Miniature Filament Eruptions and their Reconnections in X-Ray Jets: Evidence for a new paradigm

Sterling, Alphonse (1), alphonse.sterling@nasa.gov; Ronald Moore (2,1); and David Falconer (2,1).
(1) NASA Marshall Space Flight Center, Heliophysics and Planetary Science, Huntsville, AL, USA
(2) University of Alabama in Huntsville, Huntsville, AL, USA

We investigate the onset of ~10 random X-ray jets observed by Hinode/XRT. Each jet was near the limb in a polar coronal hole, and showed a ``bright point" in an edge of the base of the jet, as is typical for previously-observed X-ray jets. We examined SDO/AIA EUV images of each of the jets over multiple AIA channels, including 304 Ang, which detects chromospheric emissions, and 171, 193, and 211 Ang, which detect cooler-coronal emissions. We find the jets to result from eruptions of miniature (size <~10 arcsec) filaments from the bases of the jets. Much of the erupting-filament material forms a chromospheric-temperature jet. In the cool-coronal channels, often the filament appears in absorption and the jet in emission. The jet bright point forms at the location from which the miniature filament is ejected, analogous to the formation of a standard solar flare in the wake of the eruption of a typical larger-scale chromospheric filament. Thus these X-ray jets and their bright points are made by miniature filament eruptions. They are evidently produced the same way as an on-disk coronal jet we observed in Adams et al. (2014); that on-disk jet had no obvious emerging magnetic field in its base. We conclude that, for many jets, the standard idea of X-ray jets forming from reconnection between emerging flux and pre-existing coronal field is incorrect. ACS and RLM were supported by funding from NASA/LWS, Hinode, and ISSI.