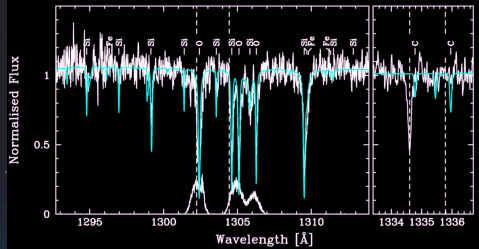
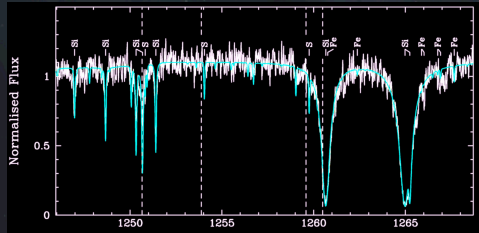
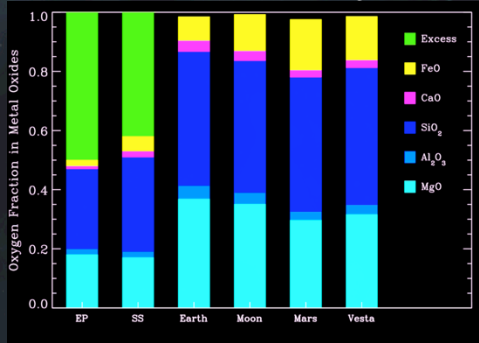


An H₂O-Rich, Rocky Extrasolar Minor Planet



- ✧ 500 km diameter
- ✧ Mass similar to Vesta
- ✧ 25% H₂O, 75% rock
- ✧ Water similar to Ceres

J. Farihi, B. T. Gänsicke, D. Koester, Science, 342, 218

Effects of clouds on reflection properties of Hot Jupiters

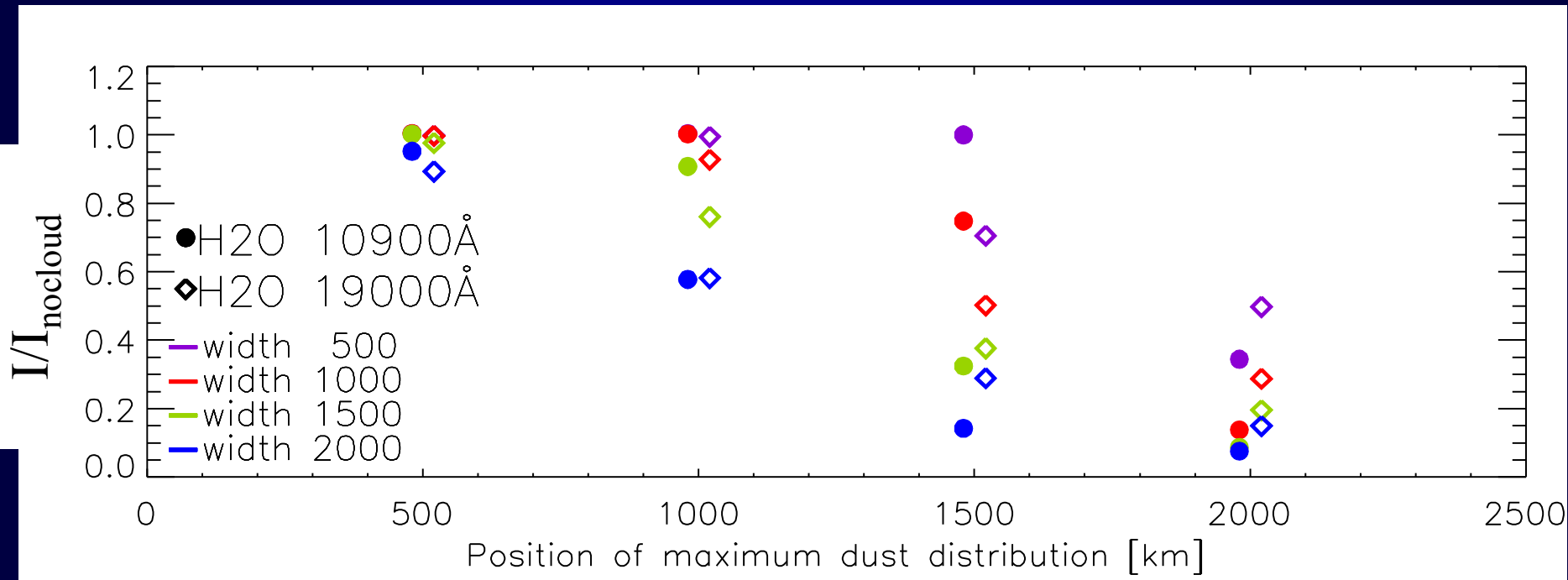
Nadine Afram

- Clouds important in exoplanetary atmosphere
- model molecular spectra with/out clouds
- vary cloud parameters (dust density, dust size, cloud position, cloud extension)
- study changes in molecular signal due to cloud parameter change, as molecules are formed at different depths => info about cloud



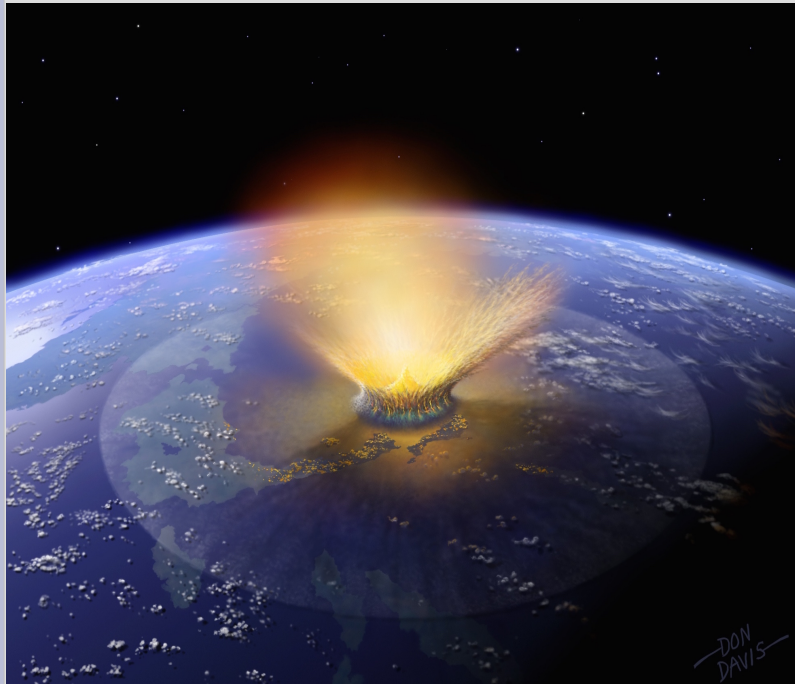
Clouds in H₂O spectra

10nm dust size, maximum dust density $10^{10}/\text{cm}^3$



Dust from impacts on exoplanets

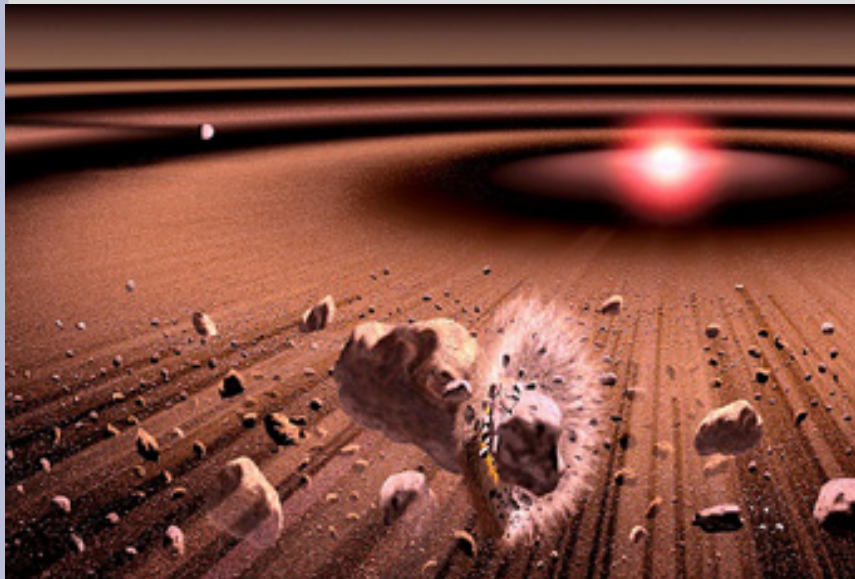
G. Cataldi, A. Brandeker, P. Thébault, K. Singer,
E. Ahmed, A. Brandenburg, G. Olofsson, B. de Vries



- impacts can eject (exo)planetary material into circumstellar orbit
- how much dust is generated?
- can we detect dust from impacts?
- can we characterise the exoplanet by studying the dust?

Dust from impacts on exoplanets

G. Cataldi, A. Brandeker, P. Thébault, K. Singer,
E. Ahmed, A. Brandenburg, G. Olofsson, B. de Vries



- 1) escaping mass for given impact
- 2) collisional evolution -> production of small dust grains
- 3) expected signal from dust
- 4) (dust composition -> geology, biomarkers,...)

Characterizing the three-dimensional ozone distribution of a tidally locked Earth-like planet

Elisavet Proedrou, Klemens Hocke

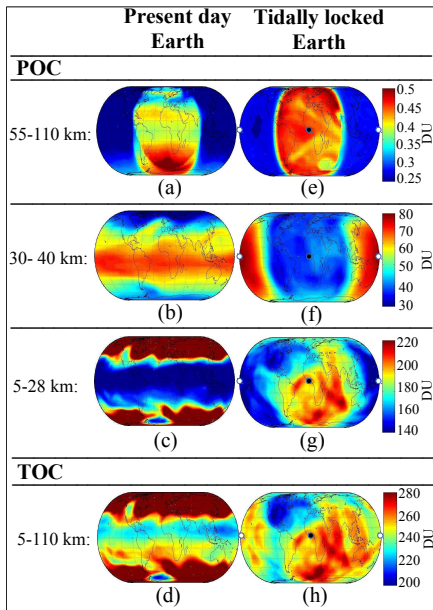
Institute for Applied Physics
Center for Space for Space and Habitability
University of Bern

Pathways to Habitability Bern 13-17 July 2015

Results:

Motivation:

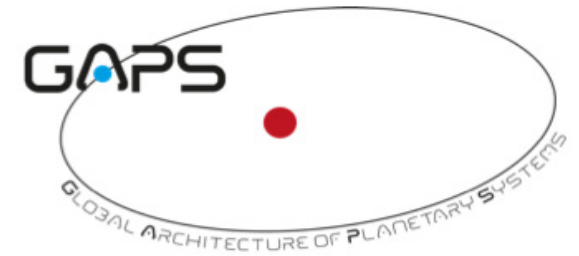
- A planet's ozone layer is important for Habitability
- The ozone layer shields life from the harmful ultraviolet radiation (UV)
- What happens to the ozone layer when a planet is tidally locked?



HARPS-N RV PROGRAM



IEEC ^R



3 YEARS

78 STARS

80 NIGHTS

2000 SPECTRA

MUCH MORE TO COME



ALEJANDRO SUÁREZ MASCAREÑO



ULL

PERIOD 8.82 DAYS

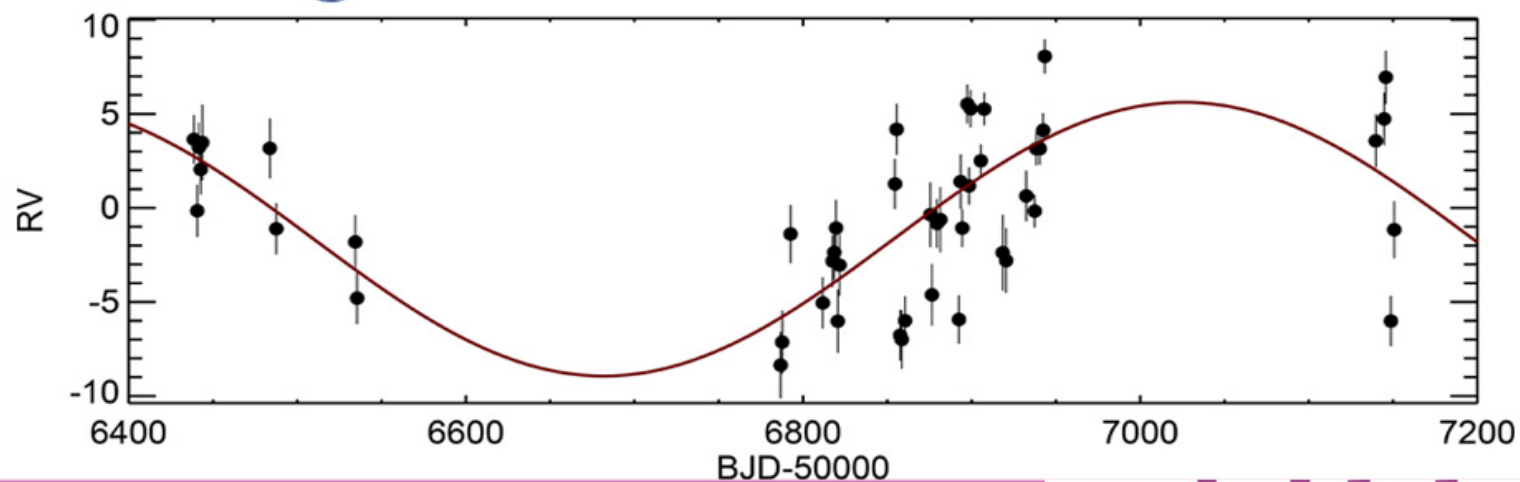
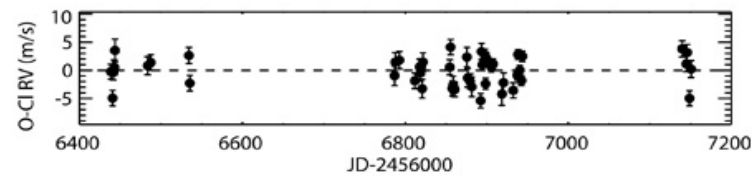
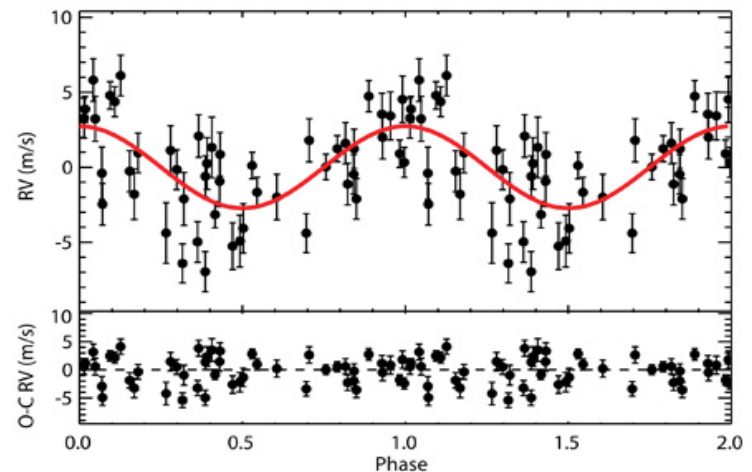
SEMI-AMP 2.7 M/S

MASS 4.8 M 

PERIOD 690 DAYS

SEMI-AMP 5.5 M/S

MASS 40 M 





NASA Exoplanet Science Institute

NExSci is the science operations and analysis center for NASA's Exoplanet Exploration Program



Sagan Exoplanet Program

Sagan Postdoctoral Fellowships

NExSci manages the Sagan Postdoctoral Fellowships, one of NASA Astrophysics' three named Postdoctoral Fellowships. These Fellowships **support early career scientists** conducting research related to the goals of NASA's Exoplanet Exploration Program: To discover and characterize planetary systems and earth-like planets.

Sagan Summer Workshops

These annual workshops focus on timely exoplanet-related topics and give attendees **access to experts and hands-on experience** with the latest techniques.

NASA Keck Time Administration

NExSci manages NASA's time on the Keck telescopes, supporting **exoplanet, extragalactic, galactic, and solar system science** in two annual proposal calls. Pending availability, successful PIs receive funding to support their observations.

NExSci Data Archives

NASA Exoplanet Archive

The archive is an **exoplanet and stellar catalog** that collates and cross-correlates data and provides data analysis tools. The ExoFOP website is designed to optimize resources and facilitate collaboration in follow-up studies of exoplanet candidates.

Keck Observatory Archive (KOA)

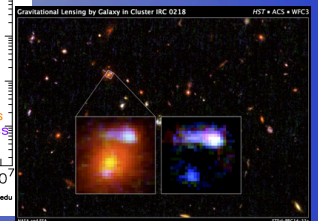
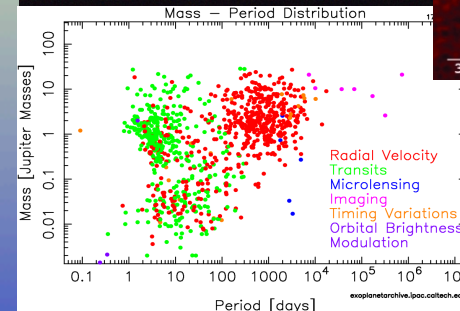
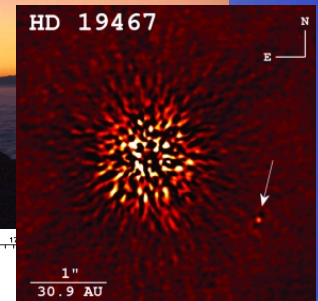
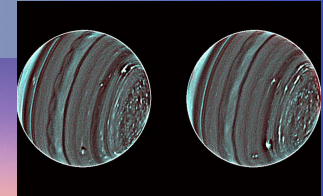
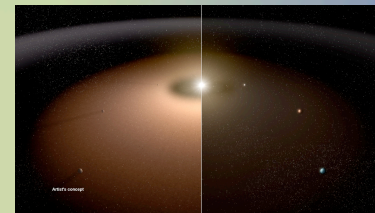
KOA ingests and curates data for all active **Keck instruments** over the 20 year lifetime of the observatory.

Large Binocular Telescope Interferometer (LBTI) Archive at NExSci

The LBTI archive contains all **NASA data** from the LBTI.

Exoplanet Mission Support

NExSci **supports NASA's Exoplanet Exploration Missions and community** through observation planning, data archiving and distribution, data product generation and calibration, and analysis tools.



nexsci.caltech.edu



Rayleigh Scattering in the Atmosphere of GJ 3470b

Diana Dragomir (UCSB/LCOGT)

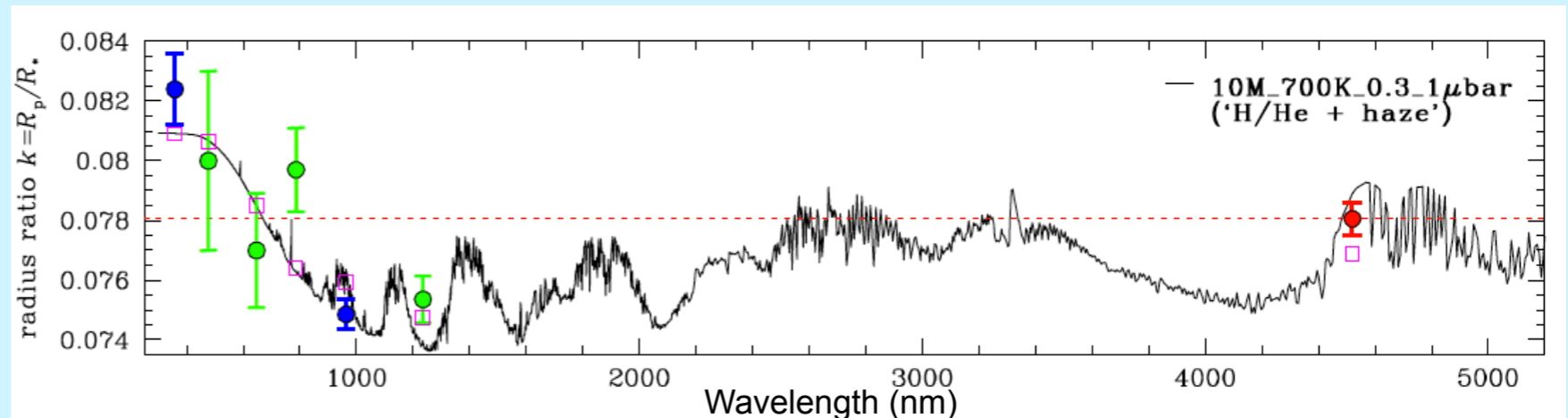


B. Benneke
K. A. Pearson
I. J. M. Crossfield
L. I. Biddle
T. Barman
J. Eastman

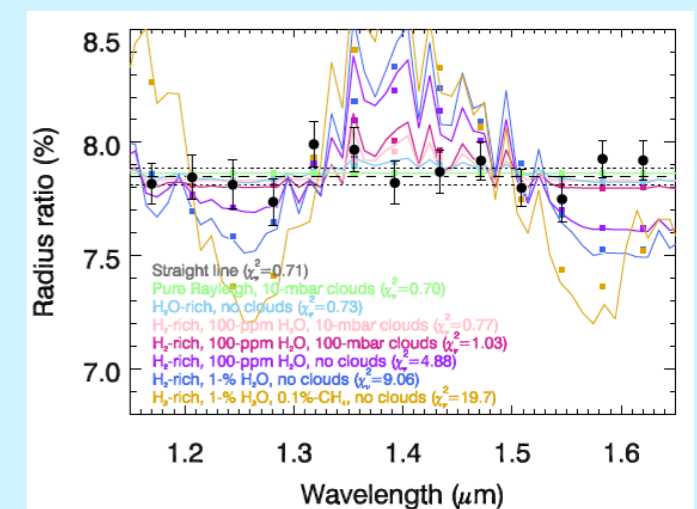
Pathways 2015:
Pathways towards
habitable planets

GJ 3470b is a warm, low-density exo-Neptune transiting a bright M dwarf.

Nascimbeni et al. (2013)

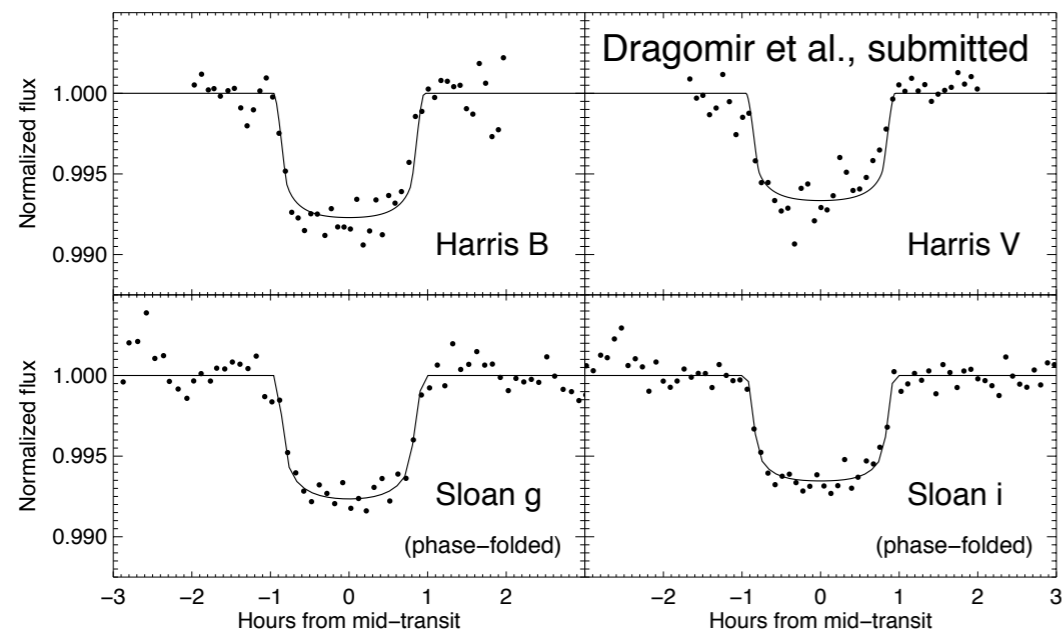


- hints of Rayleigh scattering spotted in its visible transmission spectrum in 2013;
- near-IR transmission spectrum is flat;
- need more observations to gain further insight into this planet's atmospheric structure and composition.



Ehrenreich et al. (2014)

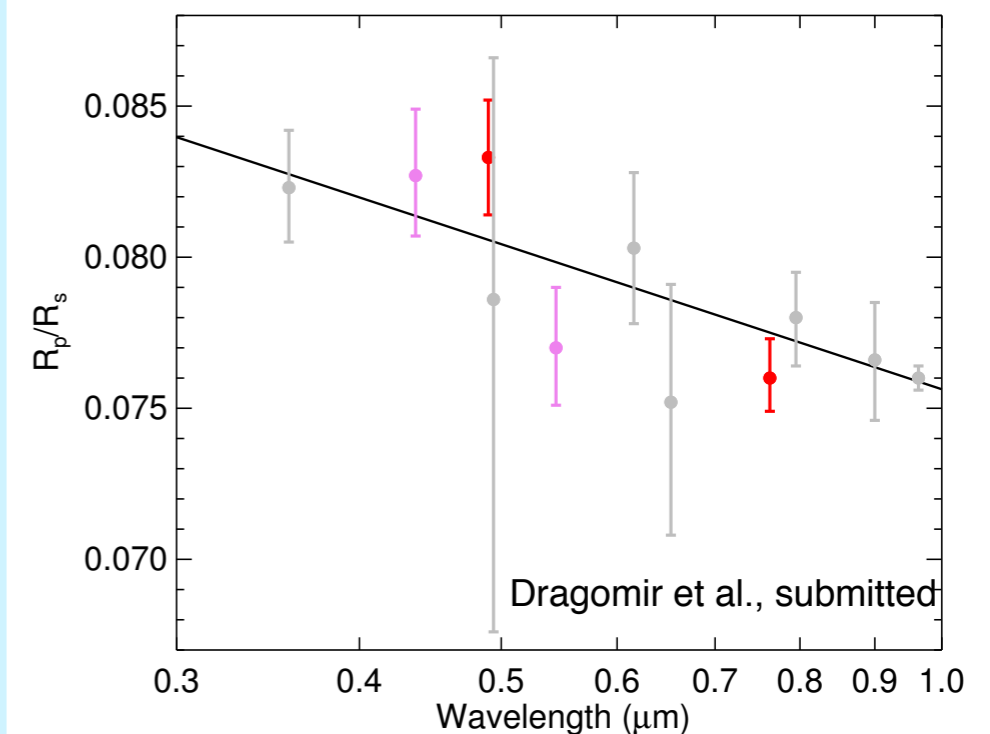
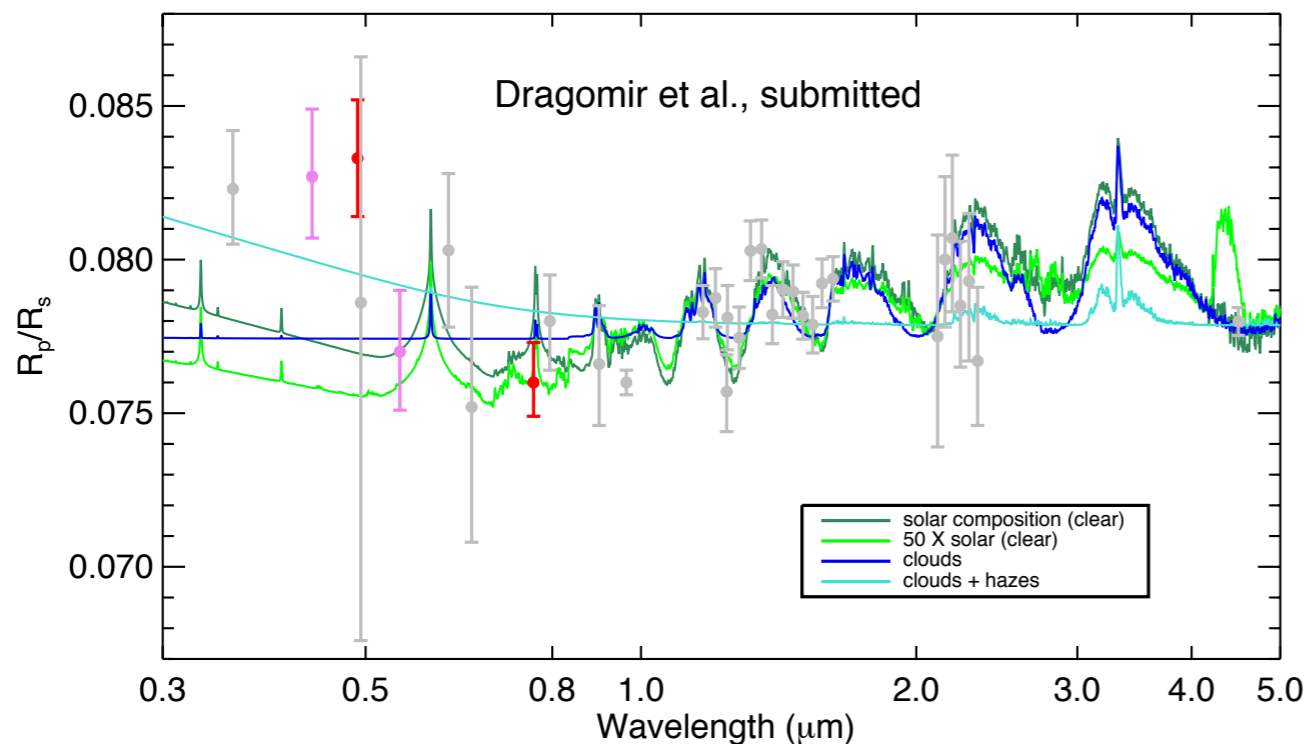
Rayleigh Scattering Detected with the *LCOGT* and *Kuiper* Telescopes



New *LCOGT* and *Kuiper* Telescope multi-color observations of several transits show a strong **Rayleigh scattering slope**, indicative of a **H/He-rich atmosphere with hazes**.

GJ 3470b is the smallest planet for which **Rayleigh scattering has been observed**.

One step closer to probing the atmospheres of increasingly Earth-like exoplanets.





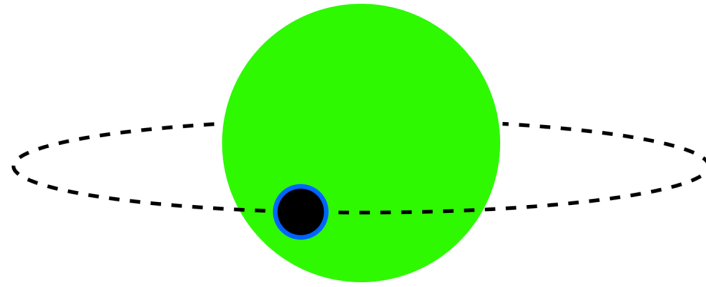
Poster #73927:

High-resolution transmission spectroscopy of exoplanets with the ground-based instruments

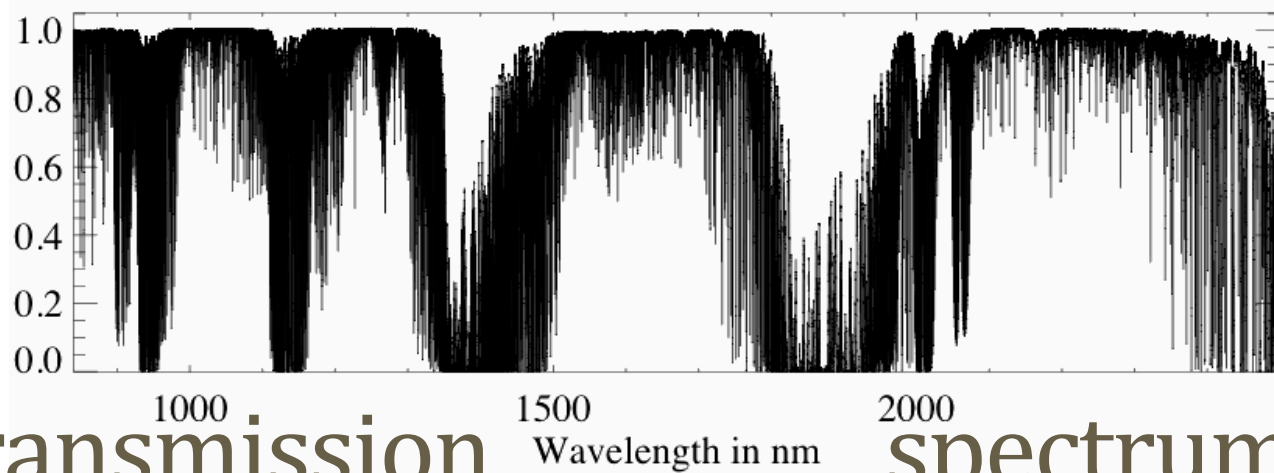
Nikolai Piskunov and Erik Aronson
Uppsala University



Transit



Spectroscopy



Transmission spectrum

