Nour E.
Raouafi
Johns Hopkins Applied Physics Laboratory, Laurel, MD 20723, USA
G. Stenborg - Johns Hopkins Applied Physics Laboratory, Laurel, MD 20723, USA
D. B. Seaton - Southwest Research Institute, Boulder, CO 80302, USA
H. Wang - Institute for Space Weather Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ 07102, USA; Big Bear Solar Observatory, New Jersey Institute of Technology, Big Bear City, CA 92314, USA; & Center for Solar-Terrestrial Research, New Jersey Institute of Technology, University Heights, Newark, NJ 07102-1982, USA
J. Wang - Institute for Space Weather Sciences, New Jersey Institute of Technology, University Heights, Newark, NJ 07102, USA; Big Bear Solar Observatory, New Jersey Institute of Technology, Big Bear City, CA 92314, USA; & Center for Solar-Terrestrial Research, New Jersey Institute of Technology, University Heights, Newark, NJ 07102-1982, USA
C. E. DeForest - Southwest Research Institute, Boulder, CO 80302, USA
S. D. Bale - Physics Department, University of California, Berkeley, CA 94720, USA & Space Sciences Laboratory, University of California, Berkeley, CA 94720, USA
J. F. Drake - Department of Physics, University of Maryland, College Park, MD 20742, USA
V. M. Uritsky - Catholic University of America, 620 Michigan Avenue NE, Washington, DC 20061, USA & Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
J. T. Karpen - Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
C. R. DeVore - Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA
A. C. Sterling - NASA/Marshall Space Flight Center, Huntsville, AL 35812, USA
T. S. Horbury - The Blackett Laboratory, Imperial College London, London, SW7 2AZ, UK
L. K. Harra - PMOD/WRC, Dorfstrasse 33, 7260 Davos, Dorf, Switzerland & ETH-Zurich, Hönggerberg Campus, HIT Building, Zürich, Switzerland
S. Bourouaine -
J. C. Kasper - BWX Technologies, Inc., Washington DC 20002, USA
P. Kumar - Heliophysics Science Division, NASA Goddard Space Flight Center, Greenbelt, MD 20771, USA & Department of Physics, American University, Washington, DC 20016, USA
T. D. Phan - Space Sciences Laboratory, University of California, Berkeley, CA 94720, USA
M. Velli - Earth Planetary and Space Sciences, University of California, Los Angeles, CA 90095, USA
Oral
(Invited Talk)
We present EUV solar observations showing evidence for omnipresent jetting activity driven by small-scale magnetic reconnection at the base of the solar corona. We argue that the physical mechanism that heats and drives the solar wind at its source is ubiquitous magnetic reconnection in the form of small-scale jetting activity (a.k.a. jetlets). This jetting activity, like the solar wind and the heating of the coronal plasma, is ubiquitous regardless of the solar cycle phase. Each event arises from small-scale reconnection of opposite-polarity magnetic fields producing a short-lived jet of hot plasma and Alfvén waves into the corona. The discrete nature of these jetlet events leads to intermittent outflows from the corona, which homogenize as they propagate away from the Sun and form the solar wind. This discovery establishes the importance of small-scale magnetic reconnection in solar and stellar atmospheres in understanding ubiquitous phenomena such as coronal heating and solar wind acceleration. Based on previous analyses linking the switchbacks to the magnetic network, we also argue that these new observations might provide the link between the magnetic activity at the base of the corona and the switchback solar wind phenomenon. These new observations need to be put in the bigger picture of the role of magnetic reconnection and the diverse form of jetting in the solar atmosphere.
Presentation file
19_Nour_Raouafi.pdf
YouTube link
View Video
Meeting homepage
PUNCH 4 Science Meeting
Download to PDF