M07a Complex Nature of the Line Width Variations with Height of Coronal Emission Lines

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Earlier (ApJ, 585, 516, 2003; Solar Phys., 212, 343, 2003), we have obtained off-the-limb spectroscopic observations in a number of forbidden emission lines ([Fe X–XIV]) to study the physical properties and temporal variations in the coronal structures. Short exposure times adopted in these observations permitted us to study the variation in line-width up to about 100″ above the limb. With a view to investigate variations in parameters of coronal emission lines to larger heights up to about 500″, we have made raster scans with larger exposure times, a factor of about 10 as compared to the earlier observations, on several days during the period of September–October, 2003.

The plot of FWHM as a function of height indicates that the slope of variation changes with height. In most of the structures, the FWHM of the [Fe XIV] 5303 Å line decreases up to 300″ ± 50″, first with higher and then at slower rates, and after this height the FWHM starts increasing. The FWHM of the [Fe X] 6374 Å line increases up to about 200″ first at a slower rate and later at a higher rate, and then appears to decrease with height. The variations in FWHM of the [Fe XI] 7892 Å and [Fe XIII] 10747 Å lines with height show an intermediate trend and confirm our earlier results. The decrease in FWHM of the 6374 Å emission line with height in the 200″–300″ range has further complicated the explanation of the observed variation in FWHM of these lines with height.