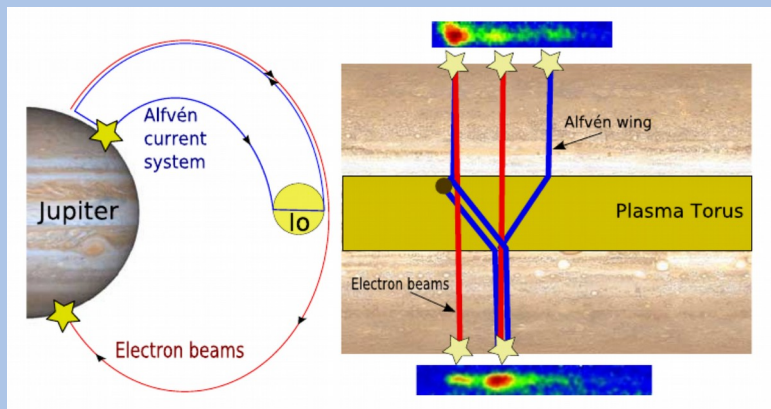


An Alfvénic source for suprathermal electrons in the Io torus

#52 - D. Coffin, P. Damiano, P. Delamere

Sources of Alfvén energy

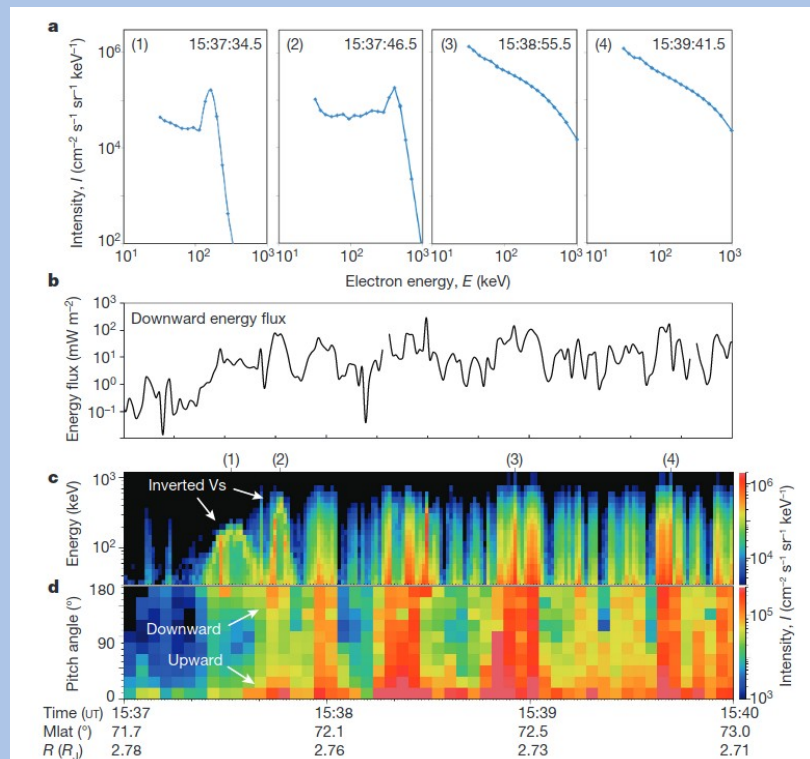
- The motion of Io through its torus generates Alfvénic perturbations.



[Bonfond et al, GRL 2008]

- In addition, radial transport may be a mechanism to facilitate the radial interchange of flux tubes (Gold, 1959), akin to a Rayleigh-Taylor (RT) instability.
- Hybrid simulations of the RT instability illustrate parallel propagating Alfvén waves (Stauffer et al., 2019).

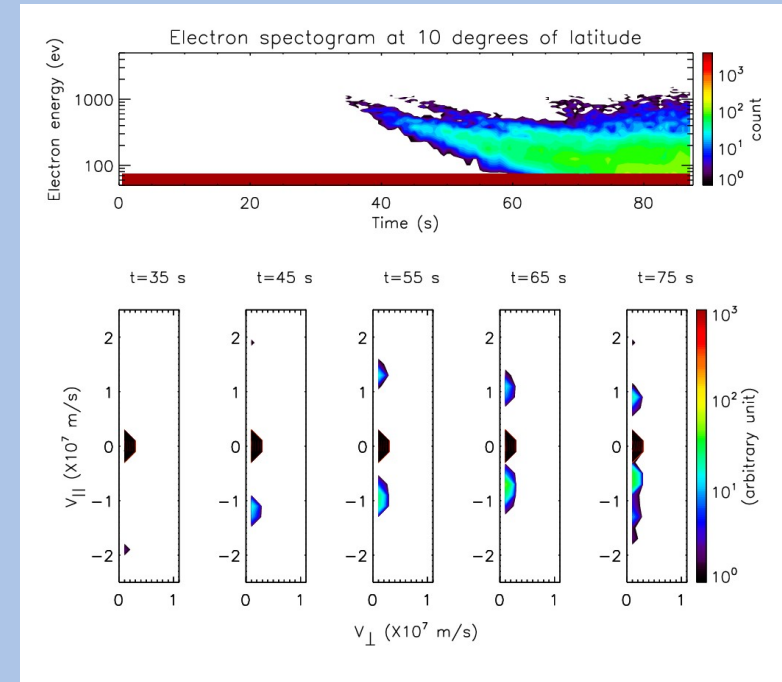
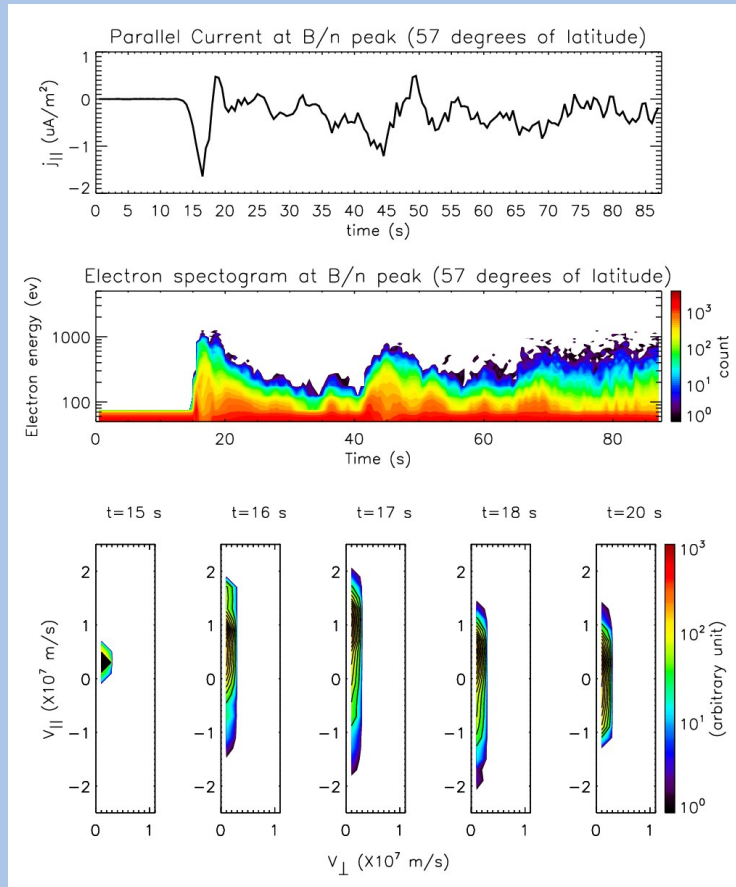
Juno observations illustrate substantial broadband electron energization (e.g. Mauk et al., 2017, Allegrini et al., 2017), associated with dispersive scale Alfvén waves (DAWs).



[Mauk et al, Nature 2017]

An Alfvénic source for suprathermal electrons in the Io torus

- Kinetic simulations of Alfvén wave propagation illustrate broadband electron energization at high latitudes.
- Electron heating persists post-energization and heated electrons can stream toward torus.
- Bi-directional energized electrons are suggestive of trans-hemispheric beams at lower latitudes [Bonfond et al, 2008].



- Suprathermal electrons are required to explain torus dynamics (Coffin et al, 2020).
- High-latitude energization may be local source for suprathermals.