

H/He+ intensity variations of the cool corona

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Outside the solar disk cool emissions can be recorded. They are inserted into the surrounding hot corona and their properties are still not well known. Emissions from neutral hydrogen can be registered using the well known H-alpha line. With a coronagraph it is possible to record this line through an interference filter broad enough to avoid Doppler effects. In these observations we used a 0.3 nm width filter associated to a 15 cm aperture coronagraph equipped with a 16 bits 1K-CCD camera. The filter is wide enough to exclude all usual Doppler shift effects produced during a prominence eruption.

An another type of cool emission is recorded using the resonance 30.4 nm line of HeII. The neutral hydrogen lines are emitted near 8000 K; the HeII line at 30.4 nm is emitted near 50000 K. The EIT instrument of SOHO records every day 4 images in the 304 channel when observing in the routine mode. Among the thousands of available images, we selected an image taken from the daily ground based H-alpha survey at the same time as the HeII image taken from space, as a part of the time sequence covering the rather large polar region eruption event of June 14, 1999 at 13:19 UT. The couple of images was analysed in order to look at the possible correlation seen when H-alpha emissions are compared to HeII emissions OUTSIDE the disk.

The figure 1 shows the result of the correlation analysis. The correlogram 304/H-alpha was built using a sky background corrected H-alpha image and a raw 304 image. Although many points are present in both images, it is premature to claim a correlation between both emissions because no definitive relations appears between the corresponding flux values. Instead of a correlation, two horizontal branches are noticed on the correlogram, without apparent significance. A color method to overlap both images at the same scale shows more qualitatively the correspondancies. This last method shows that most of the non-correlated points are produced in the region where a prominence eruption occurred (near the south polar region), which initiated a large CME event as it was seen later by the Lasco(SOHO) coronagraphs. In case of a dynamical event, emissions processes for this two lines depend of the large proper motions and heating mechanisms for HeII and Hydrogen. However, before concluding about the different properties of this two emission lines in the case of a dynamical event, it is necessary to analyse more carefully the contribution of the SiXI line emissions in the total flux recorded in the EIT 304 channel. This line produced in the hot part of the corona, may have an important contribution if the prominence eruption occurred at the same time as a hot erupting material is formed. To evaluate and correct this effect we plan to further analyse the 195 EIT Fe XII channel images.

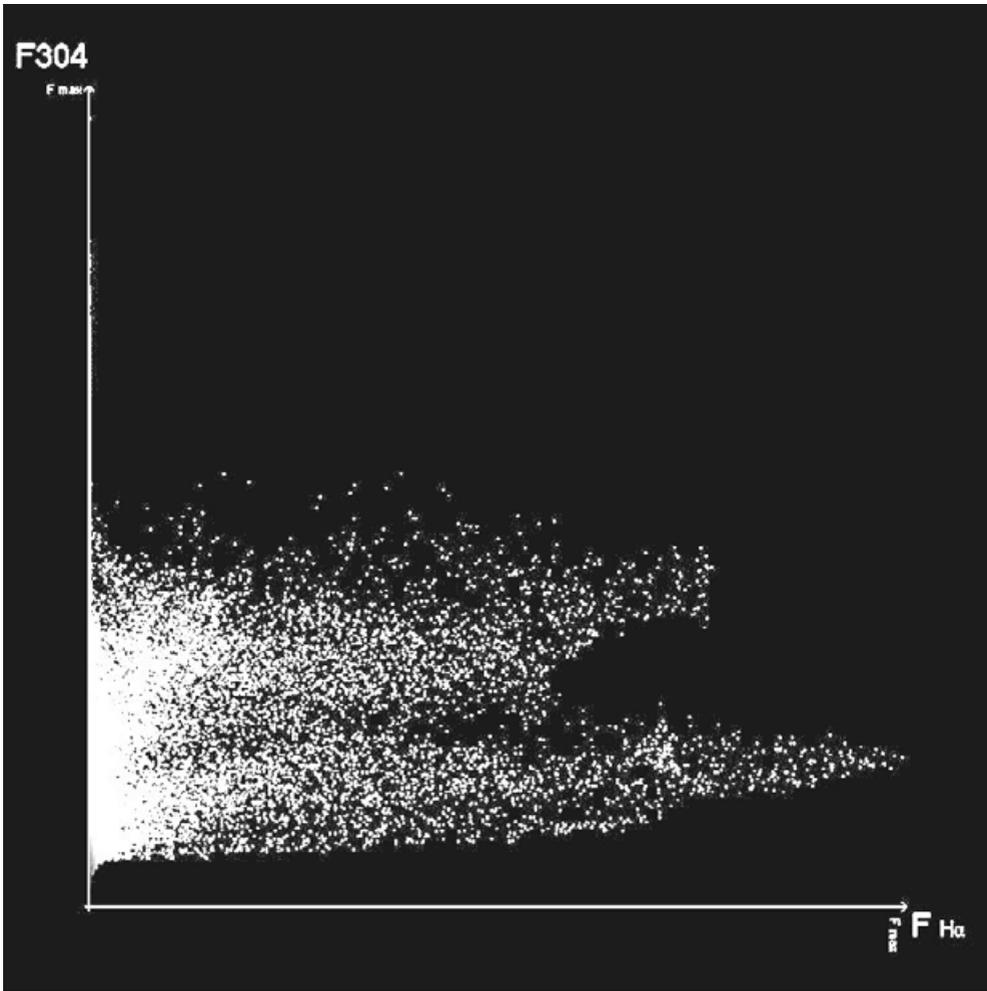


Figure 1. The correlogram HeII(304 A)/H-alpha