

Project Details

ROSES ID: NNH10ZDA001N

Selection Year: 2011

Program Element: Focused Science Topic

Topic: Jets in the Solar Atmosphere and their Effects in the Heliosphere

Project Title:

Dynamics and Physical Properties of Coronal Jets and Plumes

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Project Member(s):

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Summary:

Coronal jets and plumes are ubiquitous examples of reconnection in the solar corona as well as possible important contributors to the solar wind. The goal of this proposal is to provide the observational support and data analysis tools needed to address the following outstanding questions with respect to coronal jets and plumes.

(1) What is the connection between coronal jets and plumes? How do jets and bright points (BP) at the plume base influence its life cycle, evolution, and variability? Using focused dynamics studies concentrating on single events of simultaneous jets and plumes, including but not limited to, light curves and the evolution of differential emission measures, we will address the jet/plume relationship.

(2) What is the contribution of jets and plumes to the solar wind in terms of mass, energy and heat input? Are jets and plumes the main mechanism for mass and energy input in open flux regions? These are addressed by statistical studies of the physical properties of jets and plumes, such as velocities, sizes, lifetimes and column densities based on SDO, Hinode, and STEREO data.

(3) What are the necessary parameters of jets and plumes that are needed for modeling of these phenomena? This issue will be addressed by focused topological studies of individual jets and plumes locations of energy release, energy distribution and propagation in jets and subsequent propagation of jets and plumes in AIA "coronagraph" movies.

Publication References:

Summary: no summary

Reference: Masson, Sophie; McCauley, Patrick; Golub, Leon; Reeves, Katharine K.; DeLuca, Edward E.; (2014), The Astrophysical Journal, Volume 787, Issue 2, article id. 145, 9 pp, doi: 10.1088/0004-637X/787/2/145

Summary: no summary

Reference: Tian, H.; DeLuca, E. E.; Cranmer, S. R.; De Pontieu, B.; Peter, H.; Martínez-Sykora, J.; Golub, L.; McKillop, S.;

Reeves, K. K.; Miralles, M. P.; McCauley, P.; Saar, S.; Testa, P.; Weber, M.; Murphy, N.; Lemen, J.; Title, A.; Boerner, P.; Hurlburt, N.; Tarbell, T. D.; Wuelser, J. P.; Kleint, L.; Kankelborg, C.; Jaeggli, S.; Carlsson, M.; Hansteen, V.; McIntosh, S. W.; (2014), Science, Volume 346, Issue 6207, id. 1255711, doi: 10.1126/science.1255711

Summary: no summary

Reference: Narang, Nancy; Arbacher, Rebecca T.; Tian, Hui; Banerjee, Dipankar; Cranmer, Steven R.; DeLuca, Ed E.; McKillop, Sean; (2016), Statistical Study of Network Jets Observed in the Solar Transition Region: a Comparison Between Coronal Holes and Quiet-Sun Regions, Solar Physics, Volume 291, Issue 4, pp.1129-1142, doi: 10.1007/s11207-016-0886-1