Abstract Submitted
for the DPP11 Meeting of
The American Physical Society

Parameteric studies of nonlinear oblique magnetosonic waves in two-ion-species plasmas MIEKO TOIDA, YUICHI KONDO, Department of Physics, Nagoya University — In a plasma containing two ion species, magnetosonic wave is split into high- and low-frequency modes. Nonliner evolution of these modes is studied by theory and simulations [1,2]. First, conditions necessary for KdV equations for low- and high- frequency modes to be valid are analytically obtained. The upper limit of the amplitude of the low-frequency-mode pulse is expressed as a function of the propagation angle θ, density ratio, and cyclotron frequency ratio of the two ion species. Next, with electromagnetic particle simulations, the nonlinear evolution of a long-wavelength low-frequency-mode disturbance is examined for various θs in two plasmas with different ion densities and cyclotron frequency ratios, and the theory for the low-frequency-mode pulse is confirmed. It is also shown that if the pulse amplitude exceeds the theoretical value of the upper limit of the amplitude, then shorter-wavelength low- and high-frequency-mode waves are generated.

[1] M. Toida, H. Higashino, and Y. Ohsawa, J. Phys. Soc. Jpn **76**, 104052 (2007).
[2] M. Toida and Y. Kondo, Physics of Plasmas, **18**, 062303 (2011)

Mieko Toida
Department of Physics, Nagoya University

Date submitted: 12 Jul 2011 Electronic form version 1.4