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# Investigating Transient Events in Active Stars

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## Abstract

The stellar magnetic fields dominate the environment around late-type stars. They are responsible for driving the coronal high-energy radiation, the development of stellar winds, and transient events such as flares and coronal mass ejections (CMEs). While considerable progress has been made for the first two processes, our understanding on the eruptive behavior of active stars is still limited. This information is critical as these phenomena can have a strong or even catastrophic impact on planetary systems, particularly, during the early stages of evolution where they can become the dominant factor in determining the properties around late-type stars. In this context, the initial results of a joint observational and numerical project, aimed at studying the properties of eruptive phenomena in active stars will be presented. The first aspect comprises the analysis of simultaneous observations of X-ray and white light flares of young stars, acquired with the *Chandra* and *Kepler* telescopes. On the numerical side, I will present 3D MHD simulations of CMEs in active stars using one of the latest models employed for space weather forecast in the solar system. These results will be discussed in the solar-stellar context, considering the observed properties of the magnetic fields in which they develop.

**Keywords:** Flares, Coronal Mass Ejections, Magneto, Hydrodynamics (MHD)

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