Metastable Helium Reveals Ongoing Mass Loss for the Gas Giant HAT-P-18b

Paragas, K.; Vissapragada, S.; Knutson, H.A.; Oklopčić, A.

Publication date
2021

Document Version
Final published version

Published in
Bulletin - American Astronomical Society

License
CC BY

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: https://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
Metastable Helium Reveals Ongoing Mass Loss for the Gas Giant HAT-P-18b

K. Paragas\textsuperscript{1}, S. Vissapragada\textsuperscript{2}, H. A. Knutson\textsuperscript{2}, A. Oklopčić\textsuperscript{3}

\textsuperscript{1}Astronomy Department, Wesleyan University, Middletown, CT,
\textsuperscript{2}Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA,
\textsuperscript{3}Anton Pannekoek Institute of Astronomy, University of Amsterdam, Amsterdam, Netherlands

Published on: Jan 11, 2021
License: Creative Commons Attribution 4.0 International License (CC-BY 4.0)
The helium (He) 1083 nm line offers insight into the atmospheric mass loss of close-in exoplanets, which is likely to be significant in sculpting their population. Most studies of atmospheric escape have been done at UV wavelengths using the hydrogen Lyman-alpha line, but in the last few years the metastable He 1083 nm line has emerged as a more observationally accessible alternative. By measuring the amount of excess absorption in this line during a transit, we can characterize the spatial extent of the planet's exosphere and its corresponding present-day mass loss rate. We used an ultra-narrow band filter to observe two transits of the gas giant HAT-P-18b, using the 200” Hale Telescope at Palomar Observatory, and report the first-ever detection of outflowing gas from its upper atmosphere. With a J-band magnitude of 10.8, this is the faintest system for which such a measurement has been made, demonstrating the effectiveness of this approach for surveying mass loss on a diverse sample of close-in gas giant planets.