

Identifying Emission Lines in the Solar Extreme Ultra-Violet (EUV) Irradiance Spectrum

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Compared to the visible, the EUV is extremely variable and plays a significant role in fluctuations in the Earth's upper atmosphere. By identifying which elements produce emission lines in the EUV, the spectrum can be used as a diagnostic tool for how the temperature of the plasma changes over time thereby benefiting solar and earth atmospheric scientists alike. We use data from the Extreme Ultra-Violet Experiment (EVE) on the Solar Dynamics Observatory (SDO). EVE produces a spectrum every 10 seconds at 0.1 nm spectral resolution, which were then averaged over every hour, to remove noise, for a period of 46 days starting from April 30th 2010 and ending June 15th 2010. We used a subset of EVE data from 17 nm - 37 nm. To initially determine which ions produce emission lines, the atomic physics database CHIANTI was used. Time series of individual ion emission lines were extracted and compared with different lines from the same ion to determine which lines evolved the same. Lines which correlate well should be produced by the same ions and those that do not may be blends with other ions. Emission lines from Fe IX, Fe X, Fe XI, Fe XII, Fe XIII, He II, O IV, OV, OVI, Mg VI and Mg VII were extracted and analyzed over a slow variation. Since the iron ions are all produced around the same temperature, they all evolved similarly even when different iron ions were blended together. Results are presented.