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Riding the plasma wave: Interplanetary Travel through Magnetic Reconnection and Flux Transfer Events JAKAYLA MONIQUE ROBINSON, University of Alabama at Birmingham — Magnetic sails are well known in science fiction as spacecraft able to sail throughout the Milky Way on magnetic fields the way a boat sails the sea. We revisit the work of Andrews-Zubrin methods of accelerating and decelerating a magsail by questioning if the magsail could travel along magnetic reconnection. Magnetic reconnection is the reconnecting of colliding magnetic field lines from two bodies of mass. The Earth directly experiences magnetic reconnection when the solar wind plasma from the sun hits the magnetosphere, causing auroras, flux transfer events, and possible geomagnetic storms. Flux transfer events are brief magnetic portals that open in Earth's magnetosphere during magnetic reconnection. Through magnetic reconnection and flux transfer events, material and plasma have the ability to travel at accelerated speeds from the sun to Earth. This fact unfolds the question if a magsail could travel interplanetary at speeds matching the velocity of solar wind without any use of propellant. In this study, we explore how likely this theory is based on the types of high-temperature superconductors known today, the speed of plasma during magnetic reconnection, and how the magsail spacecraft could decelerate through flux transfer events once at the destination planet.

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