

Using H α Spectra and Imaging to Glimpse Precursors of Solar Flare Activity
Alexandra Mannings (The University of Alabama, Alabama), NWRA, Boulder, CO.
Mentor: KD Leka

The chromosphere, the transition layer between the photosphere and the corona, is thought to house small reconnection events before a flare event. H α , being the defining chromospheric line, can show small changes that will indicate pre-flare signatures of excitement that are specific to pre-flare regions. We use data from the Mees H α CCD Imaging Spectrograph, specifically a database of high-cadence H α images and spectra of the sun's active regions. By sampling points in time that are directly before a flare or remain quiet for hours to days, we will be able to effectively compare the populations and how they change over time. The use of this data will enable us to look at activity before a flare that may differ in nature from a region that will remain quiet. Differentiating between the two will allow us to understand basic physical differences between the two populations and hence improve accuracy for flare prediction. High temporal cadence of the instrument allows us to show small intermittent changes that could possibly signify a developing flare. We will be sampling the data to measure characteristics such as line width, line depth, and Doppler shift – taking full advantage of the presence of the H α well-sampled and widely sampled spectra ($\pm 9\text{\AA}$). We parameterize these values and apply them to discriminant analysis to see if we can successfully describe pre-flare and pre-quiet chromospheric characteristics.