A statistical study of the features of ion acceleration events in the Jovian magnetotail using Juno/JEDI data

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MOTIVATION

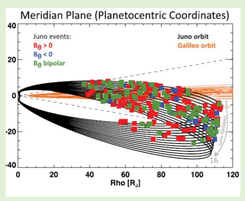
- Planetary magnetospheres are very efficient accelerators of charged particles
- The energization processes of magnetotail plasma populations are thought to share similarities among the various magnetospheres
- In this study we focus on the investigation of the characteristics of ion acceleration processes in the Jovian magnetosphere

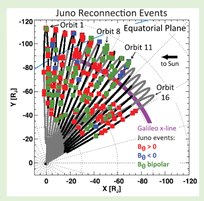
WHY JUPITER?

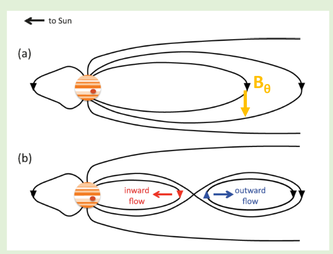
- The Jovian magnetosphere contains a variety of ion species with different charge states!
- Therefore, it provides a diverse a set of acceleration-relevant factors that can be tested, such as the mass/charge dependent nature of the heavy ion acceleration processes.

PREVIOUS STUDIES

- *Vogt et al. (2020):* July 2016 – October 2018 (first 16 Juno Orbits) -> 232 events detected based on B_θ variations







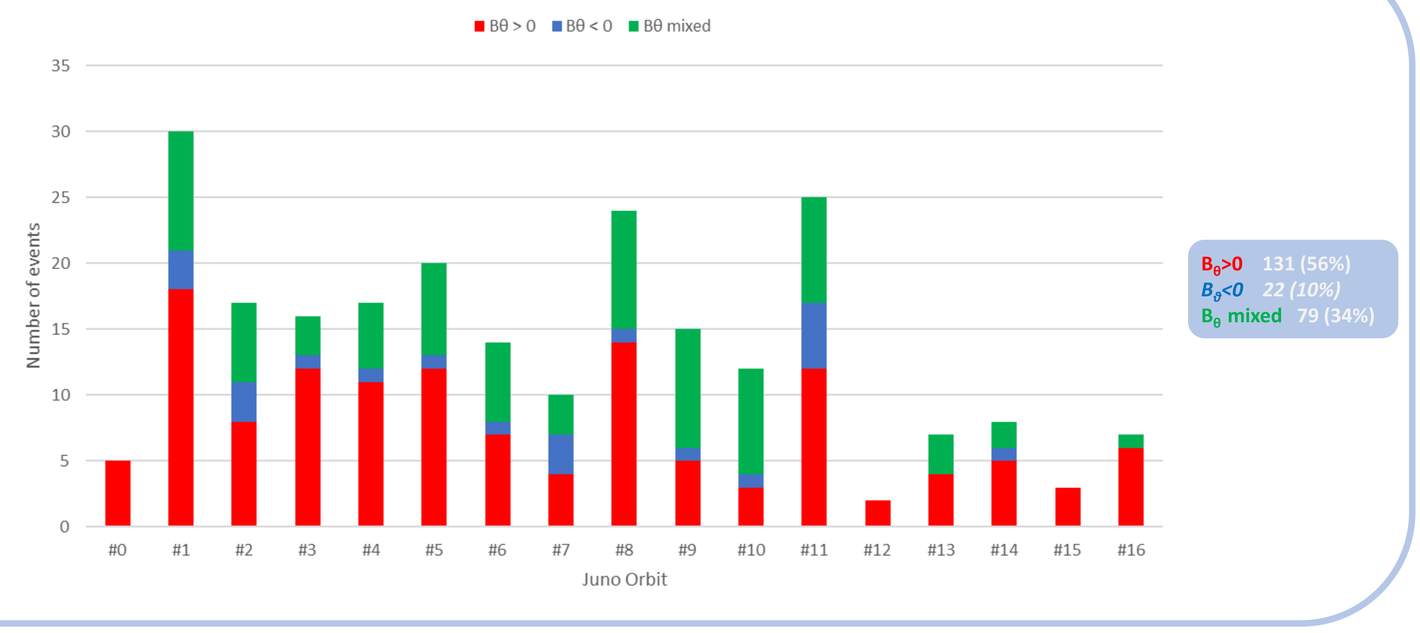
DATA SOURCES

- MAG: 1s time resolution
- JEDI-090 (“Puck” EPD): Flux, angular distribution and composition of incident ions with energies of a few keV to several MeV:
  - H+: ~50 keV – ~3 MeV
  - O+S: ~140 keV –~400 keV
  - O: ~400 keV – >5 MeV
  - S: ~400 keV – >5 MeV
  - e-: ~30 keV –~1 MeV

FUTURE GOALS

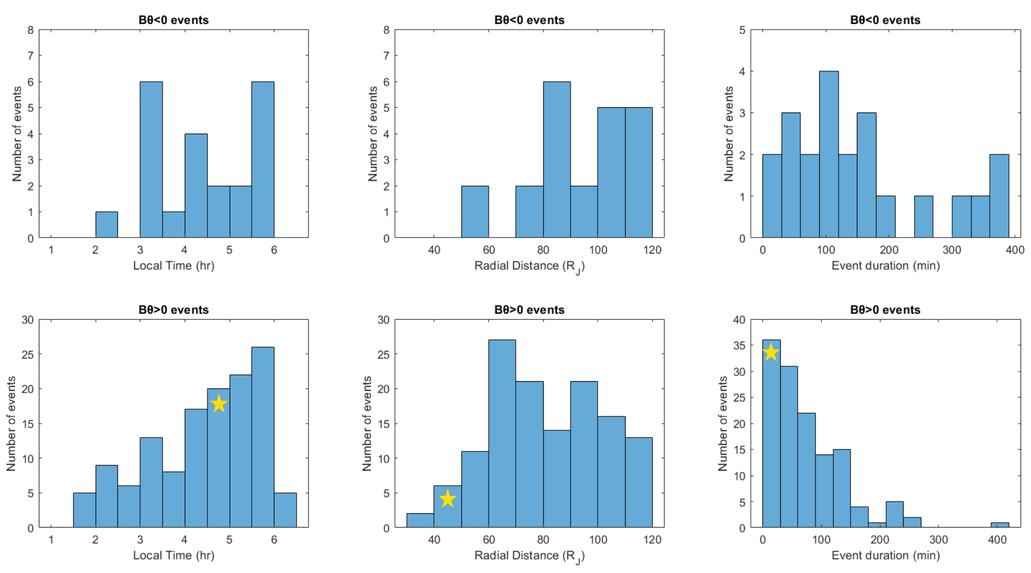
- Extract the ion plasma moments to acquire an overview of the actual plasma flows
- Investigate further the characteristics of ion acceleration and search for possible mechanism(s)
- **Ultimate Goal**: Exploit the multi-species, multi-charge state plasma of Jupiter to test acceleration theories

Event Categories



Event Properties

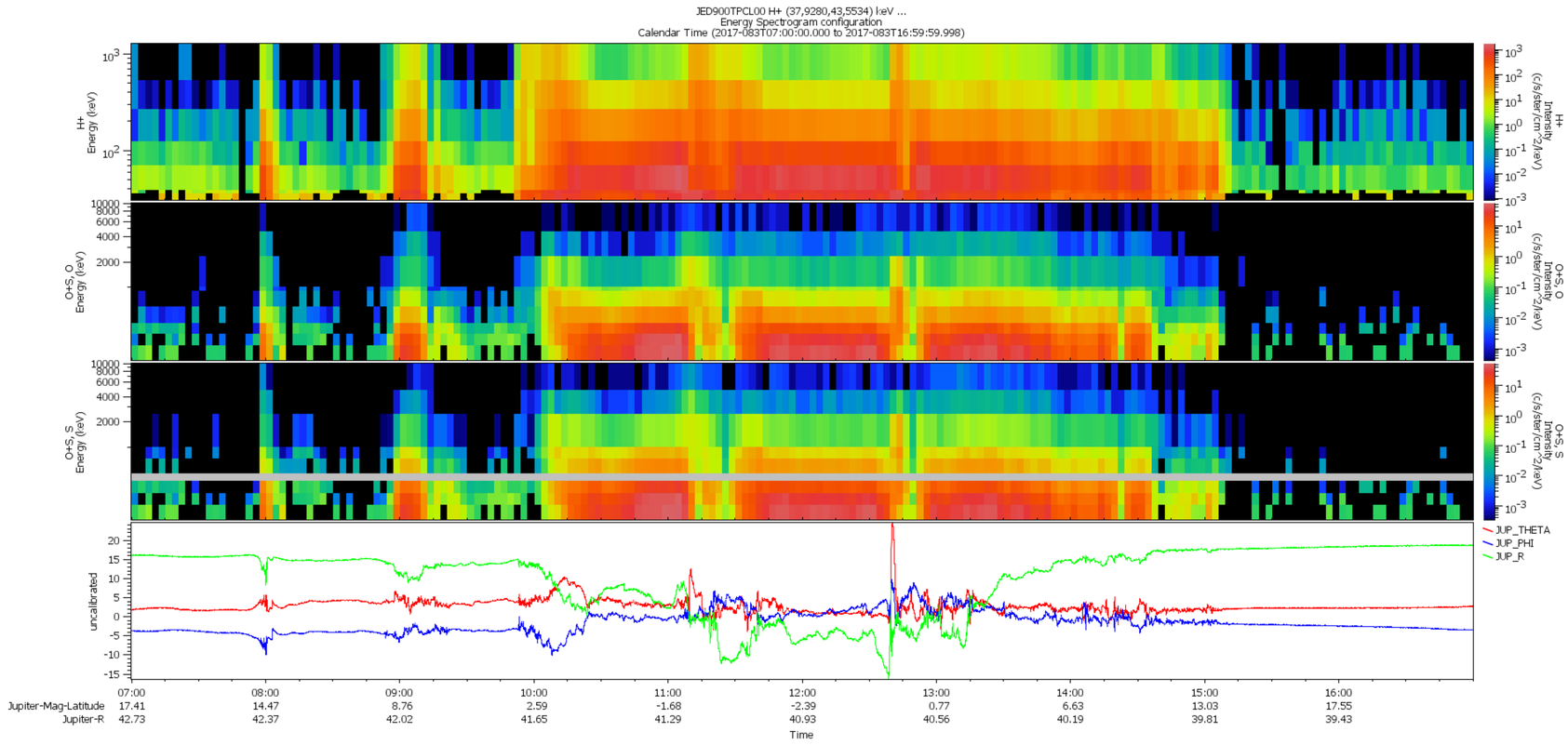
B_ϑ<0
N = 22



B_θ>0
N = 131

Local Time | *Radial Distance* | *Duration*

Interesting Examples



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