



TIM STONE'S SOLAR SPECTRUM PROJECT*

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My solar spectrum project is ongoing. The purpose of the dataset you are working with was to improve my processes and procedures for acquiring moderate resolution solar spectra, as well as to explore detailed line identification techniques and aesthetically pleasing results presentation formats. I used a LowSpec 3D printed spectrometer (<https://www.thingiverse.com/thing:2455390>) with a Thorlabs 1200l/mm grating and a 10 μ slit for highest resolution. The telescope I used was an 80mm f4 ED doublet refractor stopped down to f10. I used the sky near the sun as the source of the spectrum. The imagery was acquired with a FLIR Chameleon 3 USB web cam. The resulting spectrum is about R=12000 @6643Å. The NIR from 6850 to 10000Å utilized a longpass filter to eliminate second order contamination. I have experimented with a shortpass filter to acquire spectral data from the second order from 3800 to 5000Å, but difficulties with the spectrometer mechanics affected the quality of that data. When those difficulties are corrected, I will acquire a new set of second order data to understand its characteristics and usefulness.

I have now purchased the optical components for a new, higher resolution SolEx spectrometer (<http://www.astrosurf.com/solex/>). It, too, is 3D printed and with a 2400l/mm grating and a 10 μ slit, promises R=18000. This new instrument uses ED lenses which introduce significantly less chromatic aberration at the blue end than my current LowSpec spectrometer. It is my goal to image the photosphere directly with this instrument, rather than the near-sun sky. This will allow me to begin to note spectral differences between benign photosphere and active regions. I hope also to be able to begin measurements of doppler shifts, but I don't know yet if I will have sufficient resolution to do so. I plan to use cross-correlation techniques to attempt these measurements. It is not clear how deep into the NIR I will be able to go with this new instrument. Once it is constructed, I will be able to know its limits. I hope to have this new spectral data acquired by the end of summer 2021.

Between the LowSpec and the SolEx spectrometers, I expect to produce a new dataset with the goal of achieving R=15000 or higher across the spectrum from 3700 to 10000Å before the end of 2021.

*Tim Stone and OAG Team are currently collaborating in the development of their projects.

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