ABSTRACT FINAL ID: SH34B-05;

TITLE: The EUV Emission in Comet-Solar Corona Interactions

SESSION TYPE: Oral

SESSION TITLE: SH34B. SPA-Solar and Heliospheric Physics General Contributions: Solar III

AUTHORS (FIRST NAME, LAST NAME): Paul Bryans[1, 2], William Dean Pesnell[1], Carolus J Schrijver[3], John C. Brown[4], Karl Battams[5], Pascal Saint-Hilaire[6], Wei Liu[3, 7], Hugh S Hudson[4, 6]

INSTITUTIONS (ALL): 1. NASA Goddard Space Flight Center, Greenbelt, MD, United States.
2. ADNET Systems, Inc., Greenbelt, MD, United States.
3. Lockheed Martin Advanced Technology Center, Palo Alto, CA, United States.
4. School of Physics and Astronomy, University of Glasgow, Glasgow, Scotland, United Kingdom.
5. Naval Research Laboratory, Washington, DC, United States.
6. Space Sciences Laboratory, University of California, Berkeley, CA, United States.
7. W. W. Hansen Experimental Physics Laboratory, Stanford University, Stanford, CA, United States.

Title of Team:

ABSTRACT BODY: The Atmospheric Imaging Assembly (AIA) on the Solar Dynamics Observatory (SDO) viewed a comet as it passed through the solar corona on 2011 July 5. This was the first sighting of a comet by a EUV telescope. For 20 minutes, enhanced emission in several of the AIA wavelength bands marked the path of the comet. We explain this EUV emission by considering the evolution of the cometary atmosphere as it interacts with the ambient solar atmosphere. Water ice in the comet rapidly sublimates as it approaches the Sun. This water vapor is then photodissociated, primarily by Ly-α, by the solar radiation field to create atomic H and O. Other molecules present in the comet also evaporate and dissociate to give atomic Fe and other metals. Subsequent ionization of these atoms can be achieved by a number of means, including photoionization, electron impact, and charge exchange with coronal protons and other highly-charged species. Finally, particles from the cometary atmosphere are thermalized to the background temperature of the corona. Each step could cause emission in the AIA bandpasses. We will report here on their relative contribution to the emission seen in the AIA telescopes.

KEYWORDS: [7549] SOLAR PHYSICS, ASTROPHYSICS, AND ASTRONOMY / Ultraviolet emissions, [6099] PLANETARY SCIENCES: COMETS AND SMALL BODIES / General or miscellaneous, [7509] SOLAR PHYSICS, ASTROPHYSICS, AND ASTRONOMY / Corona.

(No Image Selected)

(No Table Selected)

SPONSOR NAME: William Pesnell

Additional Details

Previously Presented Material: