Constraining stellar eruptive events with scaling laws derived from the solar analogon

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In solar eruptive events - flares and coronal mass ejections - a large amount of stored magnetic energy is impulsively released and converted to kinetic energy of nonthermal particles and bulk mass motions, and into thermal energy of hot plasmas. During the past decade, the physical parameters of these energetic particle populations - both thermal and nonthermal - have been characterized with unprecedented quality and coverage in time, space, and energy. However, in stellar flares we can only observe signatures of thermal particle populations, and with significantly inferior data quality and coverage. We discuss one possibility for constraining the nonthermal aspect of stellar eruptions, namely using the solar analogon. Scaling relationships between thermal and nonthermal particle populations can be derived from the high-quality solar observations. Assuming that the same physics applies to solar and stellar eruptions, these scalings can then be applied to the stellar case.