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电离层Alfven谐振器对地面观测到的地磁信号的影响初步研究

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Study of the influence of IAR on geomagnetic signal at ground

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摘要 本文研究了0.1~10 Hz频率范围内的ULF波从磁层到地面的传播,得到了解析解,分析了电离层Alfven谐振器、磁倾角导率、以及波频率对地面观测到的地磁信号的影响.数值结果表明:在磁层中剪切波在竖直方向有明显的谐振结构;地面观测到IAR谐振频率出现极大值,其谐振频率随磁倾角的增大而增大;电离层电导率的变化可以改变IAR的谐振频率,并能改变波的透响地面地磁信号的频谱.

关键词: ULF波 电离层Alfven谐振器 地磁信号

Abstract: The propagation of ULF waves in the Pc1 range (0.1~10 Hz) from magnetosphere to ground examined in the presence of oblique background magnetic fields. The analytic solution is derived to analy influences of the ionospheric Alfven resonator (IAR), conductivities, and the frequency of the ULF waves geomagnetic signal. The results of the numerical calculation show that the shear mode exhibits resonant vertically; the geomagnetic signal reaches its peak at the IAR resonant frequencies which increase with the variation of Hall conductivity leads to the modulation of IAR resonant frequencies and the transmissi ULF waves which effectively influence the spectrum of geomagnetic signal at ground.

Keywords: ULF waves Ionospheric Alfven resonator Geomagnetic signal

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