Methane found on Saturn plays crucial role in planet formation

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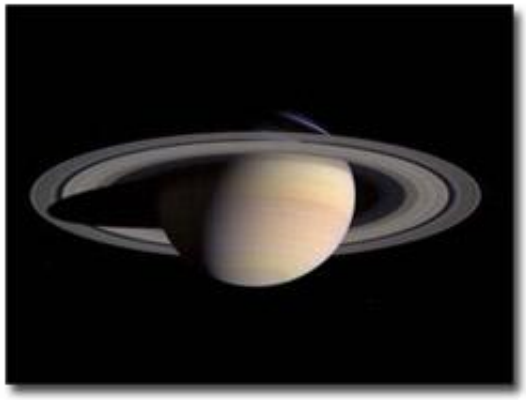

A natural color view of Saturn taken by the Cassini spacecraft on its approach to the planet

Using an infrared spectrometer on the Cassini-Huygens Spacecraft, researchers have measured the temperature, winds and chemical composition of Saturn, its rings and one of its moons, Phoebe.
The data appears in the Dec. 23 edition of "Science Express" and in the Dec. 24 print edition of Science.
Edward Wishnow of Lawrence Livermore National Laboratory participated in the research by measuring the spectrum of methane in the laboratory at temperatures and densities similar to the planet's - about 90 Kelvin (-297 degrees F) and one atmosphere of pressure. Methane (CH_4), the principal component of natural gas, is the main indicator of

carbon on Saturn and Jupiter, and it plays a crucial role in the planet's atmospheric chemistry and history of formation.

Image: A natural color view of Saturn taken by the Cassini spacecraft on its approach to the planet. (NASA/JPL/Space Science Institute)

The Cassini Composite Infrared Spectrometer (CIRS) is an infrared instrument that measures the intensity of far-infrared radiation, light with wavelengths between those of radar and near-infrared light. These wavelengths are associated with radiation emission by the constituent gases of the planet´s atmosphere or the ices and/or rocks that compose the rings and the moon Phoebe.

"Though we've known for years that the atmospheres of the giant planets are mainly made up of hydrogen and helium, using these instruments, we were able to measure the methane content with much greater precision than previous space missions," said Wishnow, who works in LLNL´s Physics and Advanced Technologies Directorate.

The methane measurement shows that carbon is enriched on Saturn by seven times the amount found in the sun and two times the amount found on Jupiter, which is consistent with the rocky core hypothesis of giant planet formation. In this model, Jupiter and Saturn began formation by accreting cores of about 10-12 times the size of Earth´s mass of heavy elements, which, in turn, attracts the surrounding nebular gas in solar proportions.

Wishnow's laboratory work was conducted with collaborators at the University of British Columbia and was supported by a NASA planetary atmospheres grant.

Other collaborators on the CIRS project include scientists from NASA/Goddard Space Flight Center, the Jet Propulsion Laboratory and

French and British institutions.

Cassini was launched in July 2004 with a mission to orbit around Saturn and its moons for the next four years. The Huygens probe is scheduled to enter the atmosphere of Titan, Saturn´s biggest moon, on Jan. 14, and eventually descend on a parachute onto its surface about 2½ hours later. Huygens will send its measurements and images to Cassini, which will then send them back to Earth.

Founded in 1952, Lawrence Livermore National Laboratory has a mission to ensure national security and to apply science and technology to the important issues of our time. Lawrence Livermore National Laboratory is managed by the University of California for the U.S. Department of Energy's National Nuclear Security Administration.

Source: Lawrence Livermore National Laboratory