra showing both of the lower threshold laser modes as well as some random laser modes when the pump is increased above the sample burn threshold. Here, $I(\lambda)$ is the intensity as a function of wavelength and $I_{\max}$ is the maximum intensity at a given wavelength for each plot.

The authors thank the undergraduate students (Sewan Ali, Ashley-Nicole Brizan, William Hackney, Micah Peters, Rebecca Robinson, and James Tedder) from the Florida Polytechnic University, Experimental Techniques in Engineering Physics course for sharing their recorded spectra provided in Figure S7.