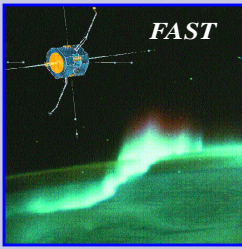
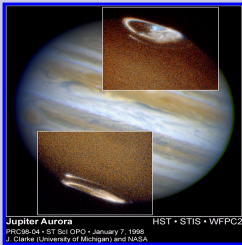


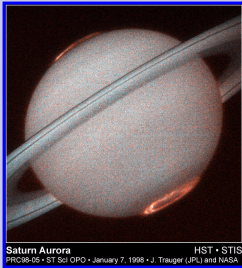
THE ELECTRON-CYCLOTRON MASER IN ASTROPHYSICS



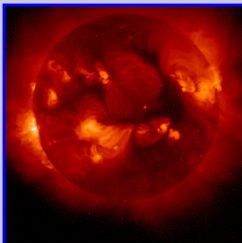
Jupiter's
Aurora



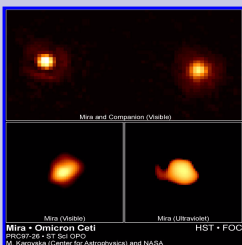
Saturn's
Aurora



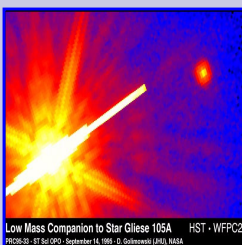
Solar
Flares



Binary
Systems



Dwarf
M Stars



FAST Results

- The FAST observations within the source region have up to 1000 times better resolution than previous missions
- The energy source of auroral kilometric radiation is the electron-cyclotron maser powered by parallel electric fields, previously believed to come from a “loss-cone” instability.

Signature of the Electron-Cyclotron Maser

- Extremely high brightness temperature.
- Nearly 100% circularly polarized.
- Narrow frequency band.
- Strong variability.

Electron-Cyclotron Maser Candidates in the Astrophysical Literature:

- Planetary radiation from all of the magnetized outer planets.
- Solar microwave spikes.
- Solar Type IV/V radio emissions.
- Radio emissions from RS CVn binaries.
- Radio emissions from AM Her binaries.
- Radio emissions from Dwarf M flare stars.

Implication of the FAST Results

- These findings may call for re-analysis of some astrophysical radio sources.
- The FAST results suggest that parallel electric fields may be widespread in astrophysical plasmas, strongly supporting the idea proposed over 50 years by Nobel laureate, Hans Alfvén of Sweden.