Explanation of Observation of Multi-Component ELF Whistlers at Low Latitude

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The physical features and propagation characteristics of the low latitude whistlers and VLF/ ELF emissions are the important and interesting subjects in the work of whistlers and VLF/ELF emissions [1-2]. Whistlers and emissions studies in India have made significant contribution to the propagation of low latitude whistlers and emissions and understanding of the structure and dynamics of the low latitude ionosphere [3-4]. During routine recording of whistlers at a low latitude ground station Jammu (geomag. lat., 19⁰ 26' N, L=1.17), we observed first time an unusual natural event in the ELF range named "ELF whistlers" [5] along with a precursor. The detailed structure of this observed unusual event clearly show that such type of "multi-component ELF whistlers" with a low cutoff frequency, around 600 Hz well below the waveguide cutoff frequency along with a precursor emission has never been obtained at any of the mid and high latitudes during normal days where most VLF/ ELF activity occurs. Generation and propagation mechanism of these events are discussed briefly. Plasma parameters are further derived from the dispersion analysis of whistlers. The nose frequency, f_n is found to vary between 1.2 kHz to 10.1 kHz. Dispersion lies in the 68 to 252 sec^{1/2} which shows that the L-value of the path of propagation of the whistlers varies between 3.25 to 6.52. The derived equatorial electron densities vary between 96 - 297 electrons/cm³

Ketwords: ELF Whistlers, Magnetospheric Physics, Wave propagation.

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