

Uranus - Past, Present, Future

In this seminar I will present an overview of our current understanding of the Uranus system, from the interior, atmosphere, and magnetic environment. In so many ways, Uranus is the oddball of the solar system, with its rotational axis located in the plane of the ecliptic, and the magnetic dipole axis being perpendicular that, so that the magnetosphere sweeps the entire sky in an 17 hour rotation. The magnetic field has strong quadrupole and octopole components that create a complicated magnetic environment and its interaction with the impinging solar wind changes dramatically as the planet rotates about the Sun. The planet lacks a significant source of internal heat, in contrast to Jupiter, Saturn, and Neptune, yet can still display very active tropospheric storm systems. The lack of internal heat also severely limits the vertical mixing in the upper stratosphere, resulting in a very low-altitude homopause, which in turn generates a very deep ionosphere. A dominant constituent of the ionosphere is the molecular ion H_3^+ , formed via the ionisation of molecular hydrogen by solar extreme ultraviolet photons and energetic charged auroral particles. This emission has been monitored on a semi-regular basis since 1993, when it was discovered using the United Kingdom Infrared Telescope. I will discuss the long-term trends seen in the upper atmosphere, the attempts to discover auroral emission from the planet, and the characterisation of the local-time behaviour of the ionosphere - directly related to the sources and sinks of H_3^+ . This seminar will aim to highlight that there are a number of exciting upcoming opportunities to explore Uranus at greater depth, using James Webb Space Telescope, next generation of 30 metre telescopes, and future robotic missions.

**Thursday, November 29th**

4:00 - 5:00 p.m.

725 Commonwealth Avenue | Room 502

**Henrik Melin**
Univ of Leicester, UK