

Alfven sweep maser with external modulation

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We study the joint influence of intrinsic feedback and external modulation (by Pc3/4 oscillations) on the formation of dynamic spectra of Pc1 emissions in the Earth's magnetosphere using the self-consistent model known as Alfven sweep maser, which takes into account the nonlinear coupling between the magnetospheric and ionospheric resonators for Alfven ion-cyclotron waves. We consider the cases of antisymmetric and symmetric spatial structure of the hydromagnetic oscillations with respect to the geomagnetic equator. We find that the modulation by Pc3/4 waves is unlikely to be the dominant mechanism for formation of Pc1 pearls, since it is very sensitive to the mismatch between the modulation period and the intrinsic period of the system, related to the propagation of wave packet between the reflection points. Moreover, the external modulation alone leads to unrealistically narrow spectrum of Pc1 pulsations. However, it can speed up significantly the development of the dynamic regime related to the magnetosphere-ionosphere interaction.