Report for Dr. Thomas R. Metcalf Travel Award

David Long

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Biography

David Long is a postdoc at Mullard Space Science Laboratory, the Space and Climate Physics Department of University College London. He obtained his PhD. in Solar Astrophysics from Trinity College Dublin, where he was supervised by Dr. Peter Gallagher. During his PhD, he spent a year working as a Smithsonian Pre–Doctoral Fellow at the Harvard–Smithsonian Centre for Astrophysics in Cambridge, MA. His research focusses on characterising the properties of globally–propagating coronal disturbances (commonly called "EIT Waves").

Contributed Presentations

Talk: CorPITA; The Coronal Pulse Identification and Tracking Algorithm
Poster: Measuring the magnetic field strength of the quiet solar corona using "EIT Waves"

The Coronal Pulse Identification and Tracking Algorithm (CorPITA) is a technique developed as part of the *SDO* Feature Finding Team initiative to automatically identify and characterise coronal "EIT Waves" in data from the *SDO* spacecraft. The algorithm is initially triggered by the identification of a solar flare and applies an intensity profile technique to a series of 36 great–circle arcs of 10° degree width on the solar surface to identify the pulse. It then tracks the pulse with propagation for each arc. Once the pulse can no longer be identified and tracked, a residual–resampling bootstrapping approach is used to estimate the variation in kinematics and pulse width with propagation for each arc, allowing a better estimate of the behaviour of the pulse as it propagates through the corona.

The CorPITA algorithm was applied to *SDO* observations of two "EIT Wave" events from 2010 June 12 and 2011 February 16, both of which were also observed by *Hinode*/EIS. The pulse kinematics derived using CorPITA were combined with density measurements from *Hinode*/EIS to estimate the coronal magnetic field strength of the quiet corona through which the pulse was passing. These values were compared to those estimated using both a PFSS and local–domain magnetic field extrapolation to determine the corresponding height range. It was found that for the estimated magnetic field strength of ≈2–6 G, height ranges of ≈70–130 Mm and ≈9–40 Mm were predicted by the PFSS and local–domain approaches respectively. The heights predicted by the PFSS approach are most consistent with both the measured densities and previous results, suggesting that "EIT waves" are a global phenomenon influenced by the global magnetic field.