

# Magnetospheres of the Outer Planets

## Who is the MOP community?

- *International grass roots group established in the 1970s to understand the magnetospheres of Jupiter and Saturn.*
- *Grown through Voyager, Galileo, Hubble, Cassini, New Horizons, Juno, to include ionosphere-magnetosphere, moon-magnetosphere, ring-magnetosphere interactions and studies of aurora and moon activity throughout the outer solar system.*
- *Meetings are inclusive of theoretical studies, mission data, remote observations, future mission/instrument discussions, and provide tutorials to engage students and Early Career scientists (and applies for and provides significant NASA and ESA support for their travel)*



MOP, 2017, Uppsala, Sweden

MOP, 2018, Boulder, Colorado



MOP, 1977, Lindau, Germany

# July 8-13, 2018 Meeting Summary: 190 abstracts

## Presentations Emphasized

*Results Cassini End of Mission*

*Science from Juno and Galileo*

*Moon – Magnetosphere Interactions*

*Ice Giants*

*Neutral cloud-torus dynamics*

*In Situ and Remote Observations*

*Theory*

*Future Mission Development*

***Discussion of the IG Study...***

## Topical Demographics (talks / posters )

Total Presentations ( 65 / 125 )

*Saturn* ( 31% / 35% )

*Jupiter* ( 43% / 37% )

*Moons* ( 22% / 23% )

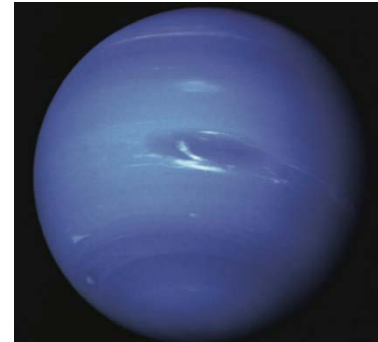
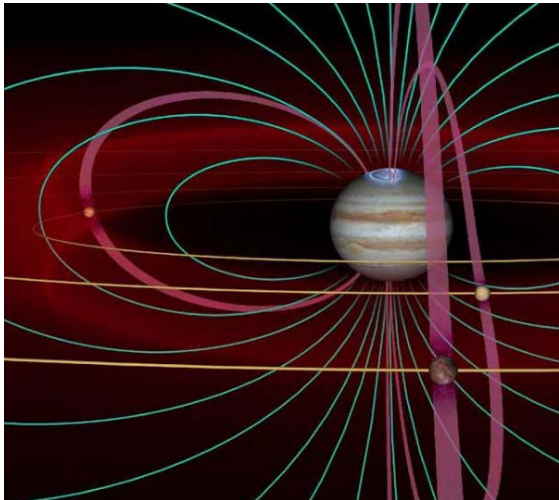
*Ice Giants* ( 6% / 5% )

## Gender Demographics:

Women Invited Talks 25%

Women Contributed Talks 14%

Women Posters 14%



## Feedback from MOP on IG study:

**There is broad agreement and support from MOP with many elements of the study findings, especially the need for an orbiter over a flyby and that there are equally compelling science drivers for Uranus and Neptune.**

There were 2 main concerns expressed at the MOP meeting, one of which is mitigated by a recent paper, submitted to Experimental Astronomy by the IG SDT.

1) The mitigated concern is related to a Doppler imager on a small payload. MOP members are concerned at a Doppler Imager as one of the only instruments on the 50kg payload (data heavy instrument based with the potential to return unprecedented science, that has however not been flown before – noting that this is not unprecedented in space exploration (e.g. INCA on Cassini) – the community note that such an instrument should not be prioritized over more tried-and- tested techniques. Recent article in prep addresses this underlining the instrument serves well as a stress test and that the IG study DID NOT recommend a payload.

2) Change to Highest Priority Science Objectives moved understanding the planetary dynamo out of the top two priorities.

### Decadal Survey V&V 2011:

1. Determine the atmospheric zonal winds, composition, and structure at high spatial resolution, as well as the temporal evolution of atmospheric dynamics.
2. Understand the basic structure of the planet's magnetosphere as well as the high-order structure and temporal evolution of the planet's interior dynamo.

### IG Study 2017:

1. Constrain the structure and characteristics of the planet's interior, including layering, locations of convective and stable regions, and internal dynamics.
2. Determine the planet's bulk composition, including abundances and isotopes of heavy elements, He and heavier noble gases.