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Temporal intermittency of Alfvenic turbulence dissipation: effect of intermediate shock instabilities

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We present numerical simulations of the turbulent regime that establishes when a random driving is supplemented to the Cohen-Kulsrud equation for non-dispersive Alfvén waves. This equation appears as a paradigm for systems that, like the primitive MHD equations, are non strictly hyperbolic. In this case, Rankine-Hugoniot conditions do not uniquely specify the shock dynamics, and zero-viscosity limit is not necessarity well defined. This situation leads to the possibility of intermediate shocks corresponding to simultaneous jumps of the amplitude and of the direction of the magnetic field. Such structures are unstable when the phase variation exceeds 180°. The front steepens and the amplitude jump increases up to the formation of a neutral point for the transverse magnetic field, an effect leading to a change in the wave polarization. A fast shock is simultaneously emitted, and the intermediate shock relaxes to a stable state with an angular jump smaller than 180°. Such a process leads to short and intense dissipation peaks with a power-law distribution. This strongly affects the dynamics which turns out to be significantly different from both Kolmogorov and Burgers turbulence phenomenologies.