

3D Monte-Carlo Simulations of Ganymede's Water Atmosphere - Predictions for JUICE / PEP / NIM

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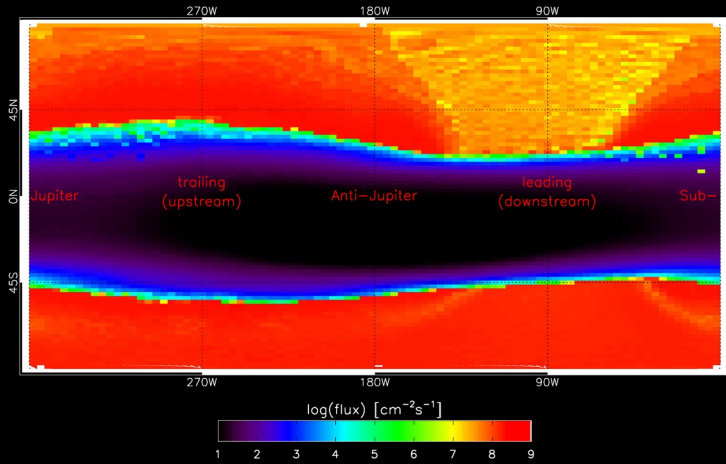
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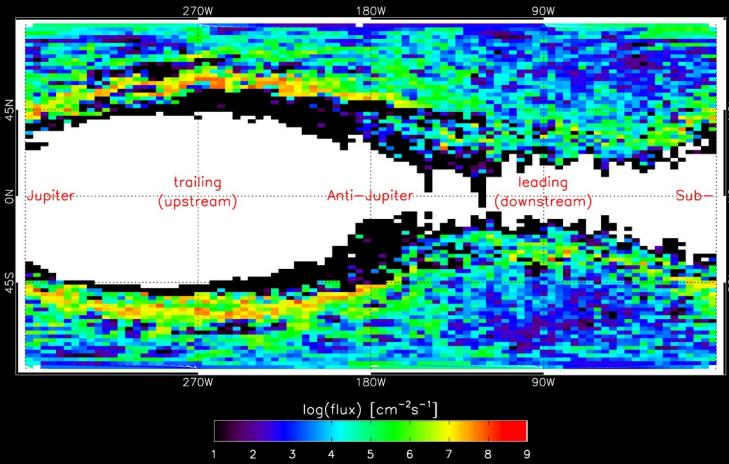
u^b

Ion Precipitation

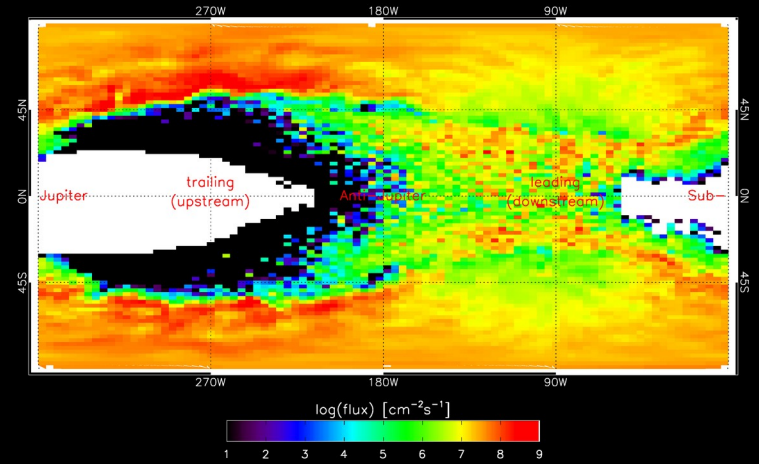
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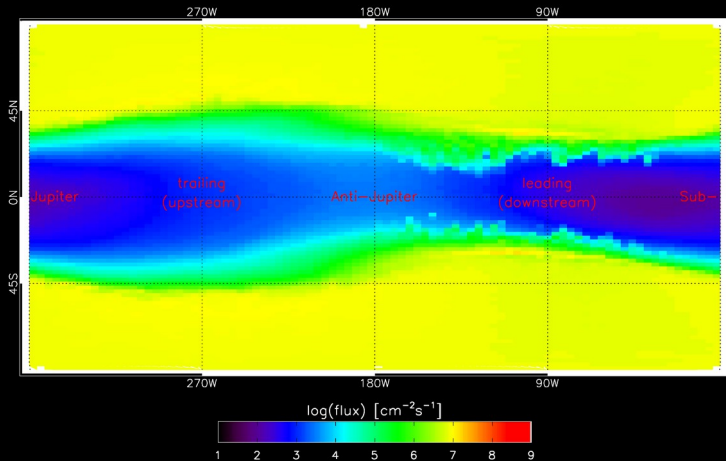
H⁺ th



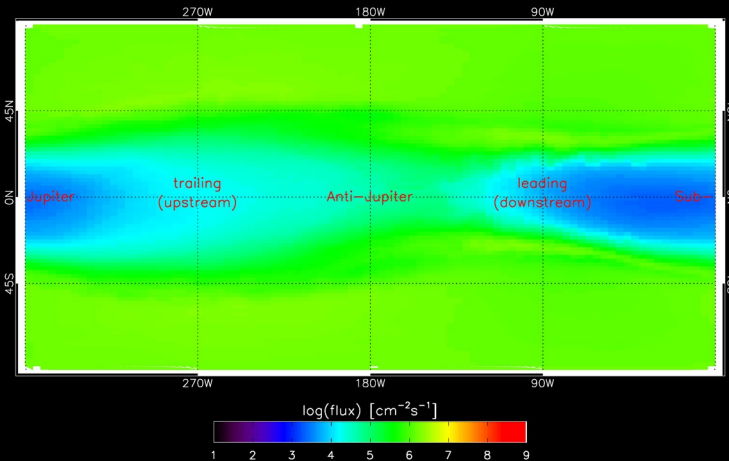
O⁺ th



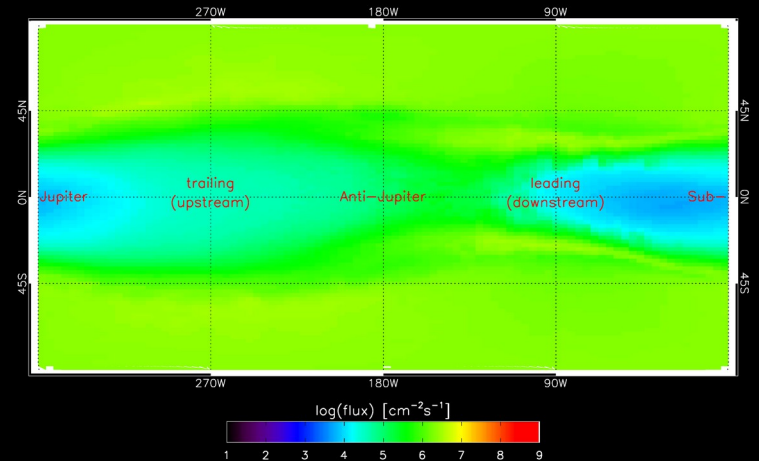
H⁺ en



O⁺⁺ en

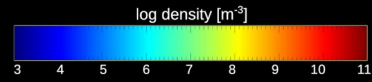
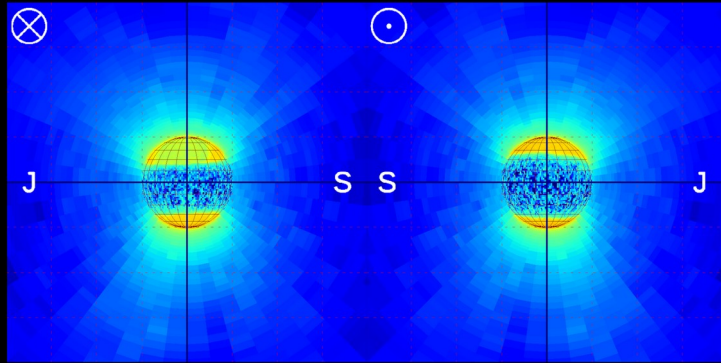
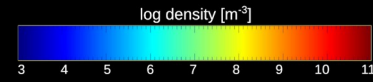
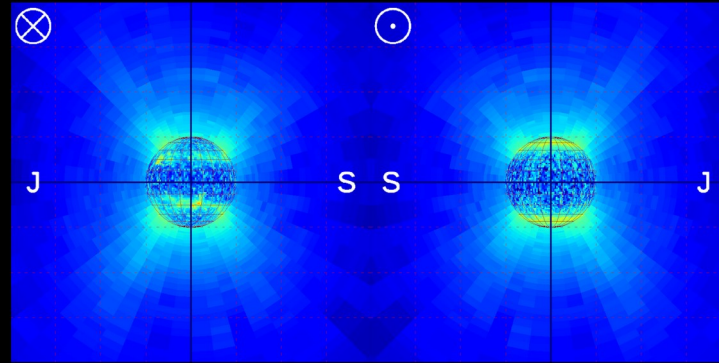
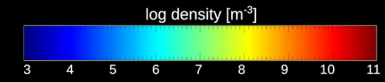
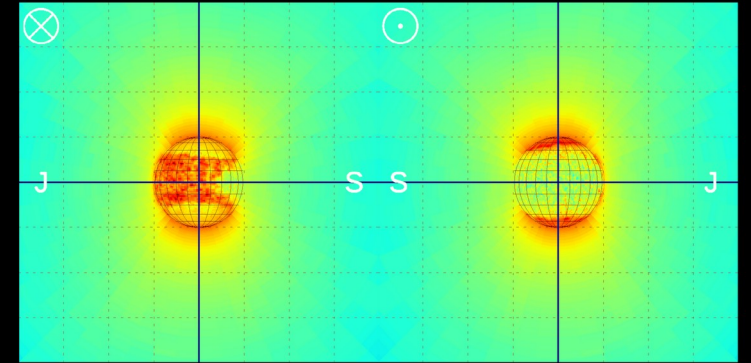
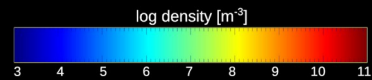
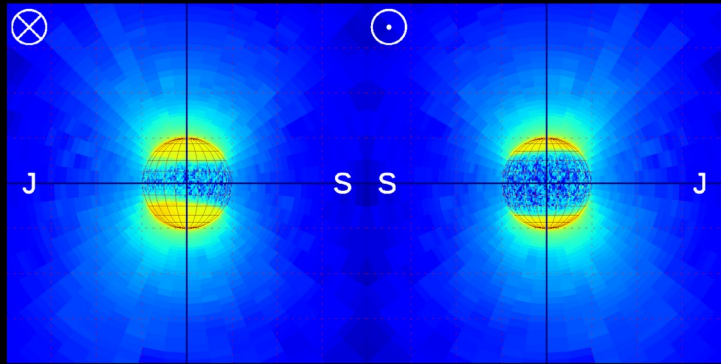
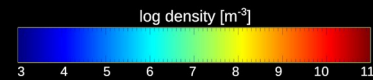
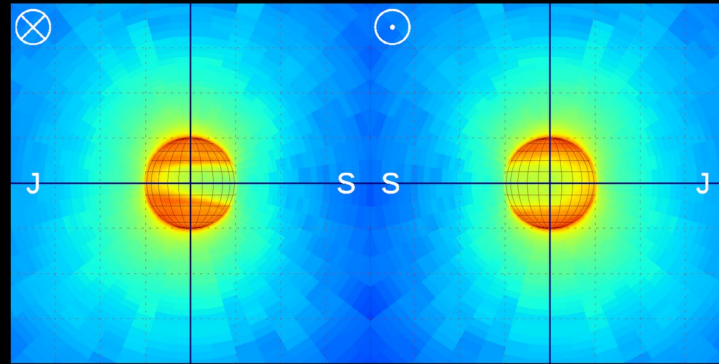
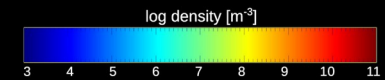
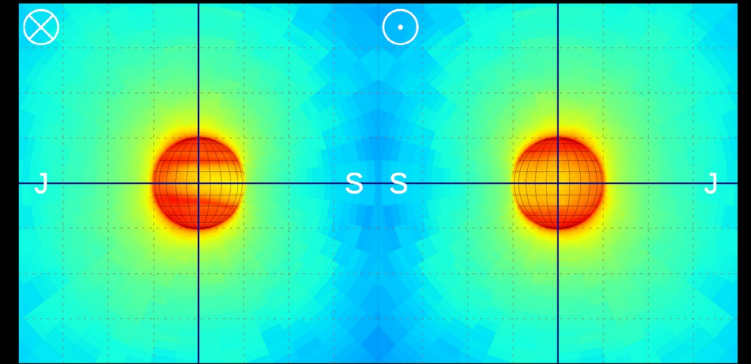


S⁺⁺⁺ en

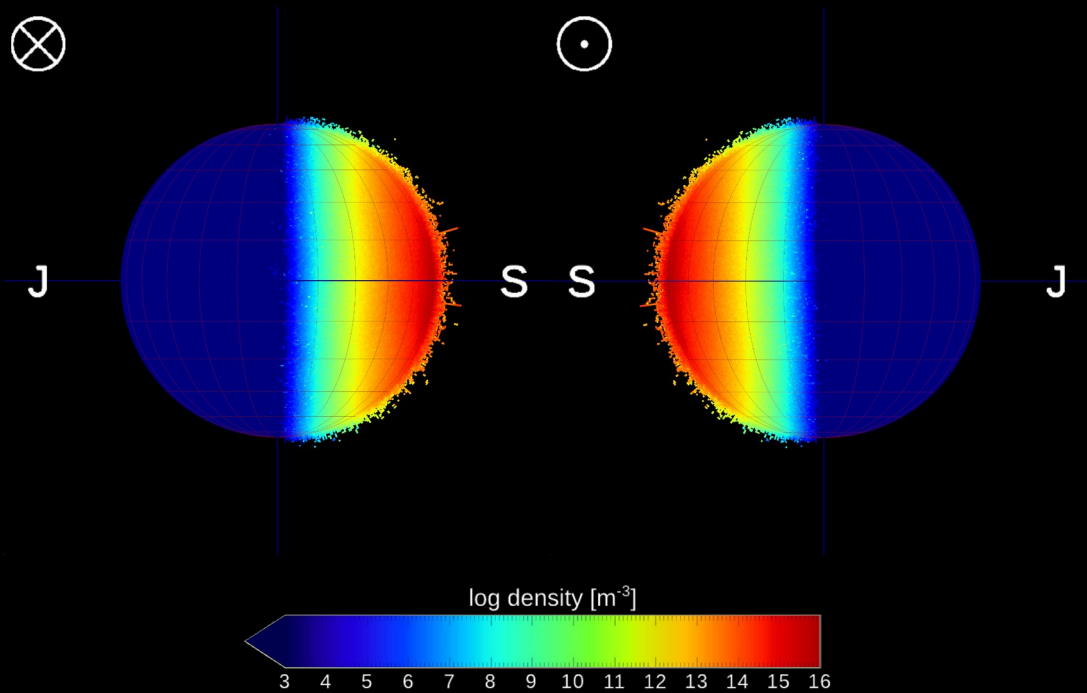


u^b Sputtered H_2O

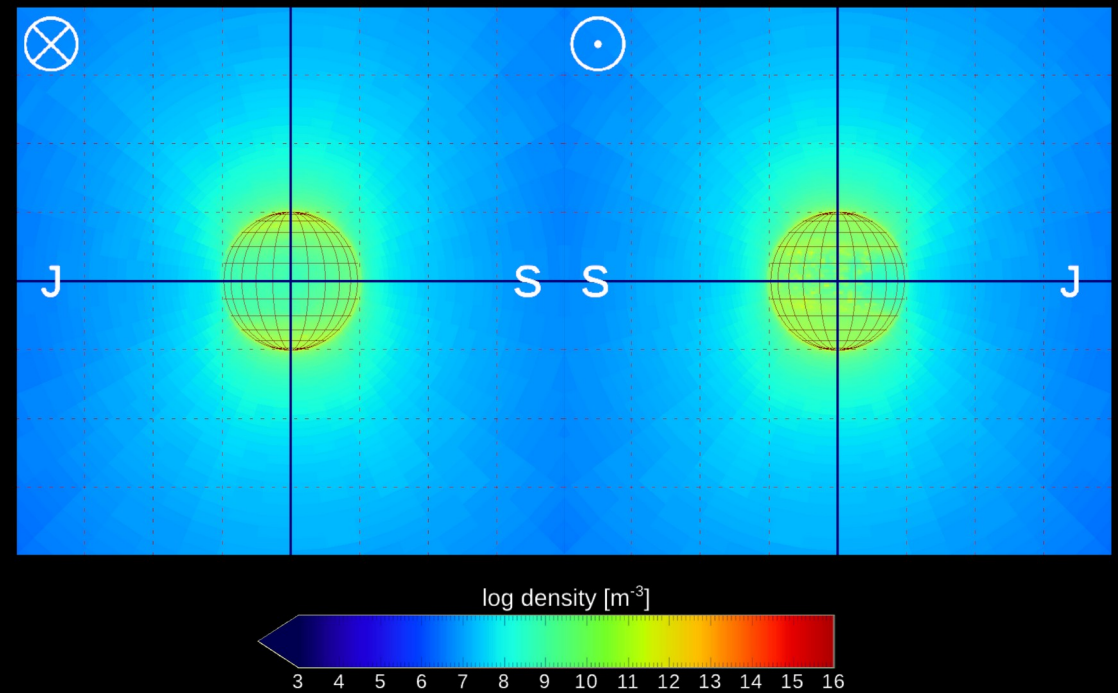
ele

 H^+ th O^+ th H^+ en O^{++} en S^{+++} en

sublimation



sputter



- Sublimated H_2O dominates up to SZAs of $\sim 60^\circ$ and altitudes of ~ 600 km
- Sputtered H_2O is mainly induced by impinging O^+ , O^{++} , and S^{+++} ions
- The extended H_2O atmosphere is mainly induced by thermal O^+ ions
- Morphology of Ganymede's magnetosphere is visible in sputtered H_2O



A. Vorburger, S. Fatemi, A. Galli, L. Liuzzo, A.R. Poppe and P. Wurz, "3D Monte-Carlo Simulation of Ganymede's Water Exosphere," Icarus 375 (2022) 114810, DOI: 10.1016/j.icarus.2021.114810.