

4分の1波長モード定在アルフヴェン波の励起条件について

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A Study of generation condition for quarter-wave length field line resonances

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We have studied the latitudinal distribution of quarter-wave, standing Alfvén modes. The diurnal variation of the local field line eigenfrequency over the latitude range $L=1.7$ to $L=5.6$ was examined using cross-phase analysis of geomagnetic data from MEASURE, CANMOS, and CARISMA magnetometer arrays in North America. The detected eigenfrequencies for $L=2$ to $L=3.1$ were remarkably low near the dawn terminator. This occurred when one end of a field line was sunlit and the other end was in darkness. However, the eigenfrequencies for $L < 2$ or $L > 3.1$ were not extraordinarily low. These results suggest that resonant quarter-wave modes were localized in the middle latitude region. We will discuss why they quarter-wave modes were localized. In particular why they were not generated at high latitudes even though the ionospheric conditions were strongly asymmetric. Our previous study showed that the mode transition from quarter wave to half wave depends on the ratio of ionospheric Pedersen conductances, and is approximately 10. However, in this study, the ionospheric conductances seems to have satisfied this condition for all stations used. Therefore another condition may apply. We relate these findings to the latest results of studies of Magnetosphere-Ionosphere coupling.