Abstract Submitted
for the MAS17 Meeting of
The American Physical Society

Evolution of photospheric flow and magnetic fields associated with the 2015 June 22 m6.5 flare JIASHENG WANG, CHANG LIU, NA DENG, HAIMIN WANG, New Jersey Inst of Tech — The evolution of photospheric flow and magnetic fields before and after flares can provide important information regarding the flare triggering and back reaction processes. However, such studies on the flow field are rare due to the paucity of high-resolution observations covering the entire flaring period. Here we study the structural evolution of penumbra and shear flows associated with the 2015 June 22 M6.5 flare in NOAA AR 12371, using high-resolution imaging observation in the TiO band taken by the 1.6˜m Goode Solar Telescope at Big Bear Solar Observatory, with the aid of the DAVE method for flow tracking. The accompanied photospheric vector magnetic field changes are also analyzed using data from the Helioseismic and Magnetic Imager. As a result, we found, for a penumbral segment in the negative field adjacent to the magnetic polarity inversion line (PIL), an enhancement of penumbral flows (up to an unusually high value of ˜2 km/s) and extension of penumbral fibrils after the first peak of the flare hard X-ray (HXR) emission. We also found a shear flow region at the PIL, which is co-spatial with a precursor brightening kernel and exhibits a gradual increase of shear flow velocity (up to ˜0.68 km/s) after the flare. The enhancing penumbral and shear flow regions are also accompanied by an increase of horizontal field and decrease of magnetic inclination angle. These results are discussed in the context of the theory of back reaction of coronal restructuring on the photosphere as a result of flare energy release.

Jiasheng Wang
New Jersey Inst of Tech

Date submitted: 30 Sep 2017 Electronic form version 1.4