
Coronal mass ejections and angular momentum loss in young stars

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Abstract

In our own solar system, the necessity of understanding space weather is readily evident. Fortunately for Earth, our nearest stellar neighbor is relatively quiet, exhibiting activity levels several orders of magnitude lower than young, solar-type stars. In protoplanetary systems, stellar magnetic phenomena observed are analogous to the solar case, but dramatically enhanced on all physical scales: bigger, more energetic, more frequent. While coronal mass ejections (CMEs) could play a significant role in the evolution of protoplanets, they could also affect the evolution of the central star itself. To assess the consequences of prominence eruption/CMEs, we have invoked the solar-stellar connection to estimate, for young, solar-type stars, how frequently stellar CMEs may occur and their attendant mass and angular momentum loss rates. We will demonstrate the necessary conditions under which CMEs could slow stellar rotation. Finally, we will discuss the potential for observing stellar CMEs on stars of a variety of masses.

Keywords: coronal mass ejections, stars, protoplanets, young stars

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