

Title: Big Flare Hunting

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Solar Flares and Coronal Mass ejections (CMEs) are one of the most explosive events in the solar system, and thus have a major impact on what is called space weather. Space weather influences the performance and reliability of space-borne and ground-based technological systems and can endanger human life and/or health. The first step to prevent and estimate the impact that these powerful space weather events can have is to try to understand the processes deep inside the Solar core that drives them. We used data from the Solar Dynamics Observatory (SDO) spacecraft (especially the Helioseismic and Magnetic Imager - SDO/HMI) to study the evolution of the photospheric magnetic field in the build-up to the most powerful solar flares and CME's of the current solar cycle. The signature of the emergence of new magnetic flux which we think is a vital component of the biggest flares was harder to detect than expected and more work is needed to understand the formation of these energetic events. The results of the project could provide a breakthrough in our understanding of these explosive events.