PROPAGATION OF HOT ELECTRONS IN JETS IN THE JUNE 29, 2012 EVENT

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We discuss the results of observations of the eruptive flare on June 29, 2012 using ultraviolet data (AIA/SDO) and radio data (HiRAS). As a rule, the microwave burst associated with an eruption is generated by fluxes of electrons with energies on the order of several hundred keV by the gyrosynchrotron emission mechanism [1]. In the case of weak bursts with energies of accelerated electrons below a hundred keV, non-thermal electrons can respond to the dynamical radio spectra due to coherent radio emission mechanisms [2, 3]. In the case of thermal flare energy release, when jets of hot plasma propagate along open field lines or along large loops, beams of nonthermal electrons generating radio emission are also possible. The beams appear at the formation of thermal fronts that limit the recession of hot plasma from the flare heating region. The electron beams generate short meter-band bursts at high altitudes and coherent microwave bursts near the remote footpoints of large loops [4].

In this paper, we investigate the relationship between the heated plasma and the flare structure and its dynamics from extreme ultraviolet observations. The propagation velocities of the plasma in the jets are estimated: along open magnetic field lines and along a high closed loop to its remote footpoint. These velocities are different; the velocities along open lines exceed the velocity of jets in closed loops, which possibly indicates a higher plasma density in these structures. A comparison of the velocities of the fronts in the first jet calculated from the UV data with the intensity of the integrated radiation in the 50–550 MHz range (HiRAS) shows a high degree of correlation between them in time. The velocities of the closed-loop fronts in different AIA/SDO channels differ from each other and do not show correlation with the time intervals when the meter radio bursts are registered on the spectrum (HiRAS).
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