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Magnetic pumping as a source of particle heating[1] EMILY LICHKO, JAN EGEDAL, University of Wisconsin - Madison, WILLIAM DAUGHTON, Los Alamos National Laboratory, JUSTIN KASPER, University of Michigan — Magnetic pumping is a means of heating plasmas for both fusion and astrophysical applications. In this study a magnetic pumping model is developed as a possible explanation for the heating and the generation of power-law distribution functions observed in the solar wind plasma. In most previous studies turbulent energy is only dissipated at microscopic kinetic scales. In contrast, magnetic pumping energizes the particles through the largest scale turbulent fluctuations, thus bypassing the energy cascade. Kinetic simulations are applied to verify these analytic predictions. Previous results for the one-dimensional model, as well as initial results for a two-dimensional model which includes the effects of trapped and passing particles are presented. Preliminary results of the presence of this mechanism in the bow shock region, using spacecraft data from the Magnetospheric Multiscale mission, are presented as well.

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