VIDEO MAGNETIC FIELD AND VELOCITY FIELDS OF
SOLAR FLARES AND RELATIVE ACTIVE REGION

Ai Guoxiang, Li Jing

Beijing Astronomical Obs. Chinese Academia of Sciences

By means of Solar Magnetic Field Telescope [1], the fine
structure of video magnetic fields (5324Å) and
sight-of-line velocity fields (4861Å) of flare active
region on July 23(E53, S19) and Aug. 8(W25, S28) in 1987
has been obtained. The main characters are following:

1. The flares occur in places where there are, compressive
and osmotic motion between opposite magnetic poles. In some
causes, the osmotic opposite magnetic pole dissipates after
the flares.

2. Sight-line velocity neutral lines are consistent with
the magnetic neutral lines. But in the two ends of "S"
shape of magnetic neutral line, the directions of flow
passing the magnetic neutral line are opposite. It shows
compressive and shearing motion in large scale of the active
region. The flares occur near the flow neutral line where
there are the most compressive and shearing motion (See
Fig.1. and Fig.2.).

3. Chromospheric flow show clearly fiber. The loop and
ejective constructions are correspondence magnetic
structures.

4. On the feet points of the flares there are down flow
about 3--10 km/ Sec. (See Fig.3. and Fig.4.)
Fig. 1. The position of flare was traced by the circle.
Levels: 20, 40, 80, 100, 160, 320, 640, 980, 1280, 1600, 1920, 2240... G.

Fig. 2. The position of flare is traced by the circle.
The direction of flow is down where flare occurred.
Levels: 400, 800, 1600, 2400, 3200, 4000, 4800... m/sec.
Fig. 3. The position of flares are traced by the circle. There are two places circled can be seen.
Levels: 20, 10, 60, 100, 320, 640, 960, 1280, 1600, 1920, 2240... G.

Dopplergram by Huairou Solar Station
August 08, 1987 0135UT
Sun Disk Coordinates: W25, S29
Wavelength: 4061 A
Frames: 255
Solid: Red shift, Dashed: Blue shift

Fig. 4. The position of flares are traced by the circle. The flow have different direction where flares occured.
Levels: 100, 800, 1600, 3400, 6400, 9600, 12800... M/Sec.
Above characters show that the energy of the small flares come from excessive magnetic energy of force-free magnetic field which are produced by the compression and osmotic motion of oppsity poles. There effects adjust potential analyses support the force-free field. These observations and analyses support the mode of flare by the compresive force-free magnetic fields [2].

The constructions of magnetic and velocity fields of the small flares are consisted with that of the large flares, that may be inspiration to stellar flares with larger size and energy.

References
