

## プラズマ圏ヒスの微細構造と非線形成長理論

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### Nonlinear wave growth theory for discrete hiss emissions in the plasmasphere

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Recent observations of plasmaspheric hiss emissions by the Van Allen Probes show that broadband hiss emissions in the plasmasphere comprise short-time discrete elements with rising and falling tone frequencies. Based on nonlinear wave growth theory of whistler-mode chorus emissions, we examined the applicability of the nonlinear theory to the discrete hiss emissions. We have generalized the derivation of optimum wave amplitudes for triggering rising tone chorus emissions for both falling and rising tone hiss elements. The amplitude profiles of the hiss emissions are well approximated by the optimum wave amplitudes for triggering rising or falling tones. Through formation of electron holes for rising tones and electron hills for falling tones, the coherent waves grow up to the optimum amplitudes. We find an excellent agreement between the optimum amplitudes and the observed amplitudes as a function of instantaneous frequency. The frequency sweep rates and time scales of the hiss emissions also agree those predicted by the nonlinear theory. Based on the theory, we can infer properties of energetic electrons generating hiss emissions in the equatorial region of the plasmasphere.