

Space Physics Seminar

Thursday, September 22, 2016



H3+ in Jupiter's Ionosphere and the Great Red Spot

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At heights near the International Space Station (ISS) above the Earth, temperatures are around 1000-2000 Kelvin due to heating by the Sun. Jupiter is five times farther from the Sun than Earth, receiving just ~3% of the solar radiation, and indeed computer simulations inform us that Jupiter's upper atmosphere ought to be ~200 K. However, observations taken in the last few decades consistently show temperatures in the 800-1200 K range, how can this be? To make matters worse, modeled and observed temperatures at Saturn, Uranus and Neptune have a similar gulf of hundreds of degrees between them, leading to what is colloquially known as the giant planet "Energy Crisis". In this talk I report on new observational evidence that extremely high temperatures (over 1600 K) occur in the upper atmosphere above the largest storm

in the solar system - Jupiter's Great Red Spot. I will explore the theory that atmospheric turbulence from the storm drives upward-propagating gravity and/or sound waves that heat the upper atmosphere. If such a mechanism works everywhere atop Jupiter's turbulent planetary atmosphere (albeit in less extreme forms), then acoustic/gravity wave heating could explain the anomalously high temperatures elsewhere, potentially solving the cursed giant planet Energy Crisis.

4:00pm in CAS 502. Refreshments served at 3:45pm in CAS 500.

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[Next Week](#)

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