

## 太陽風中の平行伝播アルフヴェン波の非線形発展

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### Nonlinear evolution of parallel propagating Alfvén waves in the solar wind

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We discuss nonlinear evolution of parallel propagating Alfvén waves using one dimensional Hall-MHD and hybrid simulation code. Since parallel propagating Alfvén waves can propagate long distance before they are eventually dissipated by various collisionless damping processes, it is extremely important to understand how such dissipation takes place, since the loading of momentum, energy, and helicity conveyed by the Alfvén waves is completed when the waves damp away, and since parametric instabilities are of great interest for dissipation of such waves. We numerically discuss parametric instabilities of incoherent Alfvén waves including ion kinetic effects and also generation of these waves.