Abstract Submitted
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Magnetic pumping of the solar wind[1] JAN EGEDAL, EMILY LICHKO, UW-Madison, WILLIAM DAUGHTON, LANL — The transport of matter and radiation in the solar wind and terrestrial magnetosphere is a complicated problem involving competing processes of charged particles interacting with electric and magnetic fields. Given the rapid expansion of the solar wind, it would be expected that superthermal electrons originating in the corona would cool rapidly as a function of distance to the Sun. However, this is not observed, and various models have been proposed as candidates for heating the solar wind. In the compressional pumping mechanism explored by Fisk and Gloeckler particles are accelerated by random compressions by the interplanetary wave turbulence. This theory explores diffusion due to spatial non-uniformities and provides a mechanism for redistributing particle. For investigation of a related but different heating mechanism, magnetic pumping, in our work we include diffusion of anisotropic features that develops in velocity space. The mechanism allows energy to be transferred to the particles directly from the turbulence. Guided by kinetic simulations a theory is derived for magnetic pumping. At the heart of this work is a generalization of the Parker Equation to capture the role of the pressure anisotropy during the pumping process.

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