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Effect of ion composition on magnetosonic waves MIEKO TOIDA, Nagoya University, HIROYUKI HIGASHINO, YUKIHARU OHSAWA — The propagation of the two kinds of fast magnetosonic waves, i.e., low- and high-frequency modes, in a two-ion-species plasma is studied theoretically and numerically. It is analytically found that the KdV equation for the low-frequency mode is valid for amplitudes $\varepsilon < 2\Delta_\omega$, where $\Delta_\omega = (\omega_{+0} - \omega_{-\mathrm{r}})/\omega_{+0}$ with ω_{+0} the cutoff frequency of the high-frequency mode and $\omega_{-\mathrm{r}}$ the resonance frequency of the low-frequency mode; Δ_ω is given as a function of the density ratio and cyclotron frequency ratio of two ion species. It is then suggested that nonlinear coupling between the two modes can occur if $\varepsilon > 2\Delta_\omega$. With electromagnetic particle simulations, the evolution of the low- and high-frequency-mode pulses is investigated for various density and cyclotron frequency ratios and is compared with theoretical predictions. In particular, it is shown that high-frequency-mode pulses are generated from a long-wavelength low-frequency-mode pulse if its amplitude ε exceeds $2\Delta_\omega$.

Mieko Toida
Nagoya University

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