

DYNAMIC EVENTS IN THE X-RAY CORONA

(*A Progress Report from the AS&E X-ray Telescope on Skylab*)

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Abstract. Data obtained by the AS&E X-ray Telescope Experiment during the first Skylab mission have revealed a variety of temporal changes in both the form and brightness of coronal structures. Dynamical changes have been noted in active regions, in large scale coronal structures, and in coronal bright points. The coronal activity accompanying a series of H α flares and prominence activity between 0800 and 1600 UT on 10 June 1973 in active region 137 (NOAA) at the east limb is shown in Figure 1. It is characterized by increases in the brightness and temperature of active region loops and a dramatic change in the shape and brightness of a loop structure. Figure 2 shows the reconfiguration of an apparent polar crown filament cavity between 1923 UT on 12 June 1973 and 1537 UT on 13 June 1973. A ridge of emitting material which attains a peak brightness at least four times that of the surrounding coronal structures appears within the cavity during the course of the event. Typical X-ray photographs with filters passing relatively soft X-ray wavelengths (3–32, 44–54 Å) show 90 to 100 X-ray bright points (Vaiana *et al.*, 1973). On twelve occasions in the data from the first mission, such bright points were seen to increase in intensity by two orders of magnitude in less than 4 min. Such an event is shown in Figure 3.

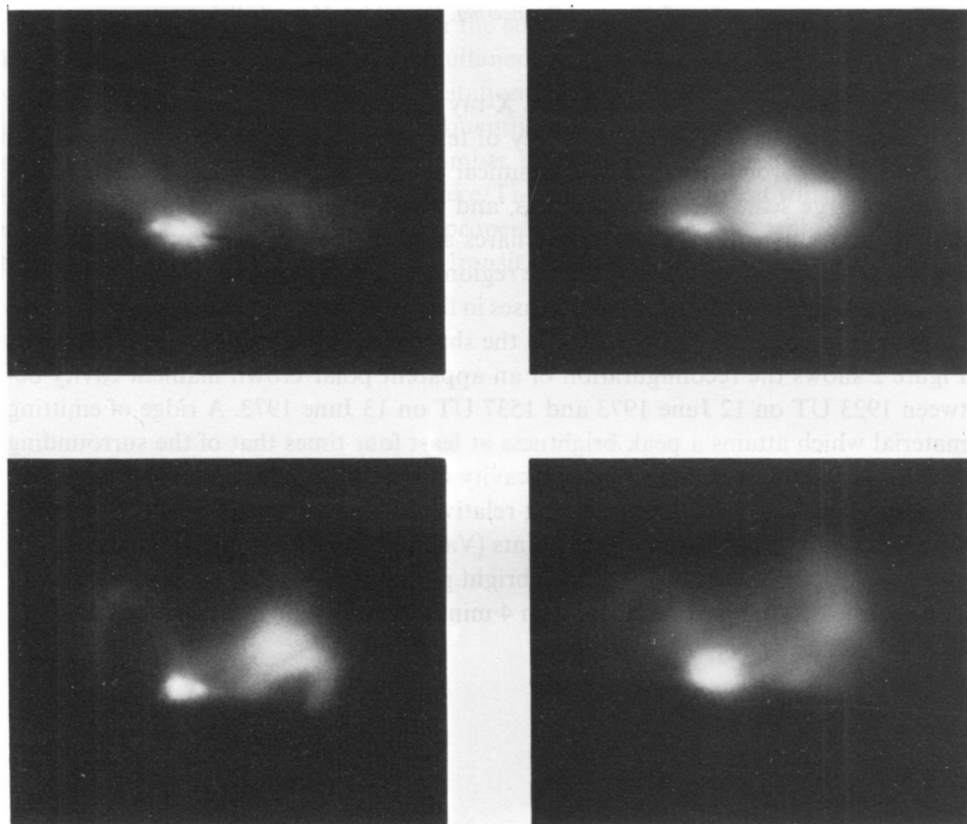


Fig. 1. The temporal behavior of active region 137 (at the east limb in 3–17 Å X-rays. *Top left*: A 16 s exposure at 0807 UT June 10, 1973. *Top right*: A 4 s exposure at 0944. The northern loop structure has changed dramatically in form and brightness; the southern loop structure is not seen on this print because of its low surface brightness. Examination of the corresponding 16 s exposure indicates that it did not change. *Bottom left*: 4 s exposure at 1135 UT. The southern loop structure and the southern bright core have increased in brightness. The northern loop has declined in brightness and the position of maximum brightness along the loop has changed. *Bottom right*: 16 s exposure at 1611 UT. The brightness of all features in the region has declined although it is still above the pre-flare value.

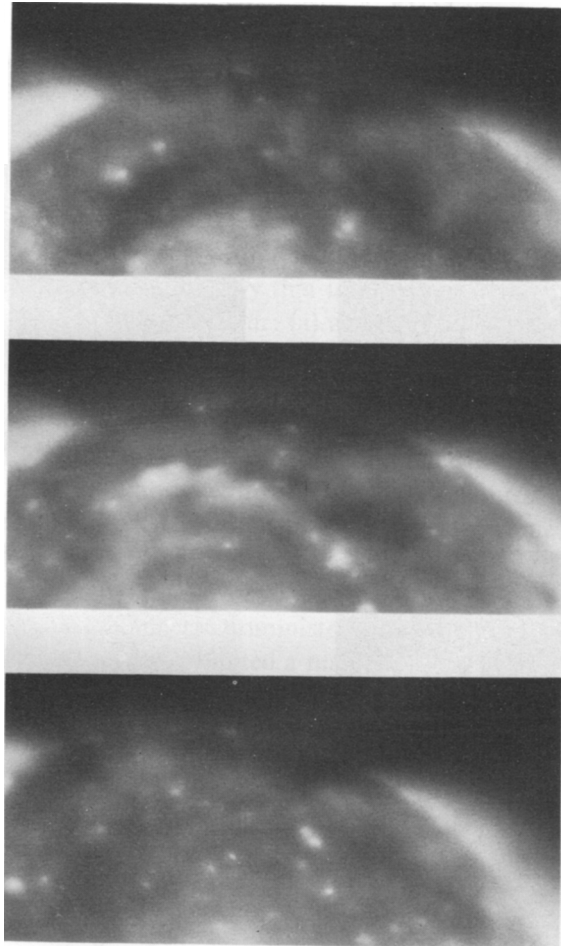


Fig. 2. The brightening and subsequent disappearance of an apparent filament cavity on June 12–13, 1973. *Top*: The appearance of the feature at 1923 UT in a 64 s exposure (3–32, 44–54 Å). *Center*: At 0118 UT, June 13, 1973, the bright structure is evident in the center of the cavity. *Bottom*: By 1537, June 13, 1973, the bright structure is no longer visible and the cavity is not distinguishable.

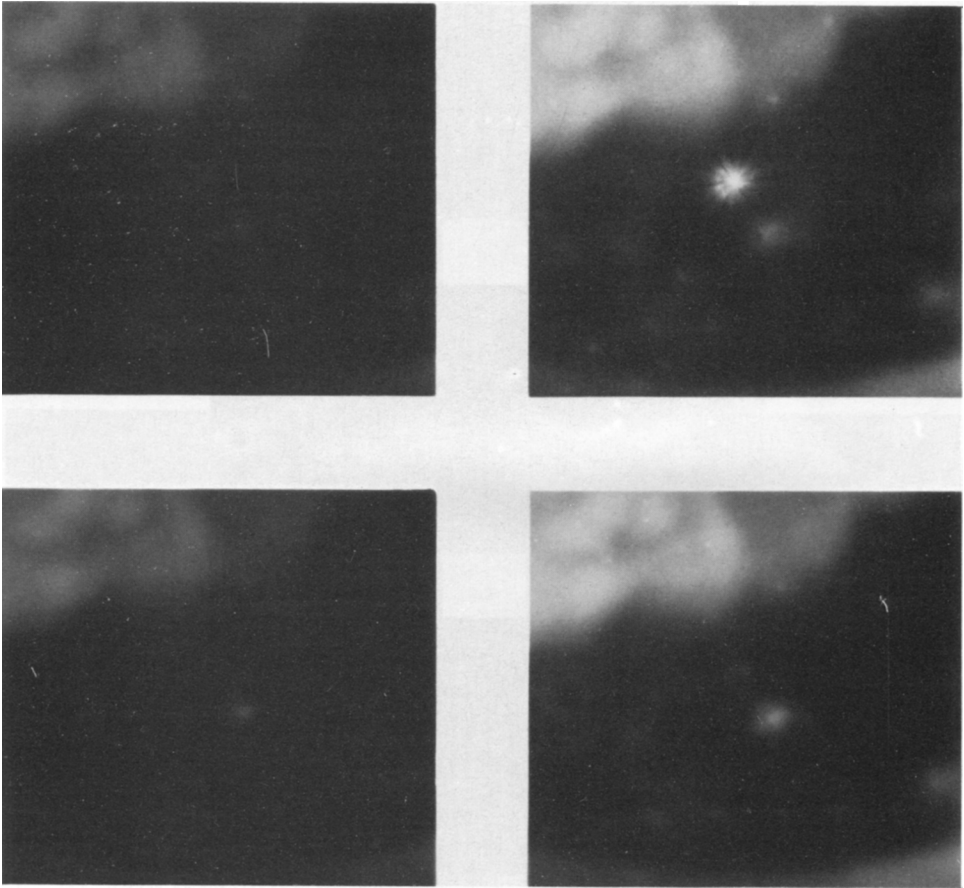


Fig. 3. A sudden increase in the X-ray intensity of a coronal bright point. *Top left:* A portion of a 64 s exposure in 3–32, 44–54 Å X-rays (June 12, 0505 UT). *Top right:* The corresponding 256 s exposure (June 12, 0506 UT). *Bottom left:* A portion of a 64 s exposure at 0641 UT. *Bottom right:* The corresponding 256 s exposure at 0642 UT.