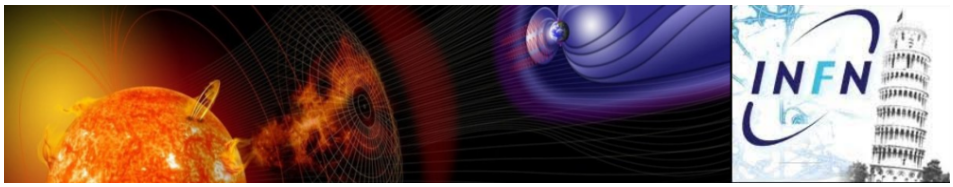

Contribution ID: **57** Type: **not specified**

LOFAR observations of a jet-driven piston shock in the low solar corona

Thursday, 8 July 2021 19:23 (4 minutes)

The Sun produces highly dynamic and eruptive events that can drive shocks through the corona. These shocks can accelerate electrons, which result in plasma emission in the form of a type II radio burst. Despite the large number of type II radio bursts observations, the precise origin of coronal shocks is still subject to investigation. Here we present a well observed solar eruptive event that occurred on 16 October 2015, focusing on a jet observed in the extreme ultraviolet (EUV) by the Atmospheric Imaging Assembly (SDO/AIA), a streamer observed in white-light by the Large Angle and Spectrometric Coronagraph (SOHO/LASCO), and a metric type II radio burst observed by the LOw Frequency Array (LOFAR). LOFAR interferometrically imaged the fundamental and harmonic sources of a type II radio burst and revealed that the sources did not appear to be co-spatial, as would be expected from the plasma emission mechanism. We correct for the separation between the fundamental and harmonic using a model which accounts for scattering of radio waves by electron density fluctuations in a turbulent plasma. This allows us to show the type II radio sources were located $\sim$0.5 $R_\odot$ above the jet and propagated at a speed of $\sim$1000\,km\,s^{-1}, which was significantly faster than the jet speed of $\sim$200\,km\,s^{-1}. This suggests that the type II burst was generated by a piston shock driven by the jet in the low corona.

Email

cmaguir4@tcd.ie

Primary authors: MAGUIRE, Ciara (Trinity College Dublin); Dr CARLEY, Eoin (Dublin Institute for Advanced Studies); Dr ZUCCA, Pietro (AASTRON Netherlands Institute for Radio Astronomy); Dr VILMER, Nicole (LESIA, Observatoire de Paris); Prof. GALLAGHER, Peter (Dublin Institute for Advanced Studies)

Presenter: MAGUIRE, Ciara (Trinity College Dublin)

Session Classification: Working Group 2: Particle acceleration

Track Classification: Working Group 2: Particle acceleration