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**Modulation of magnetosonic waves by the background plasma density in a dipole magnetic field: 2D PIC simulation** JICHENG SUN, Physics Department, Auburn University, LUNJIN CHEN, Department of Physics, University of Texas at Dallas, XUEYI WANG, Physics Department, Auburn University, QUANMING LU, University of Science and Technology of China, YU LIN, Physics Department, Auburn University — Magnetosonic (MS) waves are important naturally occurring emissions in the Earth's magnetosphere. Previous theoretical calculations and PIC simulations have shown that the background plasma is a key factor to the excitation of MS waves. In this study, we investigate the MS waves modulated by background plasma density using a general curvilinear PIC simulation. The simulation model consists of three plasma components representing the background cool electrons and protons and tenuous ring distribution protons. It is found that MS waves can be locally generated by tenuous ring distribution protons in lower plasma density region. These waves are confined near the localized source region due to two mechanisms. Firstly, MS waves will be reflected because of the variation of background plasma density. Secondly, the waves leaving the source region are subject to damping from cool protons. The background plasma densities can modulate MS waves through controlling the wave growth rates in the source region. Our simulation results demonstrate that the background plasma density can modulate the MS waves and may play an important role in the spatial distribution of MS waves.

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