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Coronal Mass Ejection Early-Warning Mission by Solar-

Photon Sailcraft

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ABSTRACT

A preliminary investigation of the early warning of solar storms caused by Coronal Mass Ejection has been carried out. A long warning time could be obtained with a sailcraft synchronous with the Earth-Moon barycenter, and stationed well below the L1 point. In this paper, the theory of heliocentric synchronous sailcraft is set up, its perturbed orbit is analyzed, and a potential solution capable of providing an annual synchrony is carried out. A simple analysis of the response from a low-mass electrochromic actuator for the realization of station-keeping attitude maneuvers is put forwards, and an example of propellantless reorientation maneuver is studied.

Keywords: space weather, solar sailing, heliocentric sailcraft-Earth synchronization, electrochromic device

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