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Are interplanetary nonlinear Alfvén waves intermediate shocks?

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Alfvén waves, discontinuities, proton perpendicular acceleration and magnetic decreases (MDs) in interplanetary space will be shown to be interrelated. Discontinuities are the phase-steepened edges of Alfvén waves. Magnetic decreases are caused by a diamagnetic effect from perpendicularly accelerated (to the magnetic field) protons. The ion acceleration is associated with the dissipation of phase-steepened Alfvén waves, presumably through the Ponderomotive Force. Proton perpendicular heating, through instabilities, leads to the generation of both proton cyclotron waves and mirror mode structures. Alfvén waves are thus found to be both dispersive and dissipative, conditions indicating that they may be intermediate shocks. We will discuss the complex resultant "turbulence" created by the Alfvén wave dissipation. Interplanetary Alfvén waves are shown to rapidly phase-steepen at a distance of 1 AU from the Sun. A steepening rate of ˜35 times per wavelength is indicated by Cluster-ACE measurements. Interplanetary (reverse) shock compression of Alfvén waves is noted to cause the rapid formation of MDs on the sunward side of corotating interaction regions (CIRs). In conclusion, suggestions for further work: experimental, theoretical and computer modeling, will be suggested.