

RAPID FLOW OF MATTER IN A DARK FILAMENT

JUN KUBOTA,¹ REIZABURO KITAI,² AND NORITAKA TOKIMASA³

¹Osaka Keizai Univ. Higashi-Yodogawa, Osaka 533, Japan

²Hida Observatory. Kamitakara, Gifu 506-13, Japan

³Nishiharima Observatory. Sayo, Hyogo 679-53, Japan

H α filtergraphic observations of a long-lived dark filament was made for the time interval from May 25 to May 28, 1993, at the Hida Observatory with the use of the Domeless solar telescope and the H α filter of 0.25Å pass band. The dark filament was located near the east limb on May 25, and it drifted near the disk center by the solar rotation on May 28. Its length was about 260Mm, and did not conspicuously change during our observations. Since its apparent form didn't remarkably change during our observed interval, our observation is available for studying the fundamental structure and the velocity field in this dark filament.

In H α picture of this filament, the narrow bone like belt ("bone") at the northern edge along the long axis of filament and several branches from the body of filament ("feet") are impressive (Figure 1).

The Dopplergram of this filament ($\Delta\lambda = \pm 0.4 \text{ \AA}$) produced on May 25 shows rapid upward flows from the photosphere in the bone, while in the feet, no large flows can be seen. However, the Dopplergrams produced on May 26 and 27 reveal strong upward motion in the bone, and downward one in the feet, with the velocity of more than 20 km/s (Figure 2).

It seems that the bone is the bundle of magnetic loops in which the matter flows in one direction, and that the feet are the ends of loops through which the matter flows down from the filament body to underlying photosphere. These features are in accordance with the observed results by Kubota and Uesugi (1985) and the empirical model proposed by Sara F. Martin (1994).

Since there exist rapid flows in the bone and the feet with the velocity of more than 20km/s, the filament would disappear, as a Disparition Brusque (sudden disappearance), within four hours when the flows of matter stops at the origin.

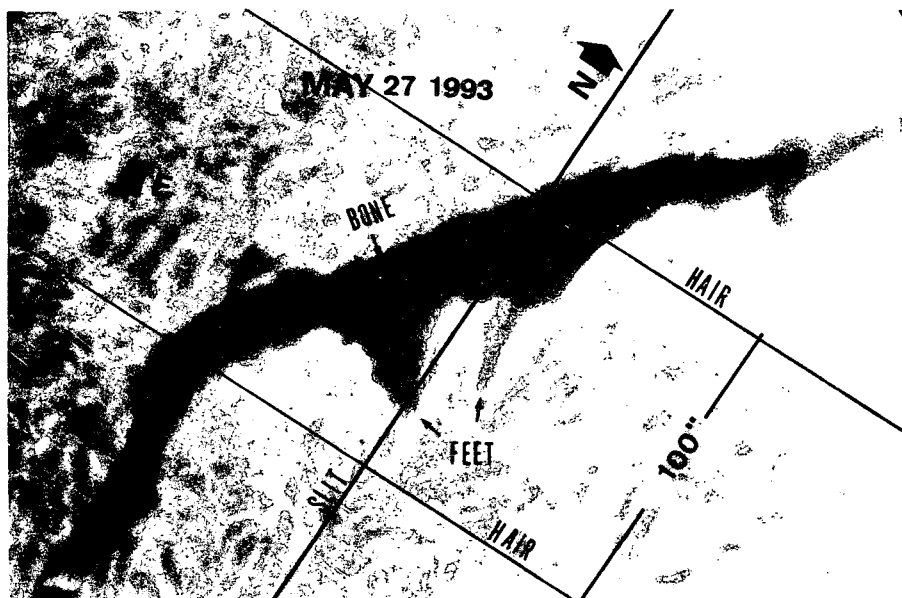


Fig. 1.— The H α picture ($\Delta\lambda = 0.0 \text{ \AA}$) of the dark filament taken on May 27, 1993. The arrows show the bone and the feet.

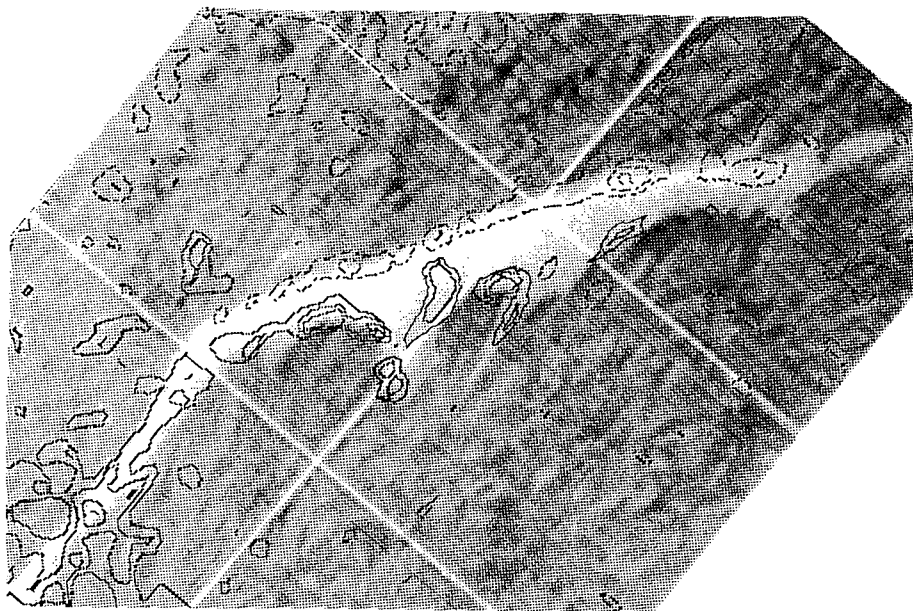


Fig. 2.— The Dopplergram($\Delta\lambda = \pm 0.4 \text{ \AA}$) of the dark filament on May 27.

REFERENCES

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Martin, Sara F., 1994, in *Solar surface magnetism*, eds. R.J. Rutten and C.J.Schrijver, Kluwer Academic Publishers, Netherland,p303-338.