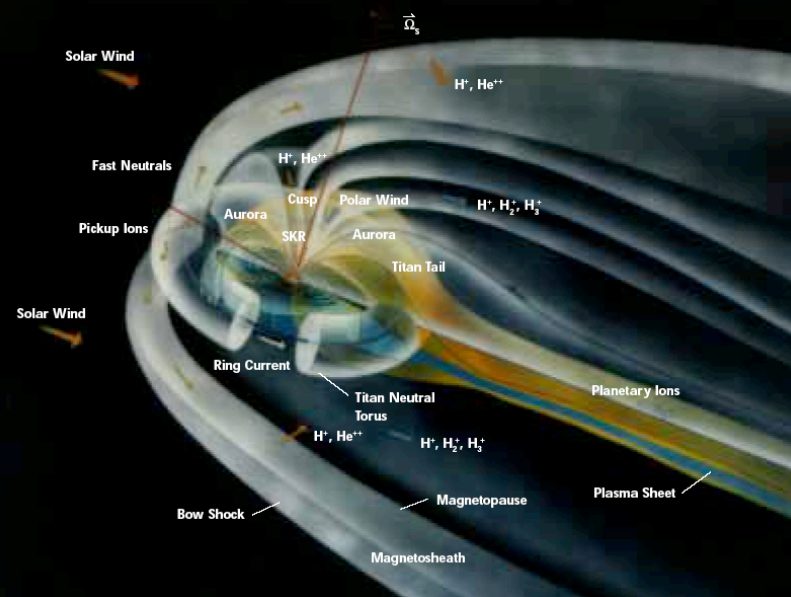


Recent Observations of Enceladus by the Cassini Magnetometer

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on behalf of the MAG team



Enceladus

Distance to Saturn – 238.020 km (3.945 Saturn radii)

Radius of Enceladus 249.5 km

Orbital period / rotation period 32.8 hours

Enceladus encounters

E3

2005 February 17 (Day 48), 03:30 UTC

Altitude 1173 km (almost 5 body radii)

Range 1423 km (5.7 Re)

Latitude 51 degrees north

Upstream

E4

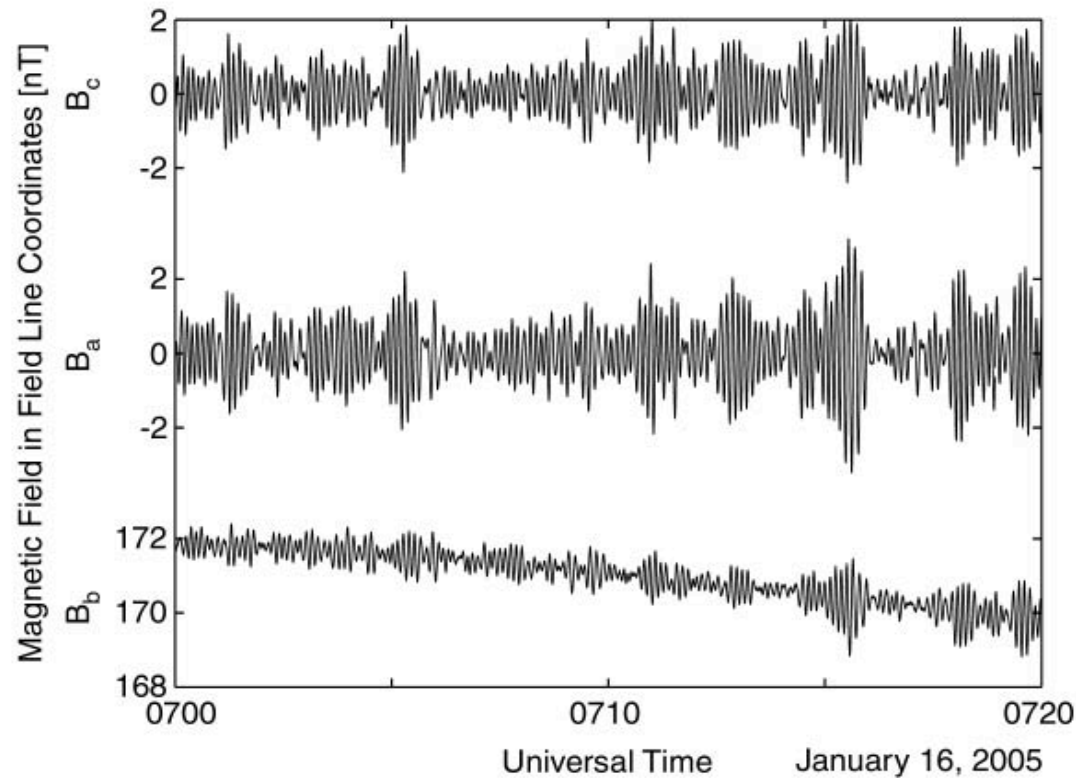
2005 March 29 (68) 09:08 UTC

Altitude 497.8 km (< 2 body radii)

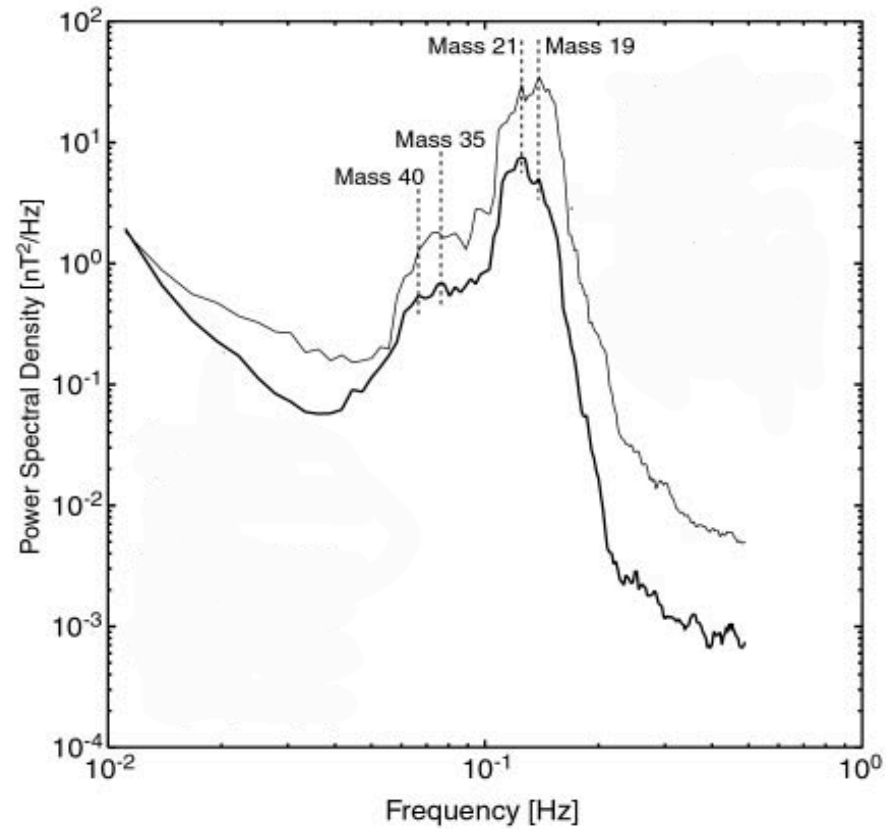
Range 747 km (3 Re)

Latitude 30 degrees south

Upstream

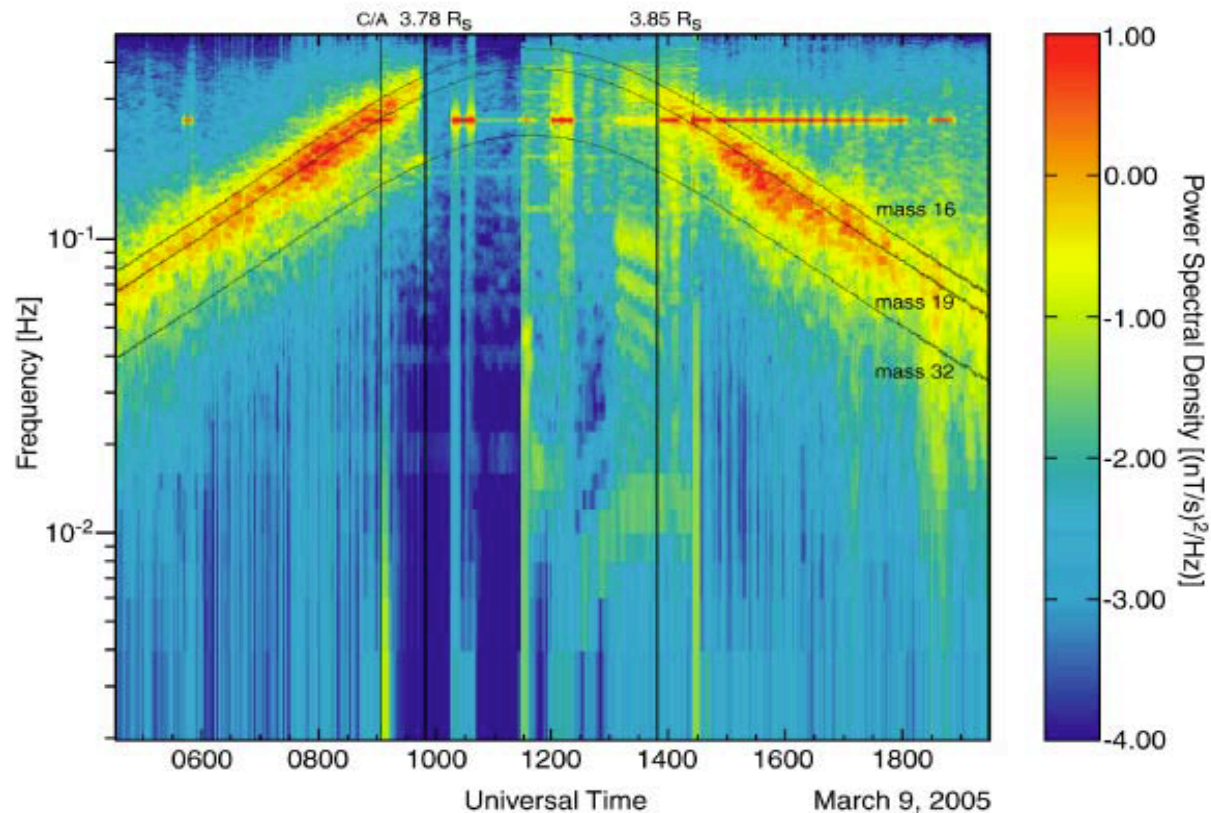


- Example of ion cyclotron waves identified in magnetometer data
- Oscillations in the magnetic field that occur when neutrals become ionized and are “picked up” by the magnetic field
- Seen throughout the inner magnetosphere but with unusual intensity near Enceladus

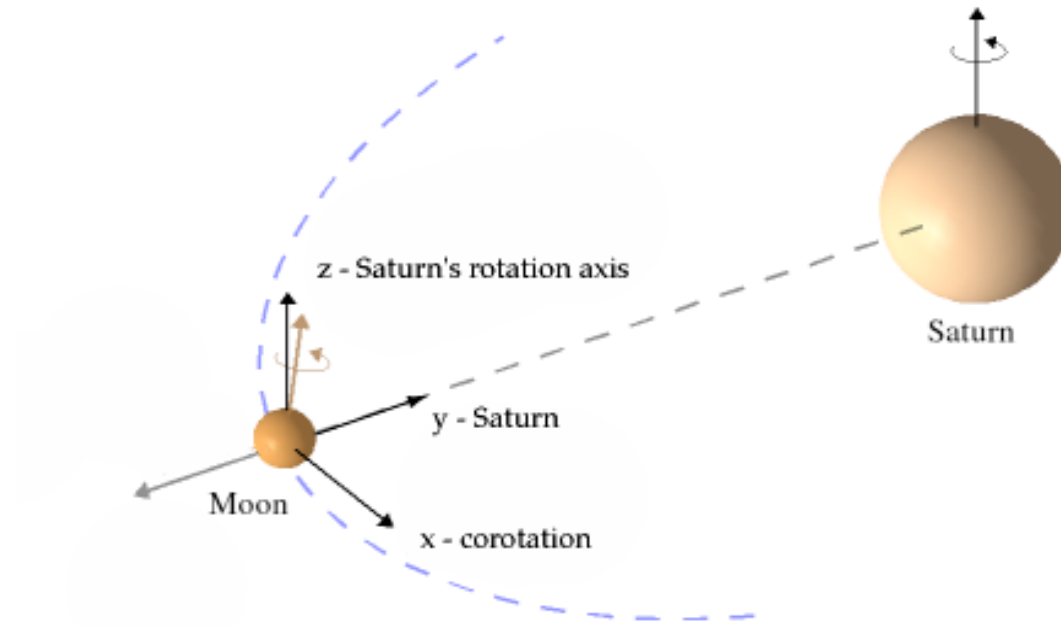


Power spectra of magnetic field data

- Frequency of ion cyclotron waves can be used to determine ion species



- Ion cyclotron waves observed near Enceladus indicate water product ions (O^+ , OH^+ , H_2O^+)
- Frequency varies in proportion to the background magnetic field strength
- Characteristics of waves are used to calculate the production rate of ions (125 kg/second to produce the waves seen)

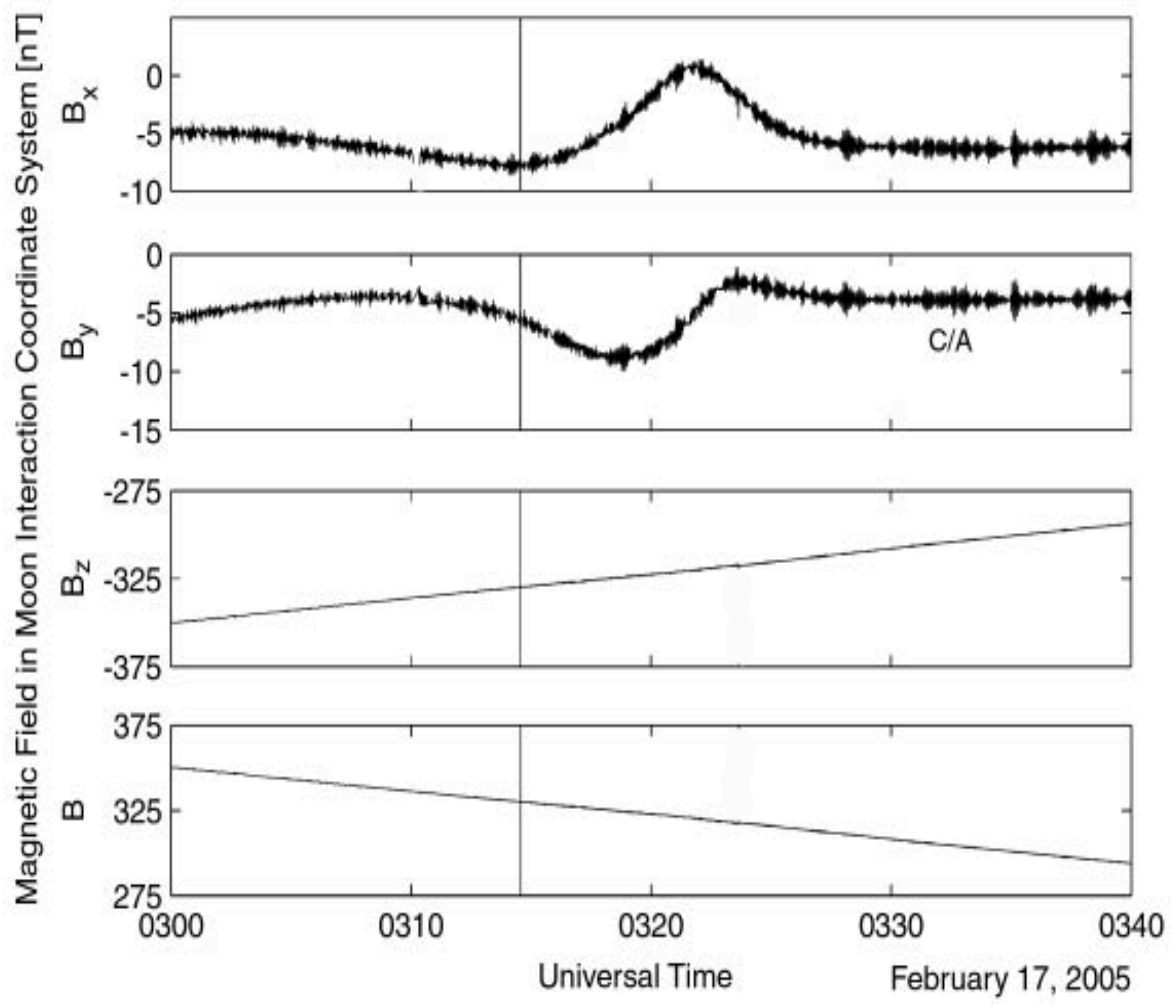


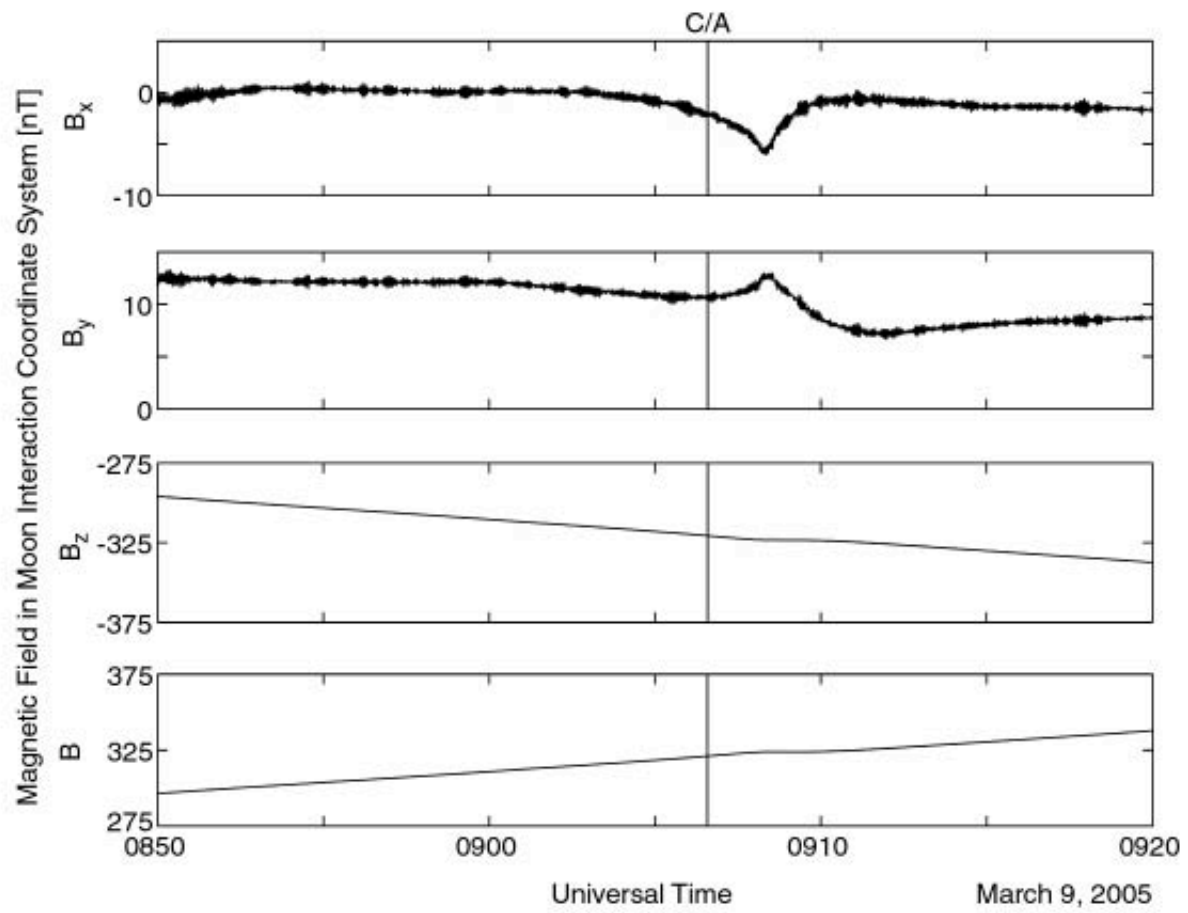
- **Enceladus Interaction Coordinate System**

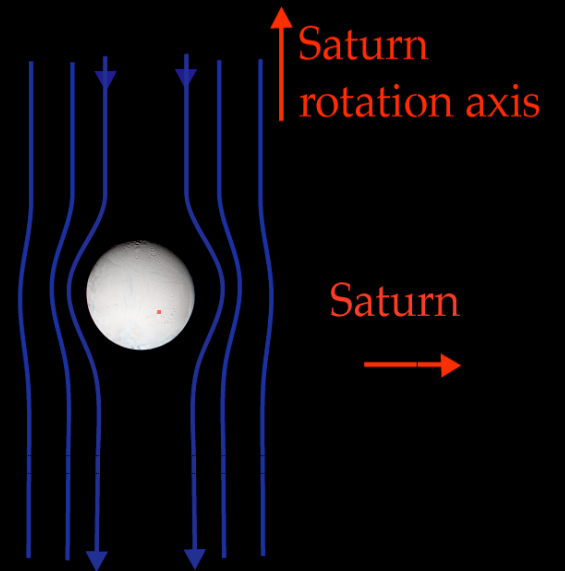
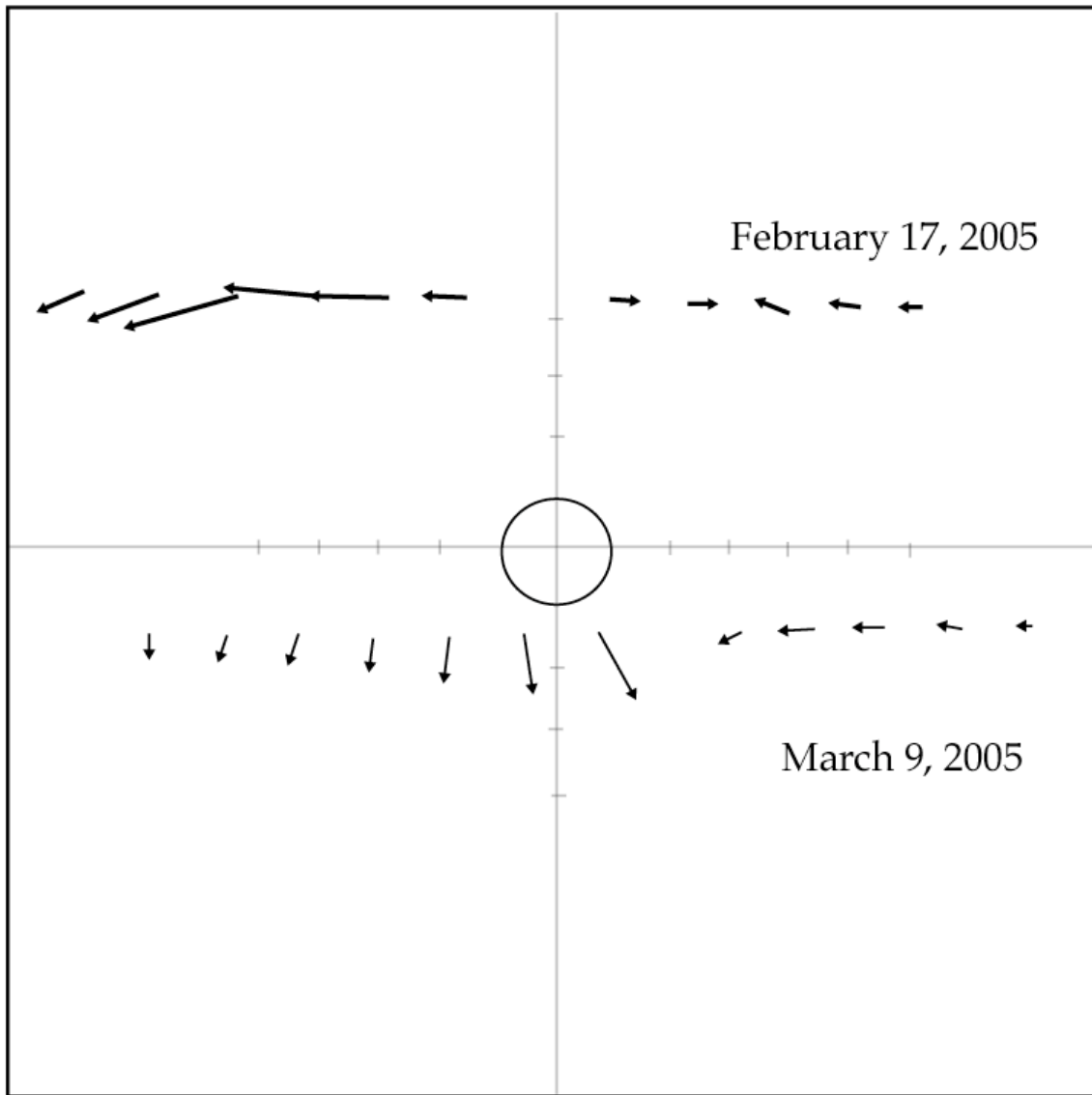
- x- direction of satellite motion

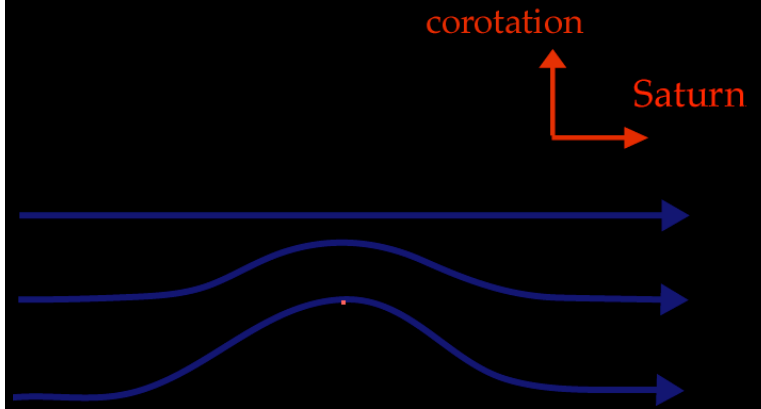
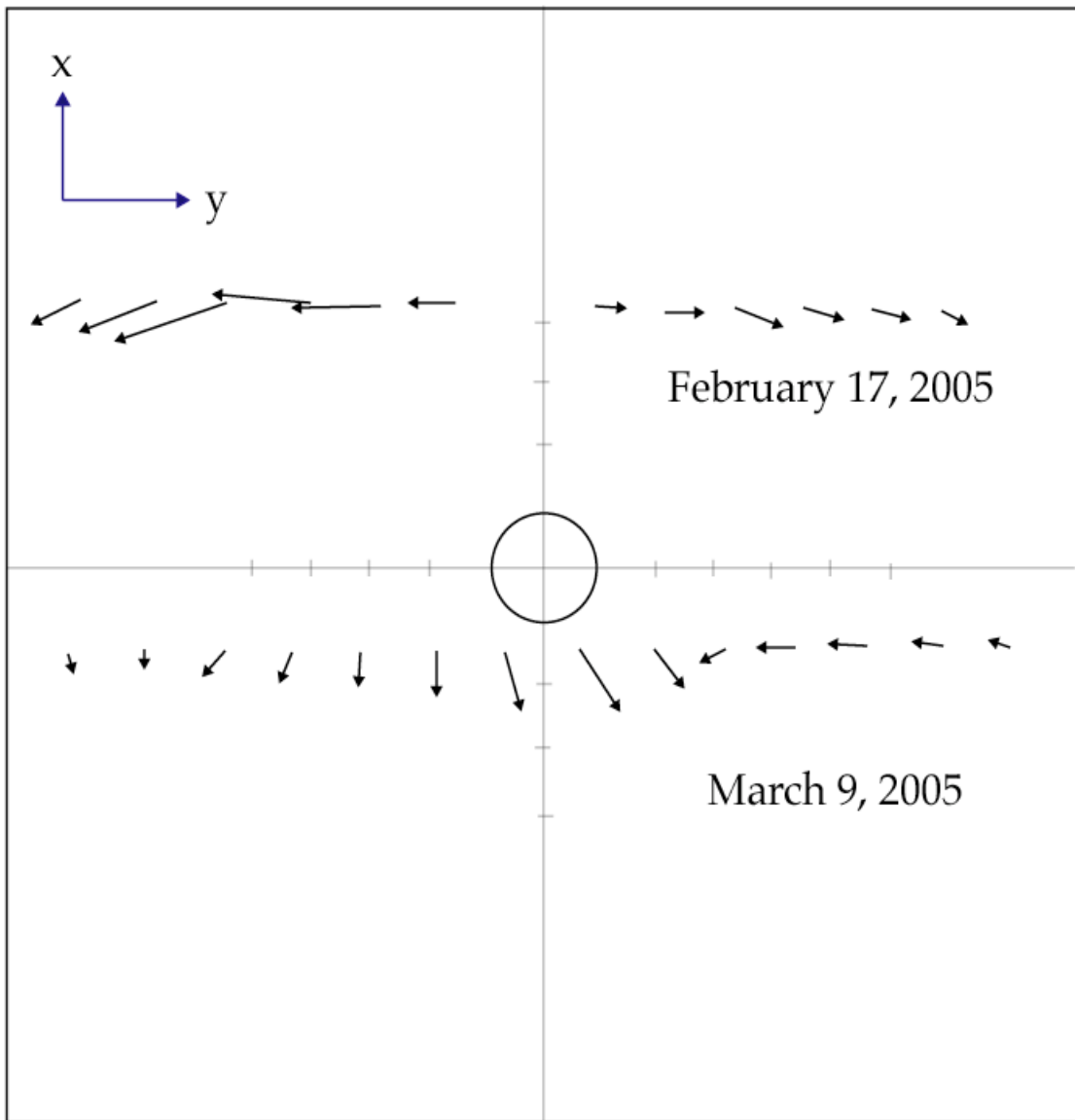
- y- toward Saturn

- z- aligned with Saturn's rotation axis









Summary

- Although ion cyclotron waves are observed throughout the inner magnetosphere, they are most intense near Enceladus
- There seems to be a magnetic signature detected close to Enceladus
- An even closer flyby is essential in understanding the magnetic signature
- A recently agreed upon change to the Cassini trajectory will bring the spacecraft to within ~200 km altitude in July of this year

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