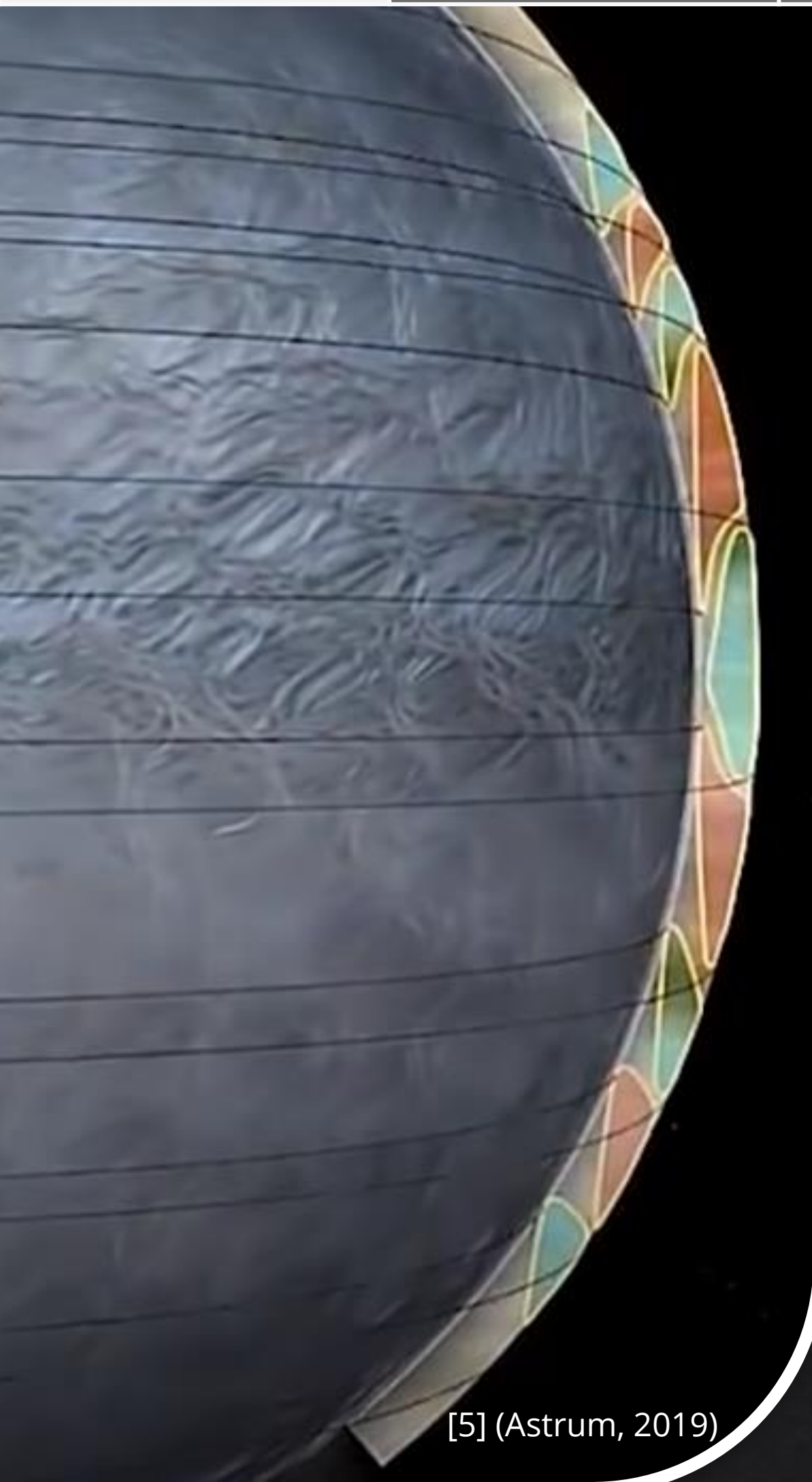


Jupiter's Magnetic Field

Space Climate D

Jordi Mata Garcia





Introduction

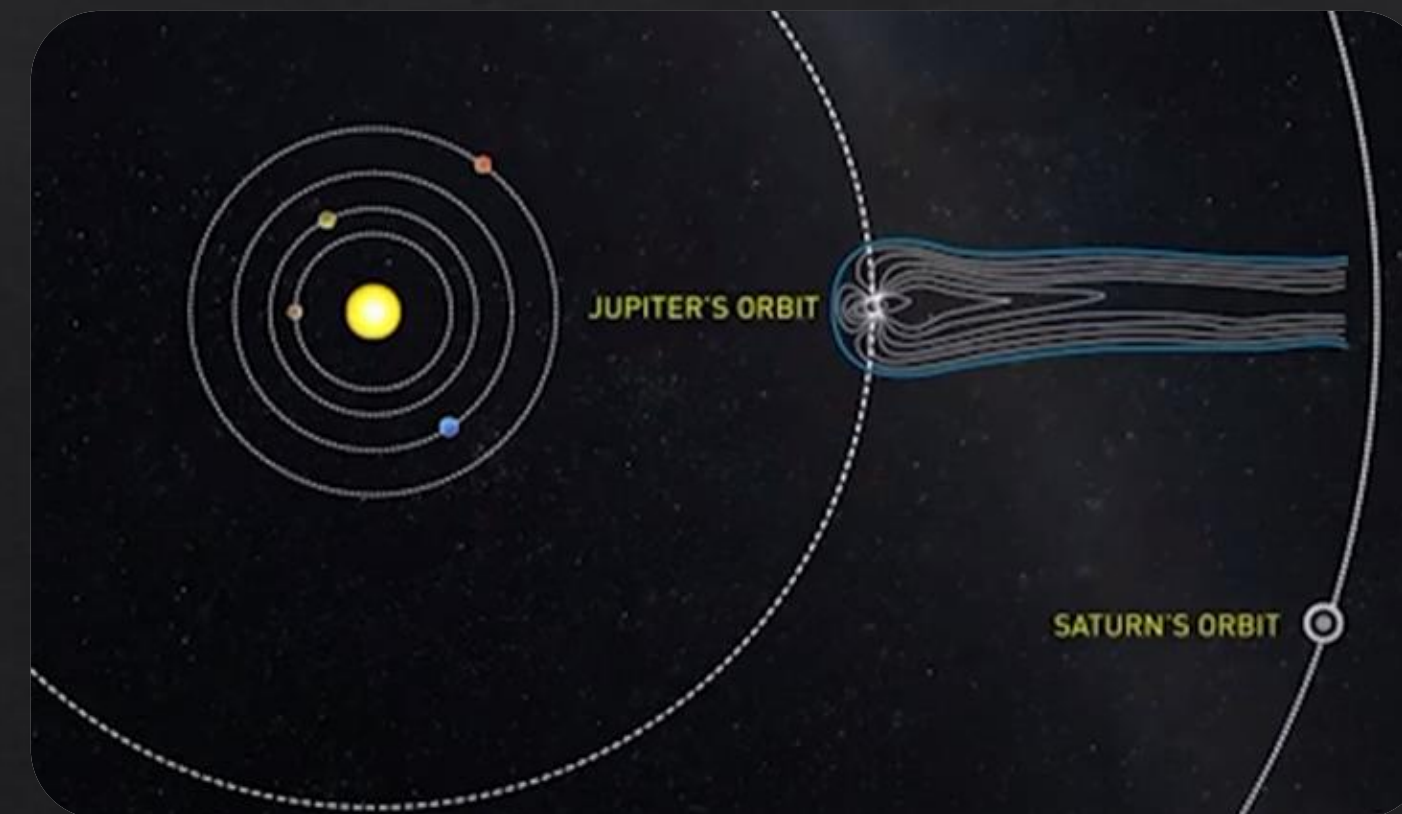
- Jupiter lacks magnetised crust
 - Atmosphere extends down to >3000 km
 - Ocean of metallic hydrogen beneath down until the centre [1]

Introduction

- Gas giant?



- 80-90% of radius is believed to be an electrically conducting plasma (high pressure) [1]
- Agrees with its enormous magnetic field [2]
- Magnetosphere is uneven and chaotic [3]



[2] (NASA Goddard, 2016)

Juno

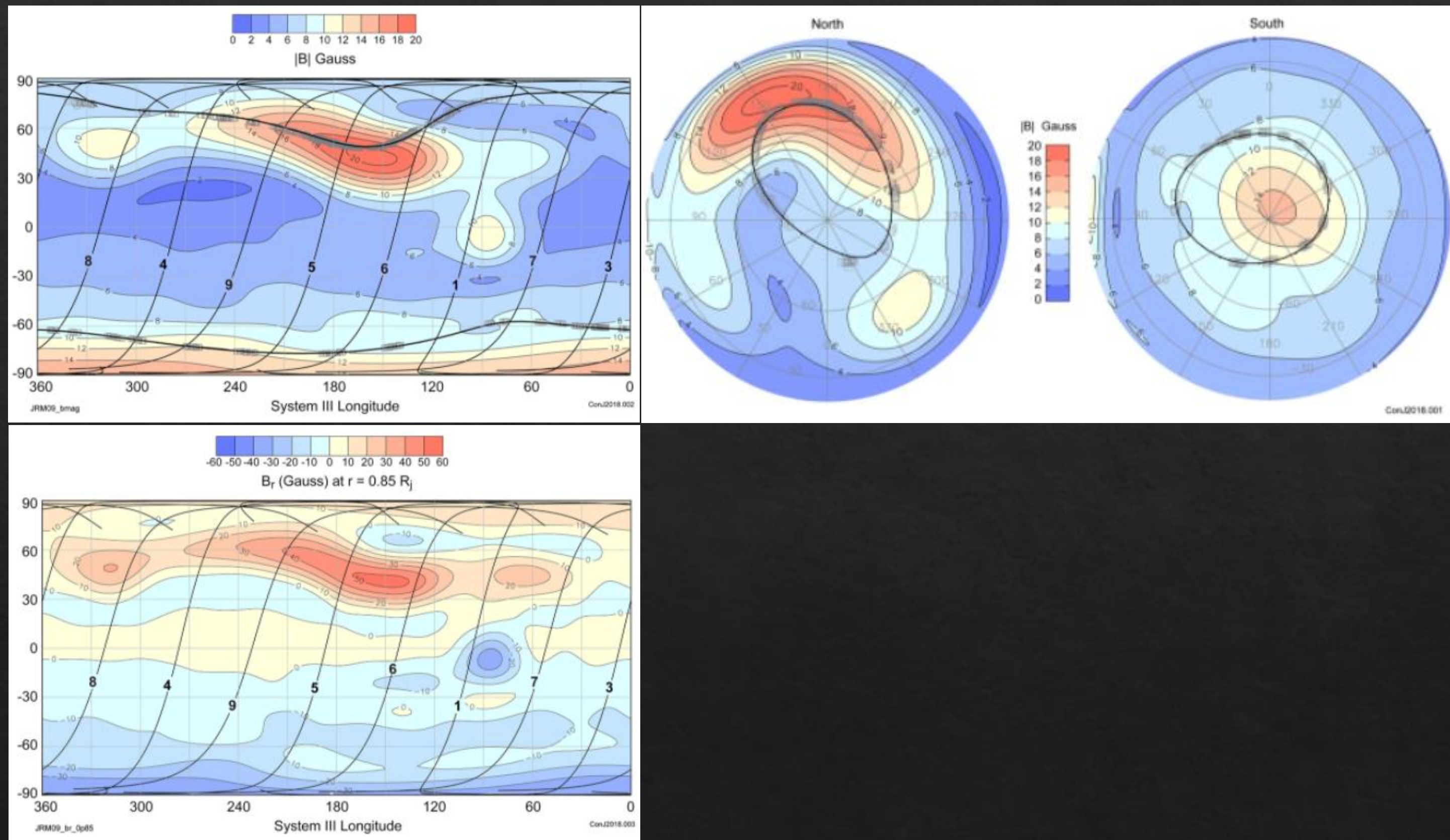
- Objective [2]
 - 37 orbits separated in latitude by $\sim 12^\circ$
 - 2 magnetometers aligned acting as 1
 - Expected to reach Europa by 29.09



Data [3]

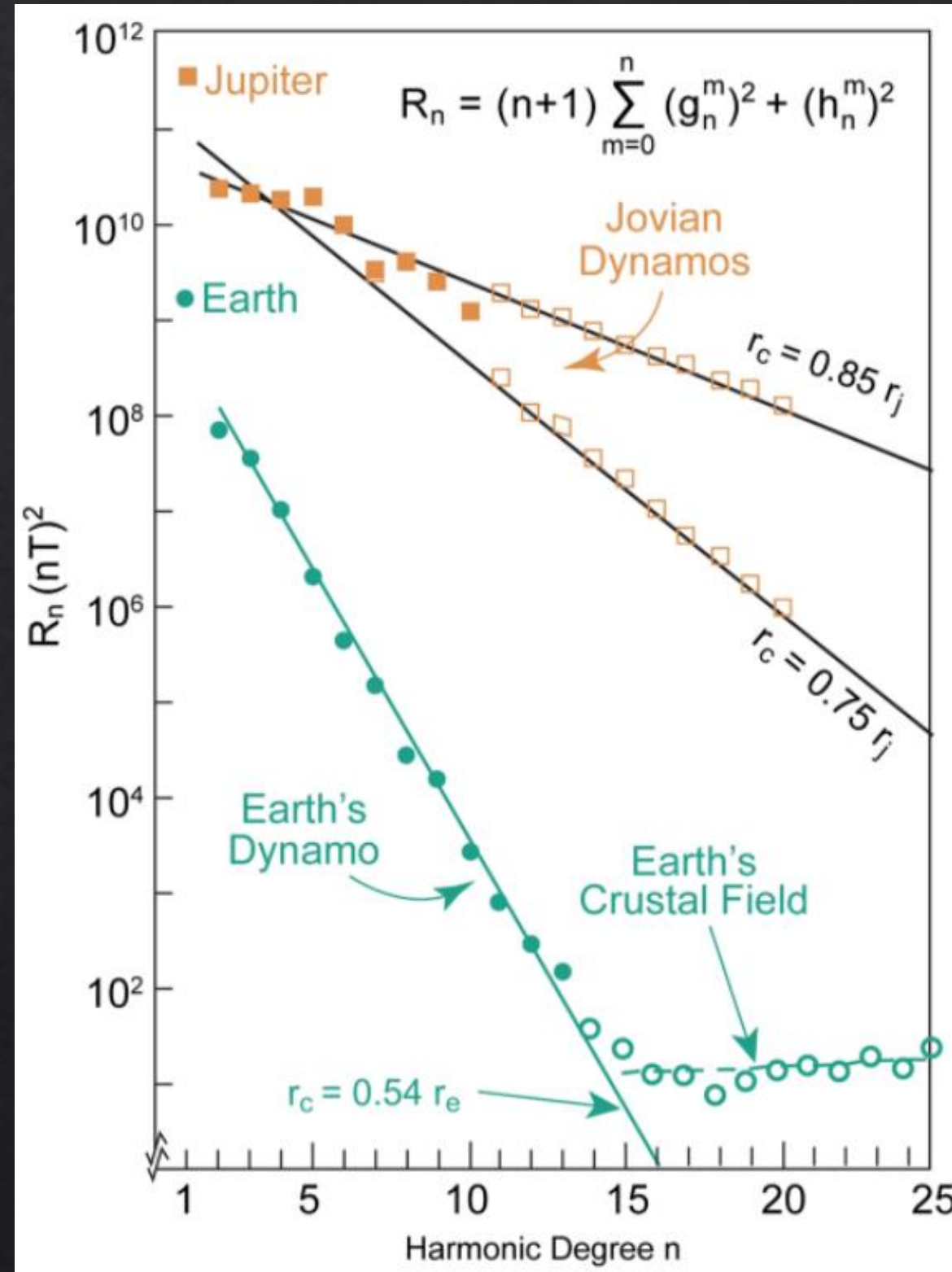
- Equatorial field strength: $417.0\mu\text{T}$ (4.170 G)
- Magnetic field ~ 20 times stronger than Earth's.
- Magnetic moment ~ 20000 times larger than Earth's.
- Magnetic field period of $\sim 10\text{h}$.
- Magnetopause distance between 50 and 100 times the planet's radius.

Data [3]



[3] (Connerney, 2018)

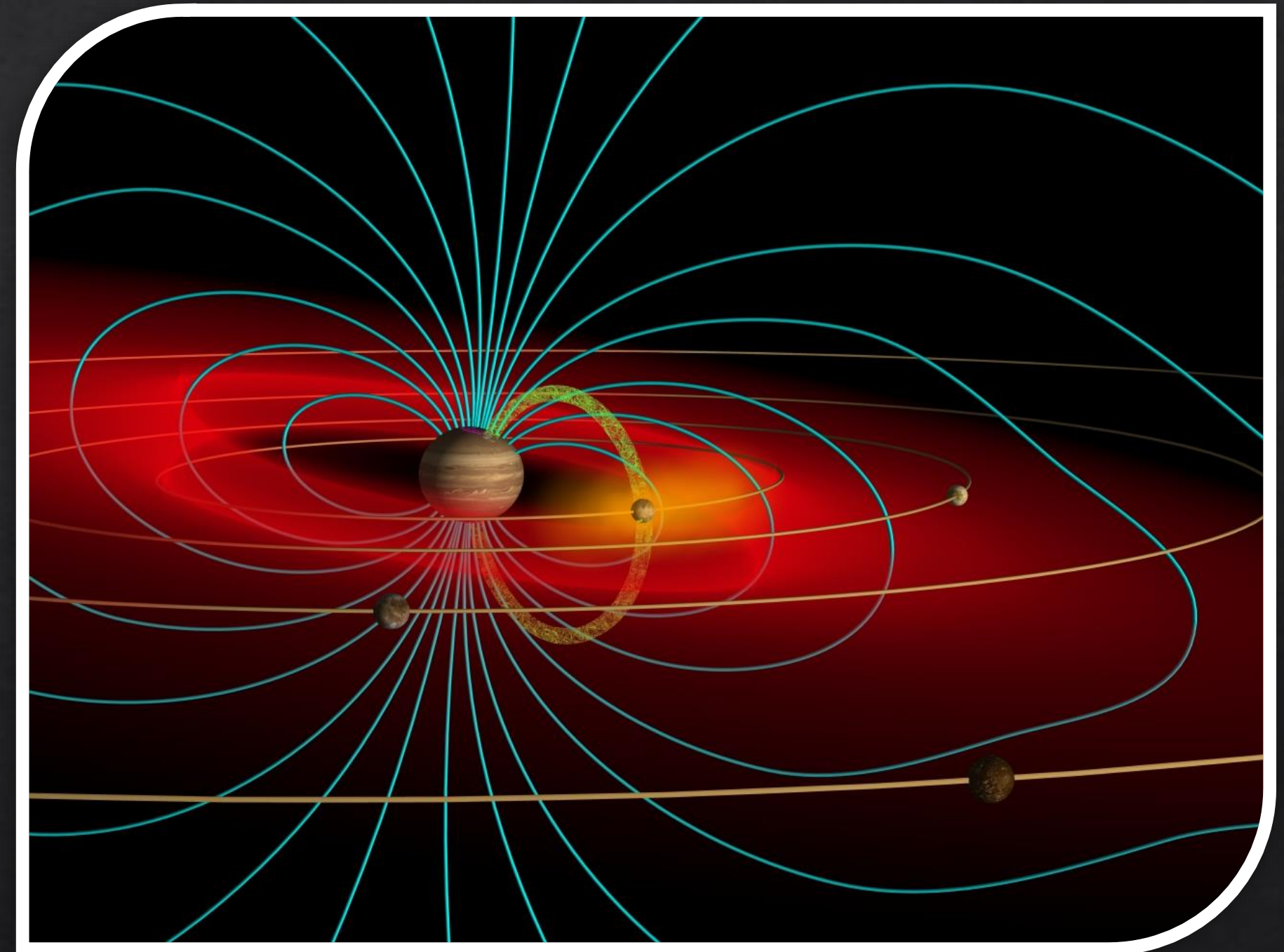
Data [3]



[3] (Connerney, 2018)

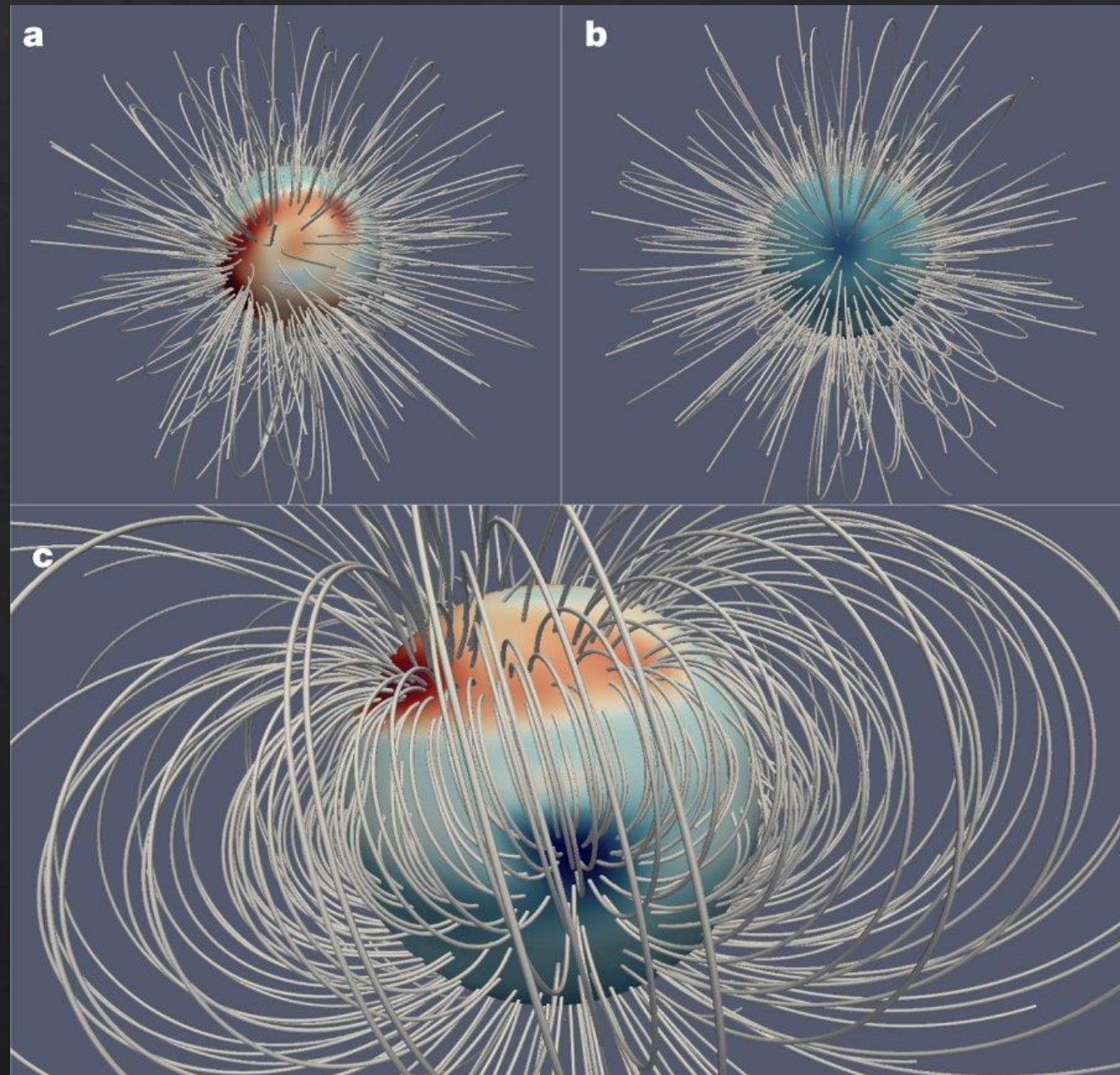
Jupiter's Plasma Torus

- Jupiter possesses a plasma torus
- Equator radiation belt [4]
- High interaction with Io

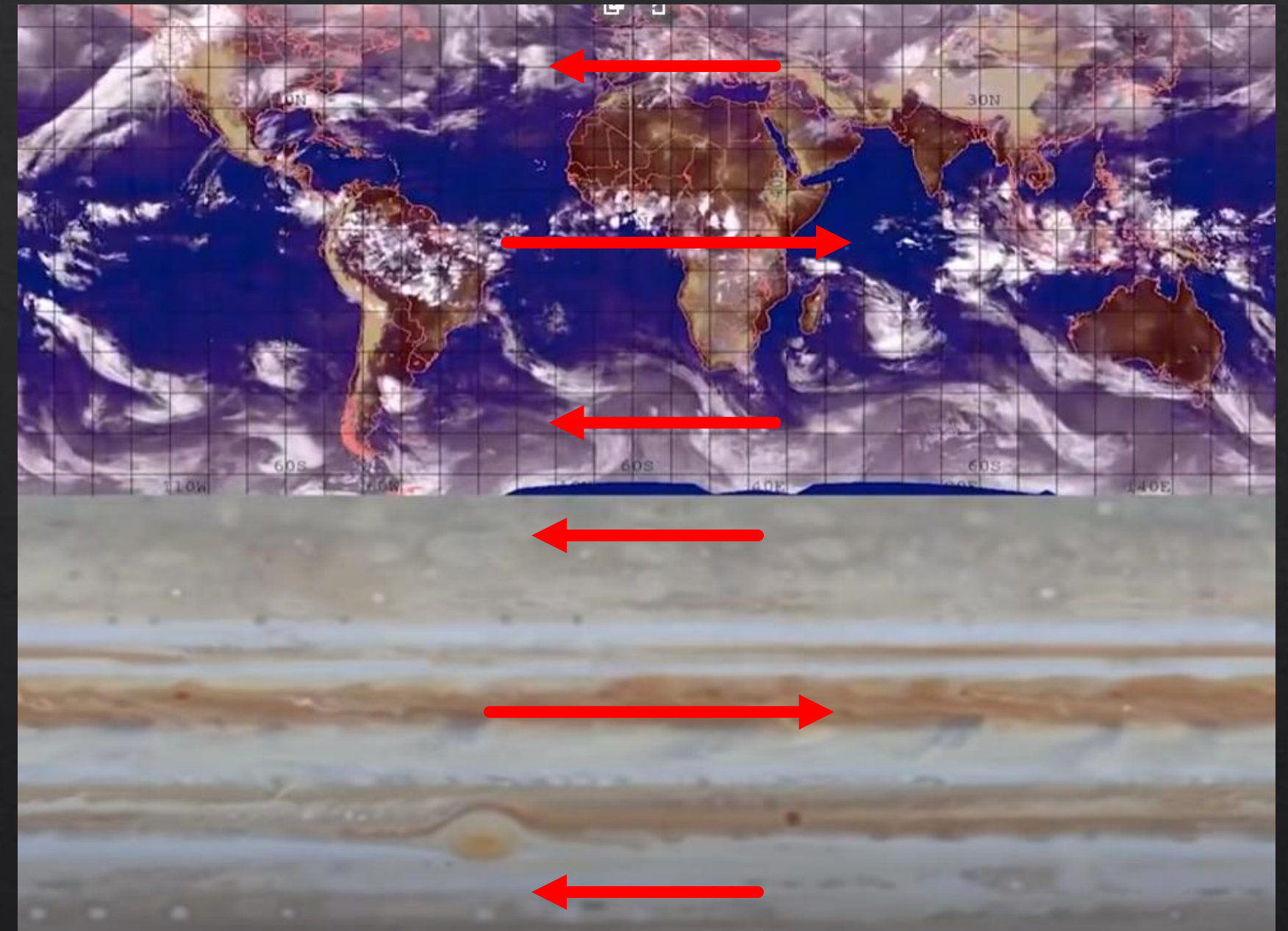


[2] (NASA Goddard, 2016)

Jupiter's Secular Variation



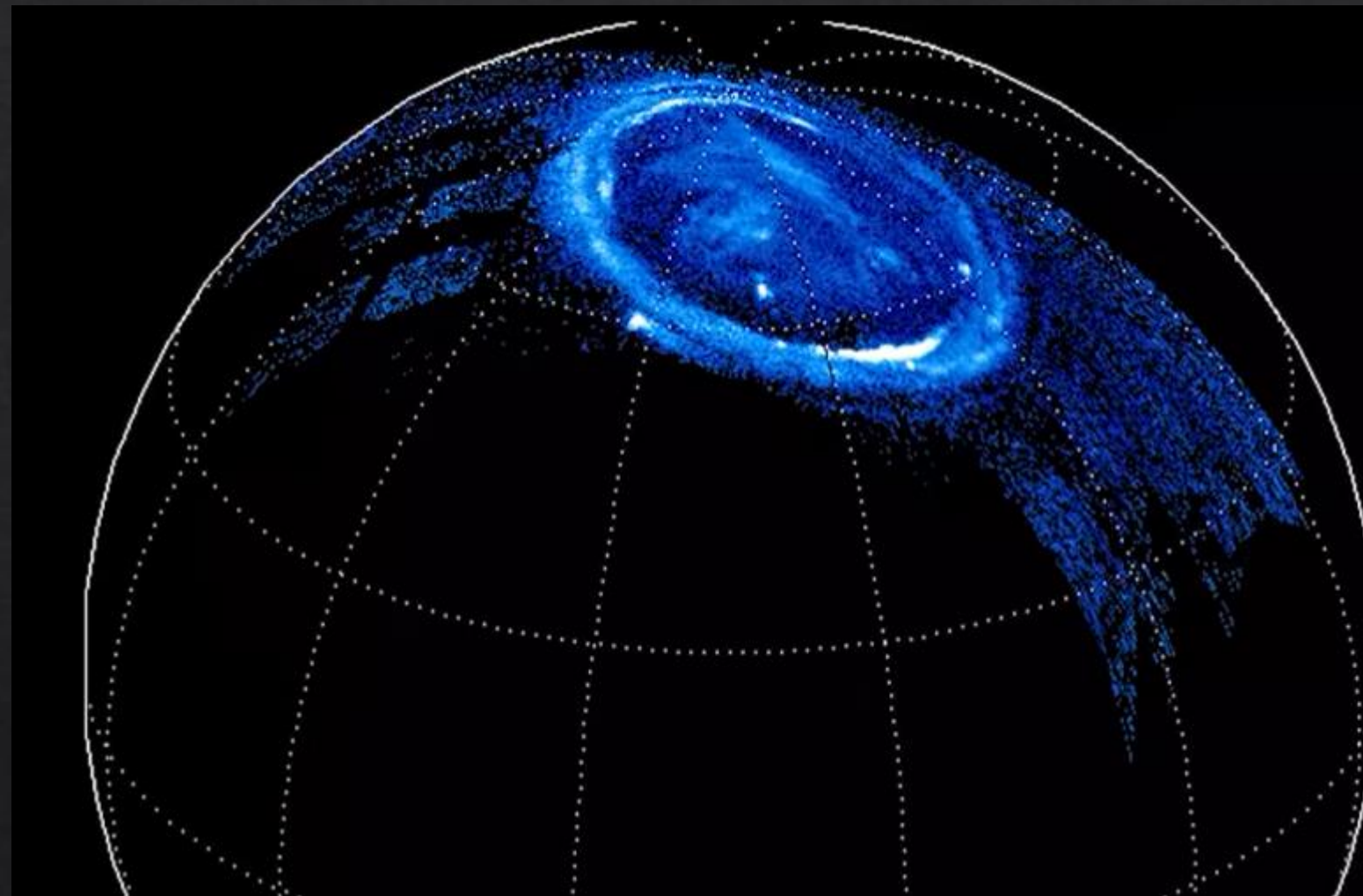
[5] (Astrum, 2019)



[5] (Astrum, 2019)

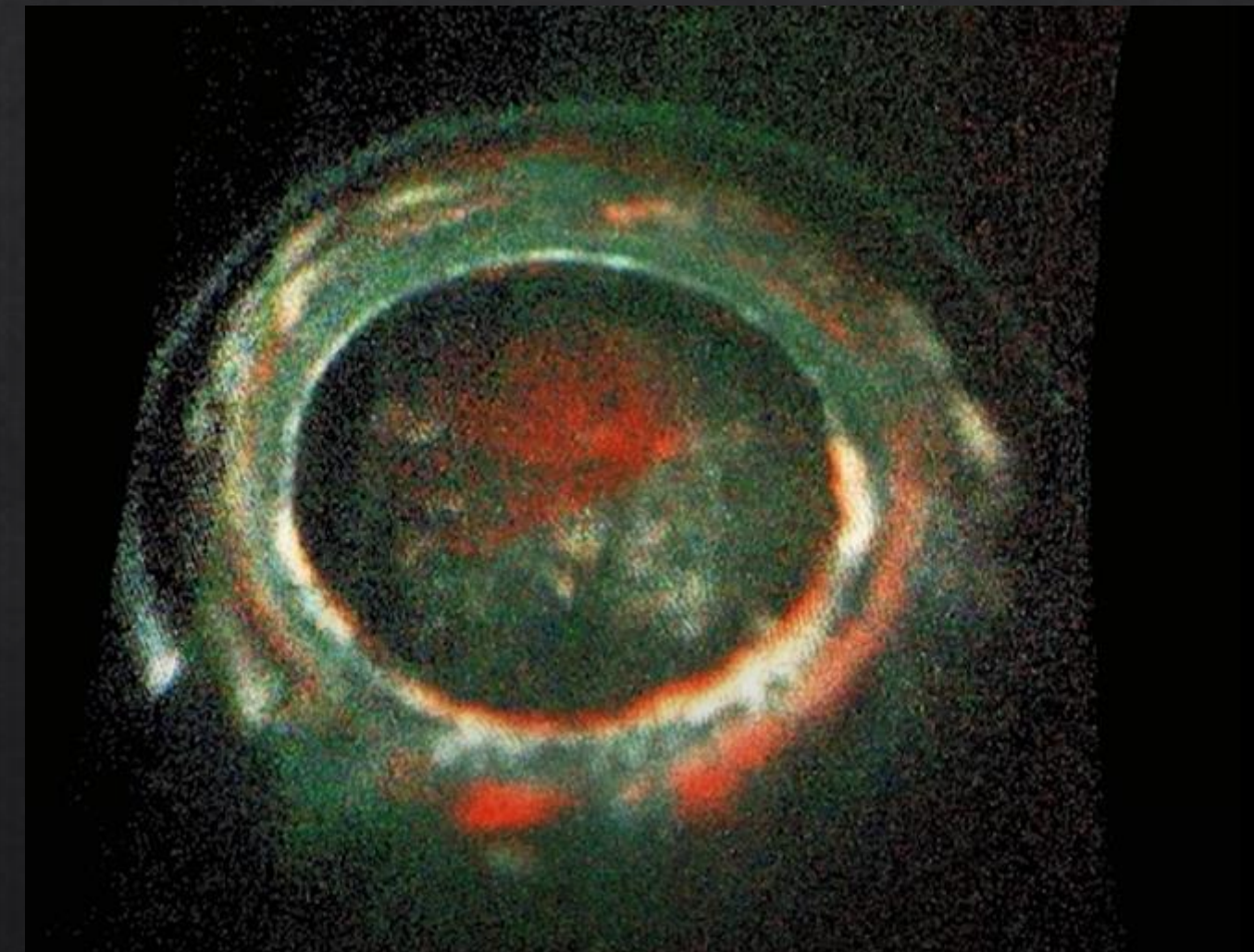
Jupiter's Auroras [3]

North Pole



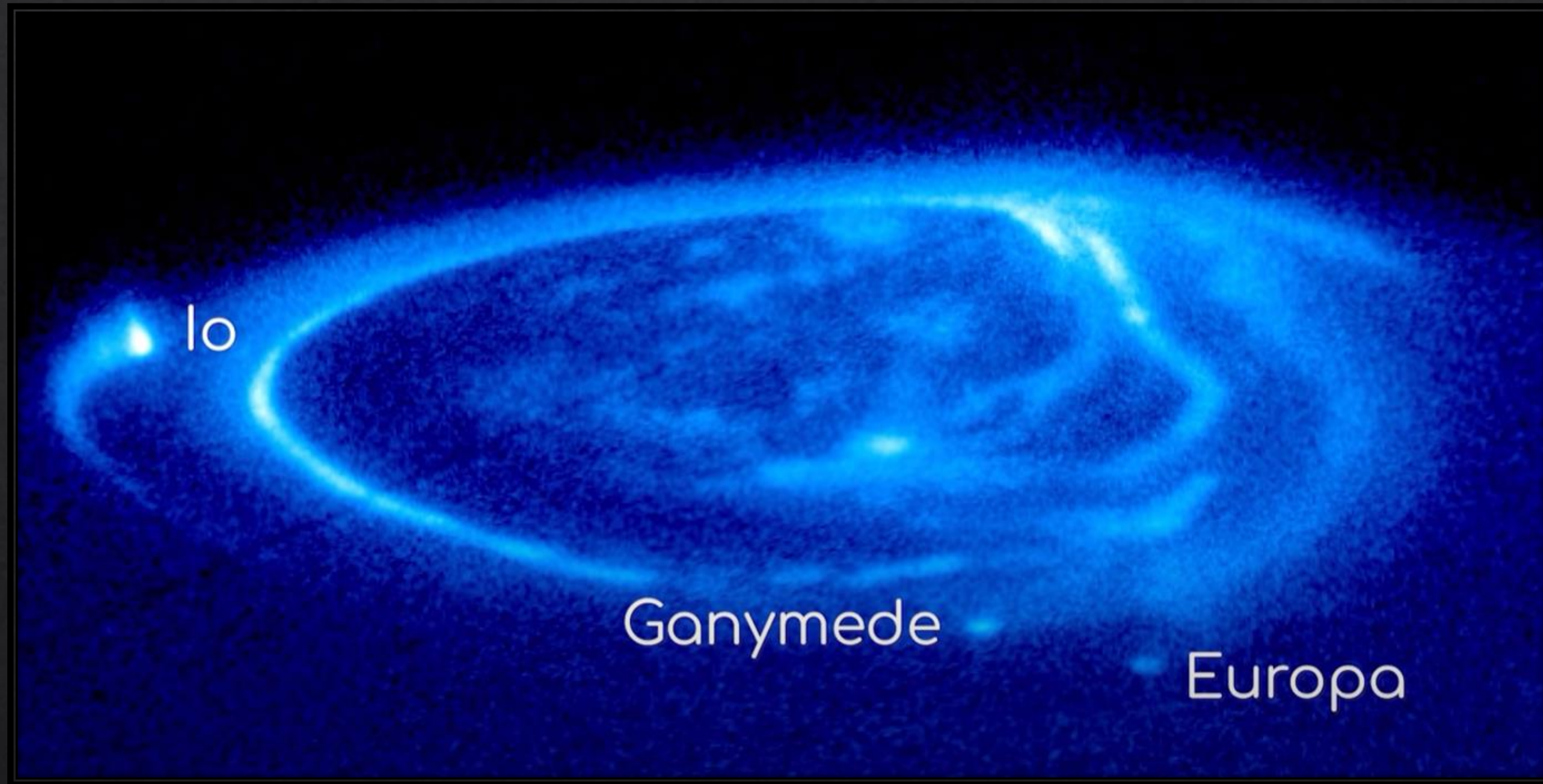
[5] (Astrum, 2019)

South Pole



[5] (Astrum, 2019)

Jupiter's Moons Interaction [3]



[5] (Astrum, 2019)

Thank you kindly for listening!

**USES IMMENSE GRAVITY TO
SHEPHERD STRAY ASTEROIDS**



**KEEPS THEM FROM
HITTING EARTH**

References

- [1] E. Huscher et al., 'Survey of Juno Observations in Jupiter's Plasma Disk: Density', *Journal of Geophysical Research: Space Physics*, vol. 126, no. 8. American Geophysical Union (AGU), Jul. 29, 2021. doi: 10.1029/2021ja029446.
- [2] NASA Goddard, 2016. Exploring Jupiter's Magnetic Field. [video] Available at: <<https://svs.gsfc.nasa.gov/12296>> [Accessed 22 May 2022].
- [3] J. E. P. Connerney et al., 'A New Model of Jupiter's Magnetic Field From Juno's First Nine Orbits', *Geophysical Research Letters*, vol. 45, no. 6. American Geophysical Union (AGU), pp. 2590–2596, Mar. 28, 2018. doi: 10.1002/2018gl077312.
- [4] E. Roussos et al., 'The in-situ exploration of Jupiter's radiation belts', *Experimental Astronomy*. Springer Science and Business Media LLC, Oct. 30, 2021. doi: 10.1007/s10686-021-09801-0.
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