

Observation of the formation of the hot loop arcade

A. Reva, S. Shestov, S. Bogachev, S. Kuzin
 Lebedev Physical Institute, Moscow, Russia
 reva.antoine@gmail.com

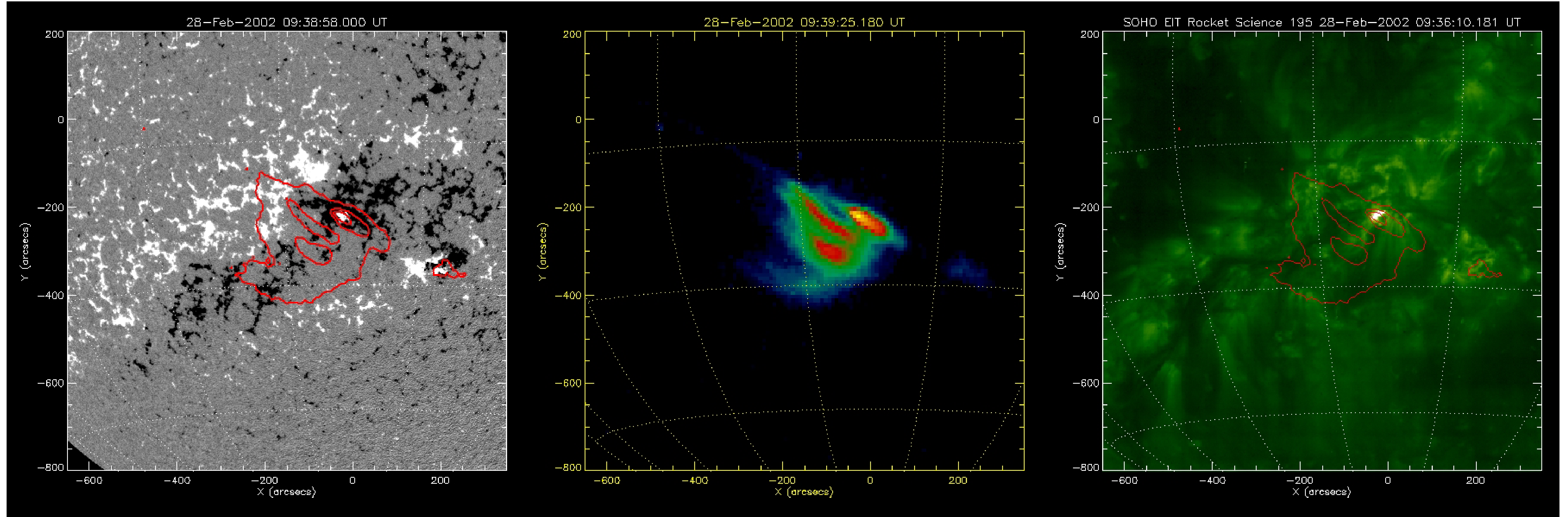


Figure 1. Hot loop arcade. Left: MDI image. Red contours denote the Mg XII signal. Middle: Mg XII 8.42 Å image. Right: EIT 195 Å image. Red contours denote the Mg XII signal.

We present observations of the formation of hot loop arcades. For the hot plasma observations, we used the Mg XII spectroheliograph data onboard CORNAS-F satellite. The Mg XII spectroheliograph built monochromatic images of the solar corona in the Mg XII 8.42 Å line. This line is emitted at temperatures higher than 5 MK, and only hot plasma is present on the Mg XII images.

The observed hot loop arcades formed above polarity inversion line between two elongated regions of opposite polarities (see Figure 1 left). In the region of negative polarity a small region of positive polarity was embedded. The magnetic field structure did not change during the whole period of observation.

Above small region of positive polarity three C-class flares occurred at 09:18, 14:13, and 22:28 UT in 2002 February 28. After each of these flares we observed the formation of the hot loop arcade on the Mg XII images. Despite the fact that EIT 195 Å telescope is sensitive to the hot

plasma, there were no indications of the hot loop arcade on its images. The evolution of all three arcades followed the same scenario (see Figure 2):

1. A small hot source appears above small region of positive polarity on the Mg XII images. At the same place a HXR source appears on the RHESSI images (see Figure 4). For different flares, the duration of these phase ranges from 2 to 10 minutes.
2. Other loops are filled with hot plasma in a wave-like nature: loop, which are closer to the initial hot source, are filled earlier than the loops, which are farther. All three arcades formed during 5 minutes, which corresponds to the wave speed of 700 km/s.
3. The loops intensity increased, and reached maximum after 5 – 20 minutes. Maximum of the loop intensity was located in the loop apex above the polarity inversion line.
4. The loop intensity gradually decreased over approximately 1 hour.

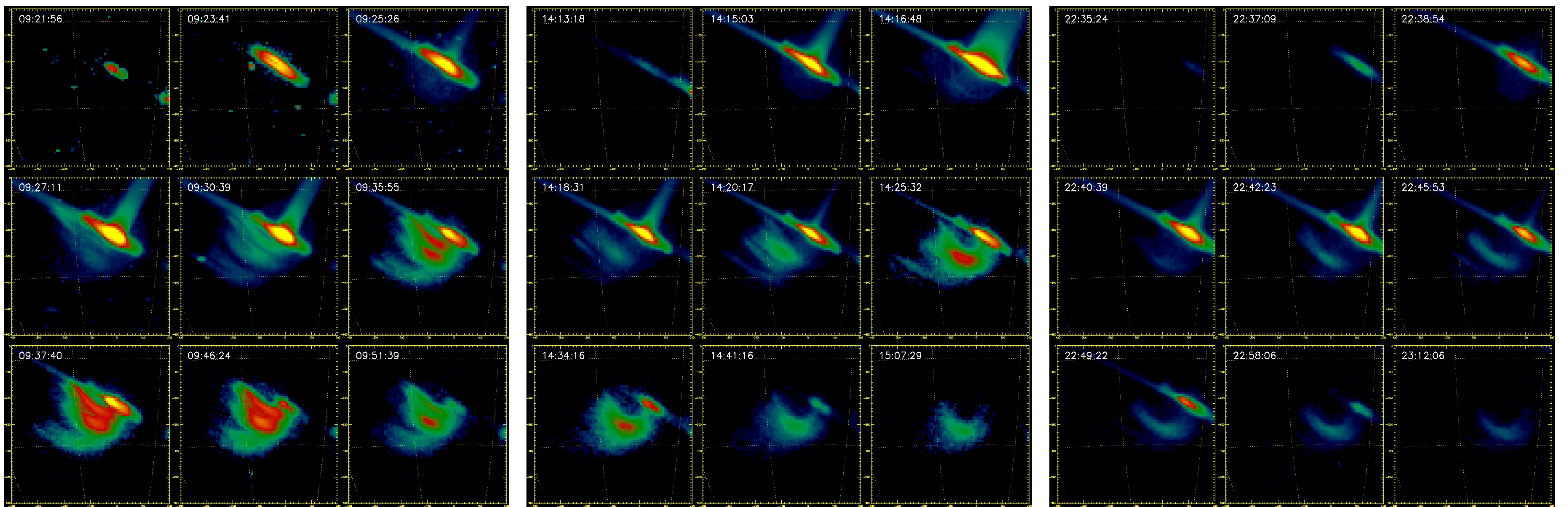


Figure 2. Evolution of the hot loop arcades on the Mg XII images.

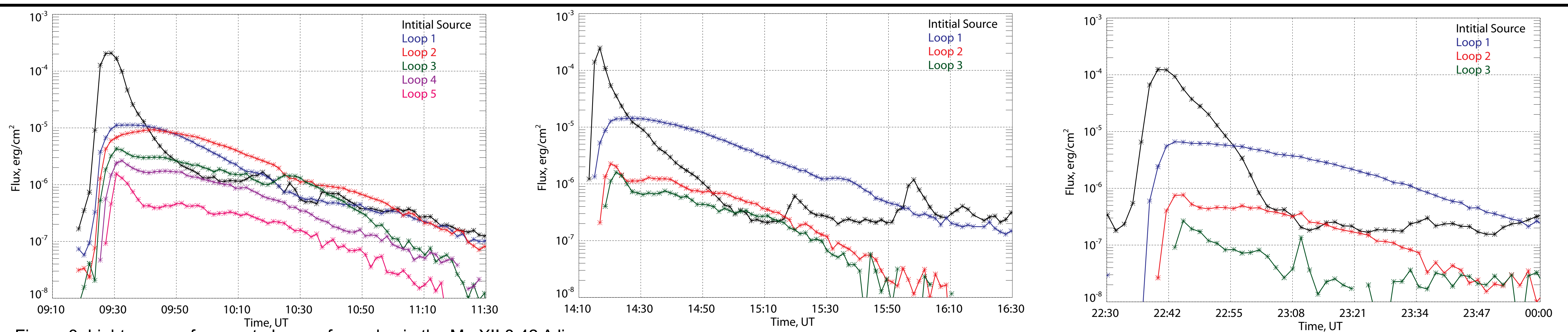
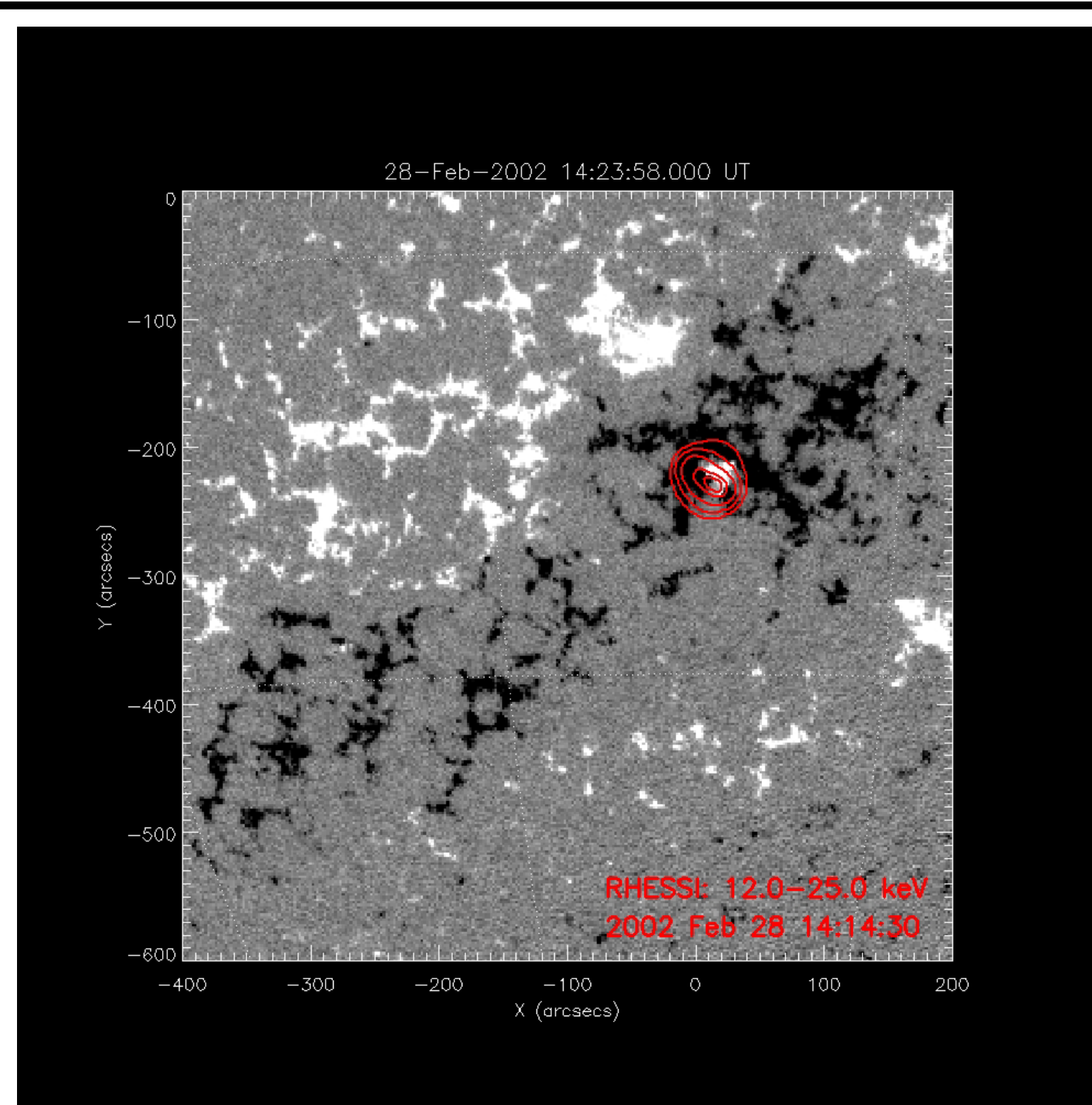
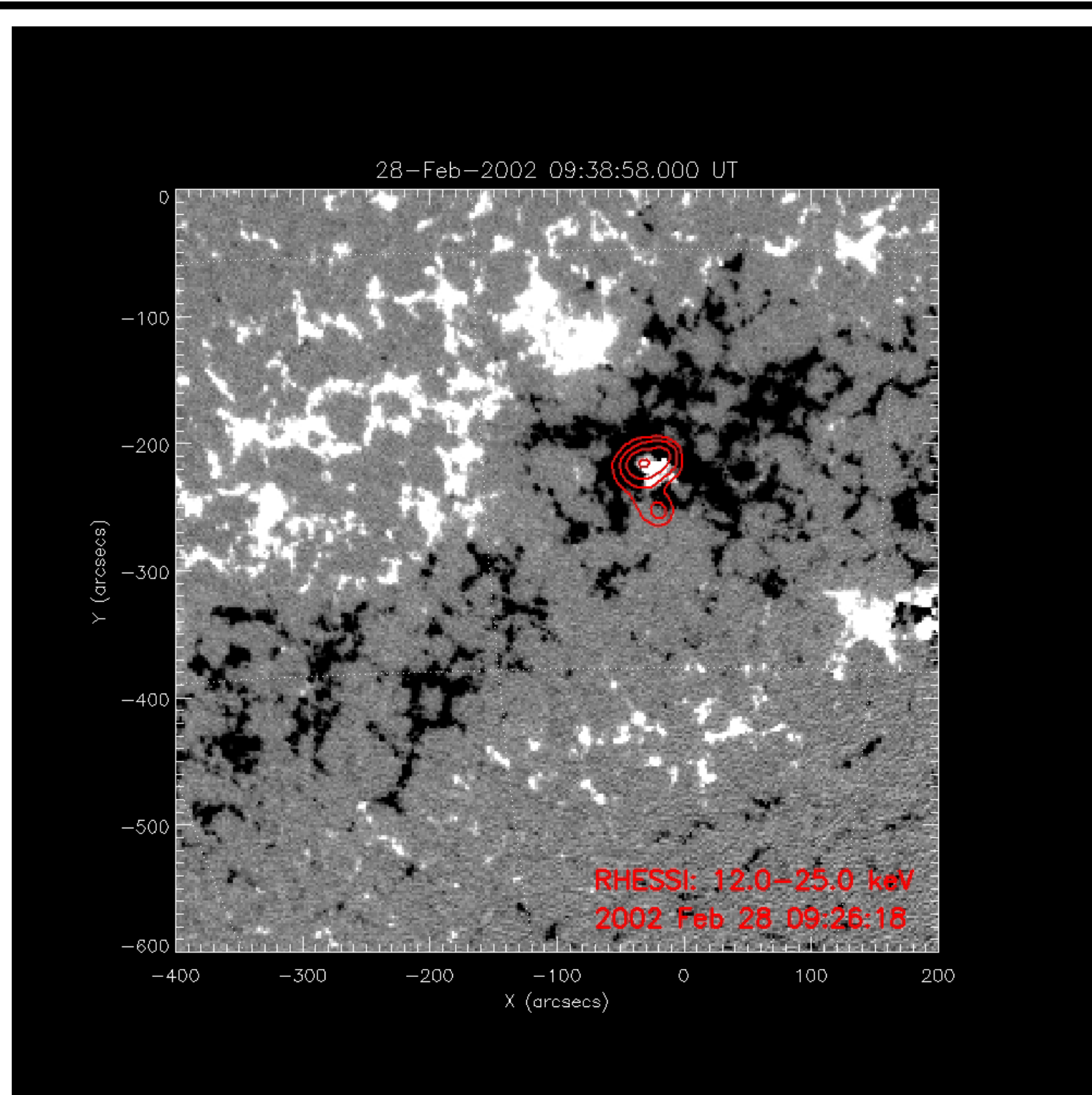


Figure 3. Lightcurves of separate loops of arcades in the Mg XII 8.42 Å line.



**NO RHESSI
DATA**

Figure 4. MDI magnetogram with an overlaid RHESSI signal in the 12-25 keV spectral range. Left: 09:26 UT event; middle: 14:14 UT event. there were no RHESSI data for the 22:37 event. For the RHESSI image reconstruction we used the Pixton method.