



## **Harmonic growth of ion cyclotron waves in Saturn's Magnetosphere**

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Ion-cyclotron waves have been commonly observed by the Cassini Spacecraft in Saturn's middle magnetosphere. Waves have frequencies near the gyrofrequencies of water group ions, they are left-handed, and in most regions propagate at small angles to the ambient magnetic field. Their origin is explained in terms of the ion cyclotron instability generated by water group ion rings that form due to pickup of material from the e-ring. In addition to the waves observed at the fundamental ion gyrofrequency, dynamic spectra reveals the existence of fluctuations at approximately twice the value of the gyrofrequency. These waves have a significant compressional component and propagate at larger angles to the magnetic field. Their characteristics suggest that these fluctuations correspond to a harmonic mode. In this work we study in detail the characteristics of this harmonic mode and evaluate growth rates using a kinetic approach.