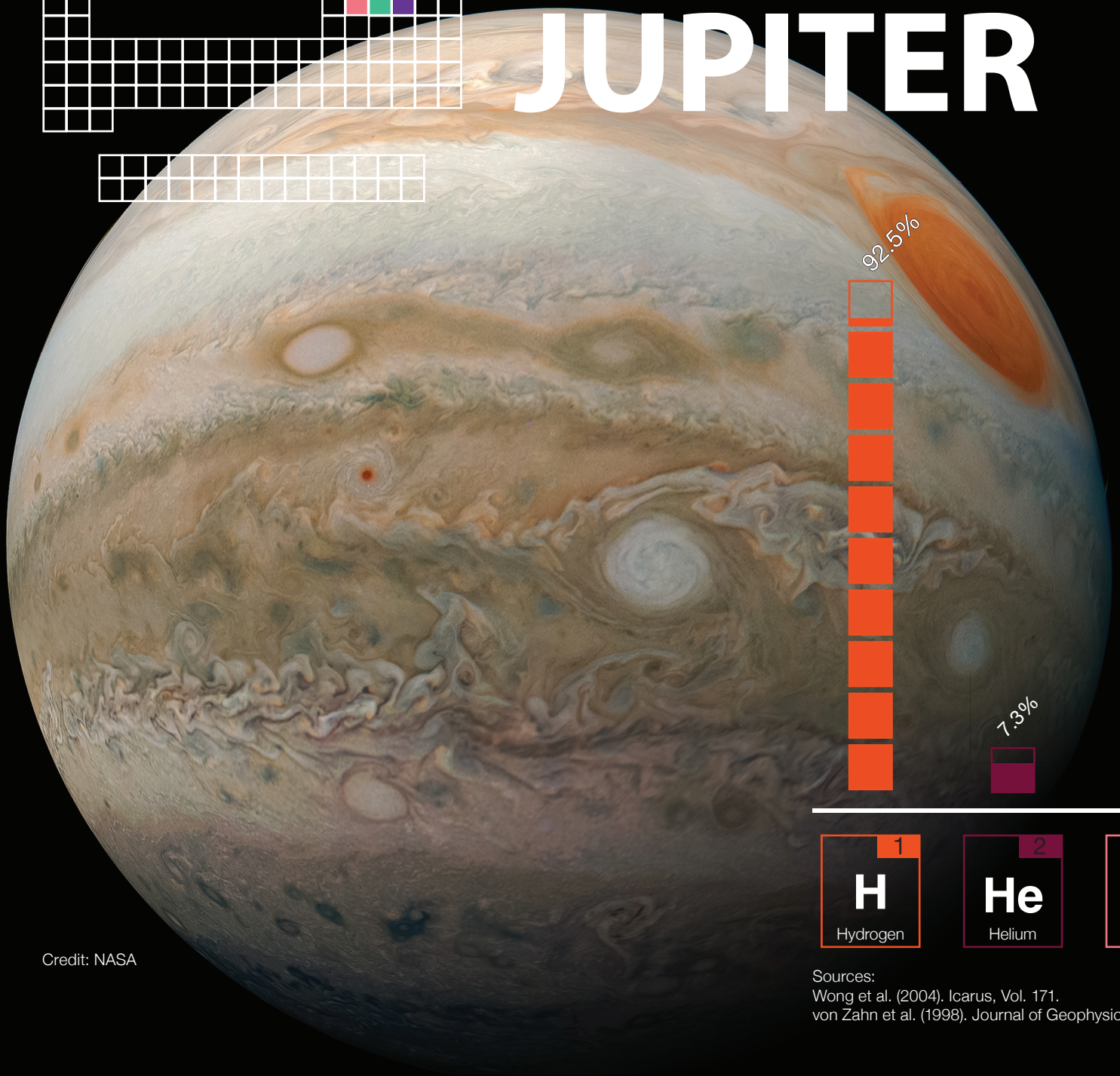
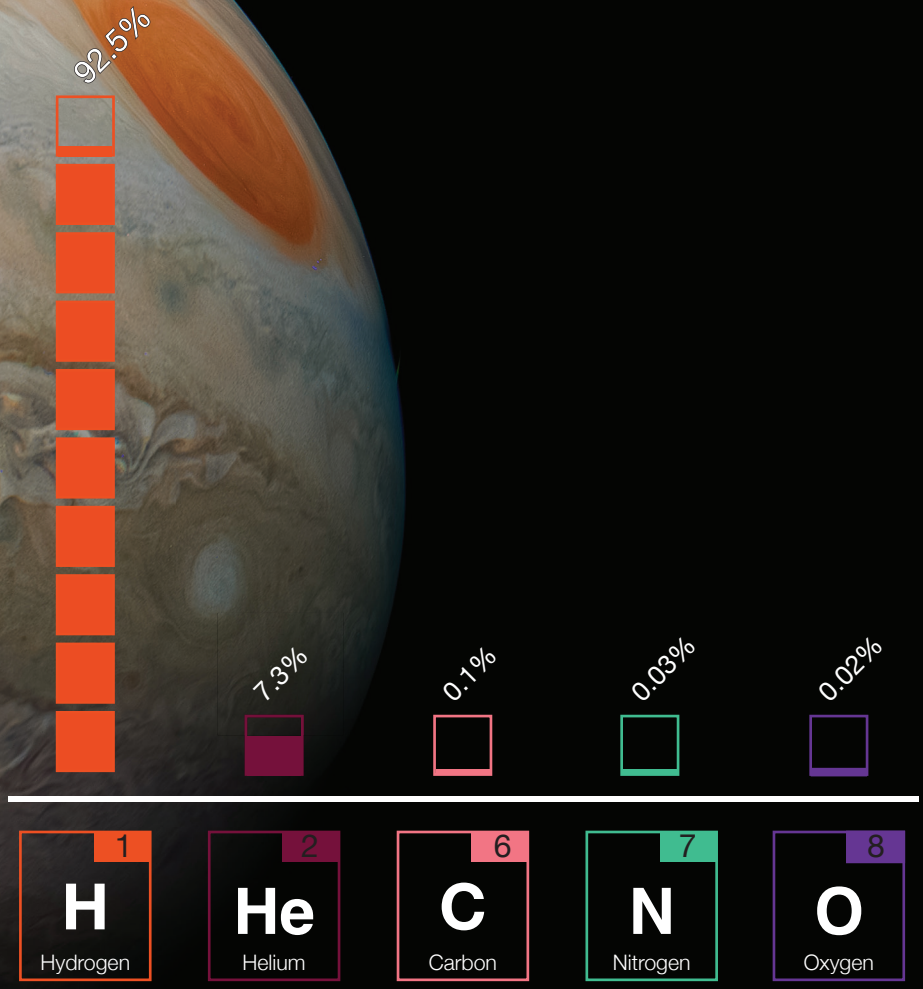
TOP 5 ELEMENTS IN THE ATMOSPHERE OF JUPITER

LUNAR AND PLANETARY INSTITUTE

2019 IYPT

International Year of the Periodic Table of Chemical Elements





Credit: NASA

Sources:
Wong et al. (2004). Icarus, Vol. 171.
von Zahn et al. (1998). Journal of Geophysical Research, Vol. 103.

JUPITER

Jupiter's chemical composition is vastly different from that of Earth. Being composed largely of hydrogen and helium, with much smaller amounts of heavier elements, Jupiter has more in common with the Sun than with the terrestrial planets in our solar system. However, scientists do not know the precise composition of Jupiter's atmosphere or interior. Clouds and the scattering of light by gases prevent us from peering deep into the atmosphere with remote-sensing instruments. In 1995, a probe released from NASA's Galileo spacecraft fell through Jupiter's atmosphere, providing excellent measurements of the amount of hydrogen, helium, and several heavier elements during its descent. However, the probe entered Jupiter's atmosphere in a meteorologically strange region and may not have penetrated deep enough before breaking up to sample the full amount of water thought to be below the cloud base. Therefore, the oxygen abundance reported on the front is considered to be a lower limit. Because the relative abundance of elements heavier than hydrogen and helium within Jupiter provides important clues to the various processes involved with its formation and evolution, a major goal of the current Juno mission is to better constrain the elemental composition of Jupiter's atmosphere, including the deep oxygen abundance. Scientists are eagerly awaiting the full results from Juno.

This image of dramatic cloud formations in Jupiter's northern hemisphere was captured by JunoCam onboard the Juno spacecraft. Credit: NASA/JPL-Caltech/SwRI/ MSSS/Kevin M. Gill

United Nations Educational, Scientific and Cultural Organization

2019 IYPT International Year of the Periodic Table of Chemical Elements

The year 2019 marks the 150th anniversary of Dmitri Mendeleev's development of the Periodic System and has been proclaimed the "International Year of the Periodic Table of Chemical Elements" (IYPT2019).

www.iypt2019.org

DR. JULIANNE MOSES

Space Science Institute (SSI)

Dr. Julianne Moses is a senior research scientist at the Space Science Institute (SSI) at their Seabrook, Texas, branch. She investigates physical and chemical processes in planetary and satellite atmospheres, with a particular emphasis on giant-planet and exoplanet chemistry. She studies how planetary atmospheric composition is altered by the chemistry that is initiated when atmospheric gases absorb ultraviolet light or interact with high-energy charged particles. Her recent research projects include investigations into how interplanetary dust particles and comets affect giant-planet atmospheric composition, how the abundance of hydrocarbon and oxygen molecules on Uranus and Neptune vary with season, and how disequilibrium chemistry affects the composition of young extrasolar planets. The models she develops are typically compared with spectroscopic observations from groundbased telescopes and spacecraft such as Cassini and the Spitzer space telescope, or are used to help plan future observations from the James Webb Space Telescope. Her research may aid in understanding the formation and evolution of planetary systems. Moses is awed by the recent discoveries of extrasolar planets and their apparent amazing diversity. Aside from conducting research, she has been a director of SSI's Center for Extrasolar Planetary Systems, a director of a summer undergraduate intern program, an editor for a planetary science journal, and an advisor for high school and undergraduate students.

LPI

Founded at the height of the Apollo program in 1968, the Lunar and Planetary Institute (LPI) is an intellectual leader in lunar and planetary science. LPI's mission is to advance understanding of the solar system by providing exceptional science, service, and inspiration to the world. The research carried out at LPI supports NASA's efforts to explore the solar system.

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