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Convective Amplification of EMIC Waves from Ring-distribution Protons in the Inner Magnetosphere[1] MANISH MITHAIWALA, CHRIS CRABTREE, GURUDAS GANGULI, Naval Research Laboratory, LEONID RUDAKOV, Icarus Research Inc., KUNIHIRO KEIKA, Solar-Terrestrial Environment Laboratory — The growth of electromagnetic ion cyclotron waves (EMIC) due to a ring distribution of Hydrogen ions is examined. Though these distributions are more commonly implicated in the generation of equatorial noise, their potential for exciting EMIC waves is considered here. It is shown that since the ring distribution is non-monotonic in perpendicular velocity, the amplification achieved by this instability is greater than bi-Maxwellian distributions for typical anisotropies, because the waves can maintain resonance over a much longer part of its trajectory. For ring speeds (V_r) close to the Alfven speed (V_A), the growth rate is maximum at parallel propagation but decreases less rapidly towards oblique angles compared with a bi-Maxwellian. Additionally there can be a second peak approximately at (kperp c/wpH)(V_r/V_A) $\sim$ 2.3 for ring speeds about the parallel thermal speed. Strong wave gain is achieved for moderate ring speeds ($V_r \sim V_A$). The analysis suggests that EMIC wave activity should be closely associated with equatorial noise.

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