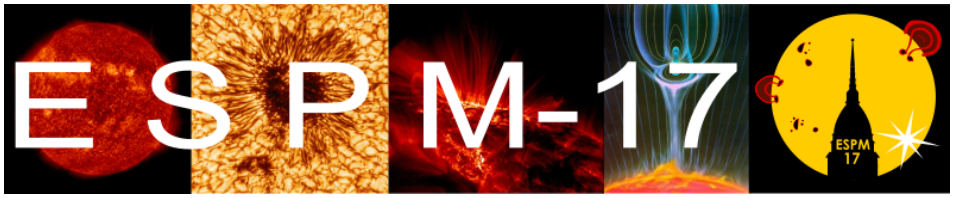

Contribution ID: **88** Type: **Poster**

Fast Magnetic Reconnection Excites a Global Blast Wave in the Solar Corona

Magnetic reconnection is the key mechanism for various explosive phenomena in astrophysical plasmas, such as jets, flares, and coronal mass ejections (CMEs), yet many details remain elusive. An important piece of the puzzle is whether shock waves, a major particle accelerator in the universe, can be excited directly through flaring reconnections rather than driven by the jet/CME piston. Here, by investigating an isolated episode of fast magnetic reconnection leading up to a global blast wave, we give a definite answer. The reconnection occurs at the apex of a magnetic flux rope (MFR) when it rises obliquely from a behind-the-limb active region toward a coronal streamer visible to the Earth; the MFR disappears with its flux being shed by the reconnection. Both the angle of a V-pattern extending outward from the reconnection site and the MFR's speed relative to the background Alfvėn speed indicate a reconnection rate as fast as 0.2. The driven nature of the reconnection is manifested in the velocity profile of the MFR emulating the lightcurves of the impulsive hard X-ray (HXR) and microwave emission. An extreme-ultraviolet front expands centering on the reconnection site immediately after the HXR peak. The shock wave nature of the front is unambiguous as it propagates through a prominence embedded in the streamer, producing a γ-ray burst and a metric type II burst. These observations reveal that magnetic reconnection directs a significant fraction of magnetic free energy into exciting the blast wave, comparable to the energy into accelerating electrons.

Primary author: Mr LUO, Runbin (University of Science and Technology of China)

Co-author: LIU, Rui

Session Classification: Coffee break and poster session 2

Track Classification: Multi-scale energy release, flares and coronal mass ejections