S-BURSTS AND THE JUPITER IONOSPHERIC ALFVÉN RESONATOR

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Abstract

We explore a possible relationship between S-Bursts and trapped Alfvén waves in Jupiter's upper ionosphere. Eigenmodes of inertial Alfvén waves in Jupiter's ionosphere have frequencies (∼20 Hz) that match the repetition frequency of S-bursts and the two phenomena are colocated, suggesting such an association is possible. Electron beams may provide the physical mechanism that transfers energy from the Alfvén wave to the S-burst. Inertial Alfvén waves are known to accelerate electrons with fluxes that are modulated at Alfvén wave eigenmode frequencies. The modulated electron fluxes, in turn, may generate the S-Burst emissions but the exact growth mechanism has not been identified. Since the Alfvén wave eigenmode phenomena and electron acceleration are seen on Earth, we rely heavily on analogy with Earth-based observations.

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