MATEMATICKO-FYZIKÁLNÍ FAKULTA
Univerzita Karlova

Erasmus+

Astronomický ústav AV ČR

Stopárov sprievodca exoplanétami

Daniel Dupkala
Martin Blažek, Magdalena Špoková, Ján Šubjak

T-Exkurze

27.10.2020

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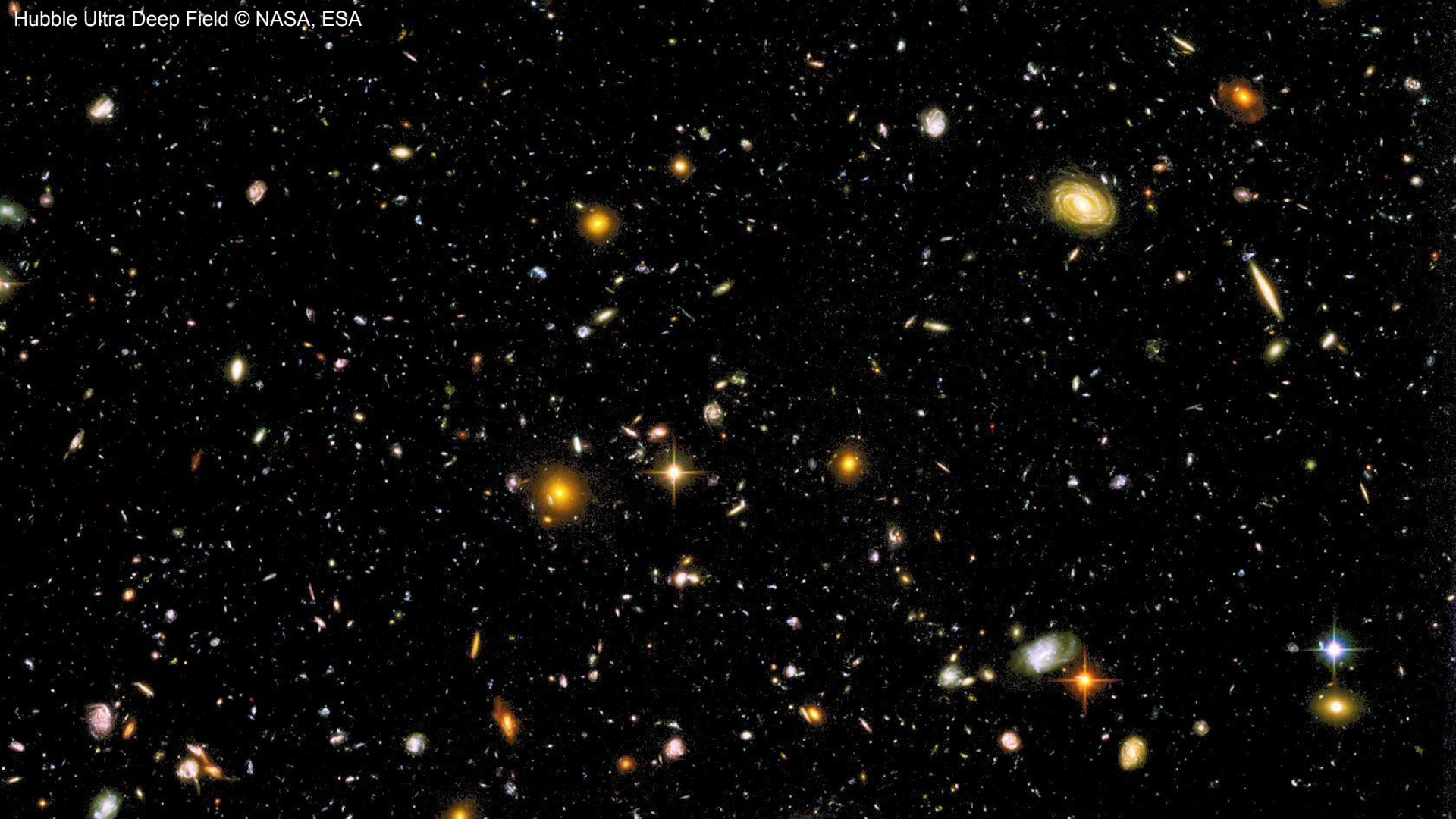
Hubble Ultra Deep Field © NASA, ESA

Stručná história výskumu exoplanét

1992 - Planetárny systém pulzaru

1995 - **Prvá planéta pri hviezde podobnej Slnku**

1999 - Prvý zaznamenaný tranzit

2002 - Potvrdený objav exoatmosféry

2009 - Vypustenie teleskopu Kepler

2013 - Prvé výsledky Keplera

2018 - Vypustená misia TESS

2019 - Nobelova cena za objav prvej exoplanéty pri hviezde podobnej Slnku

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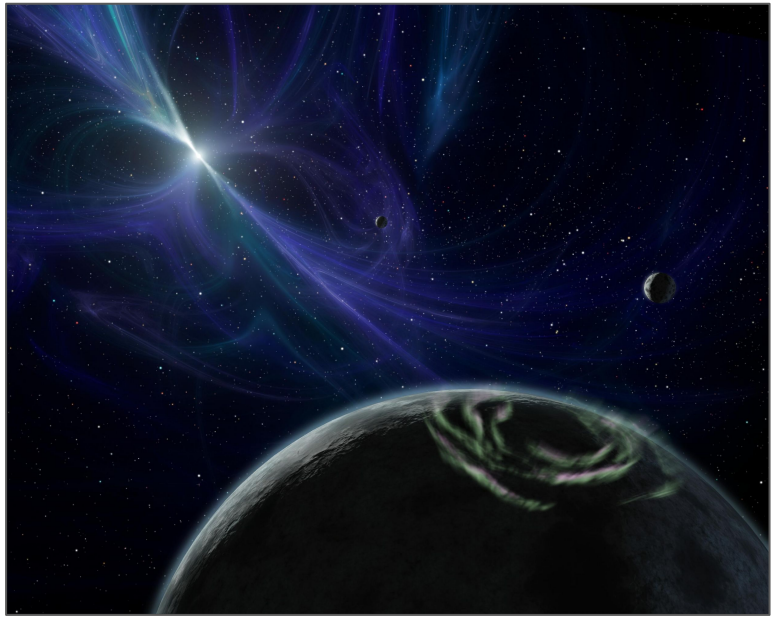

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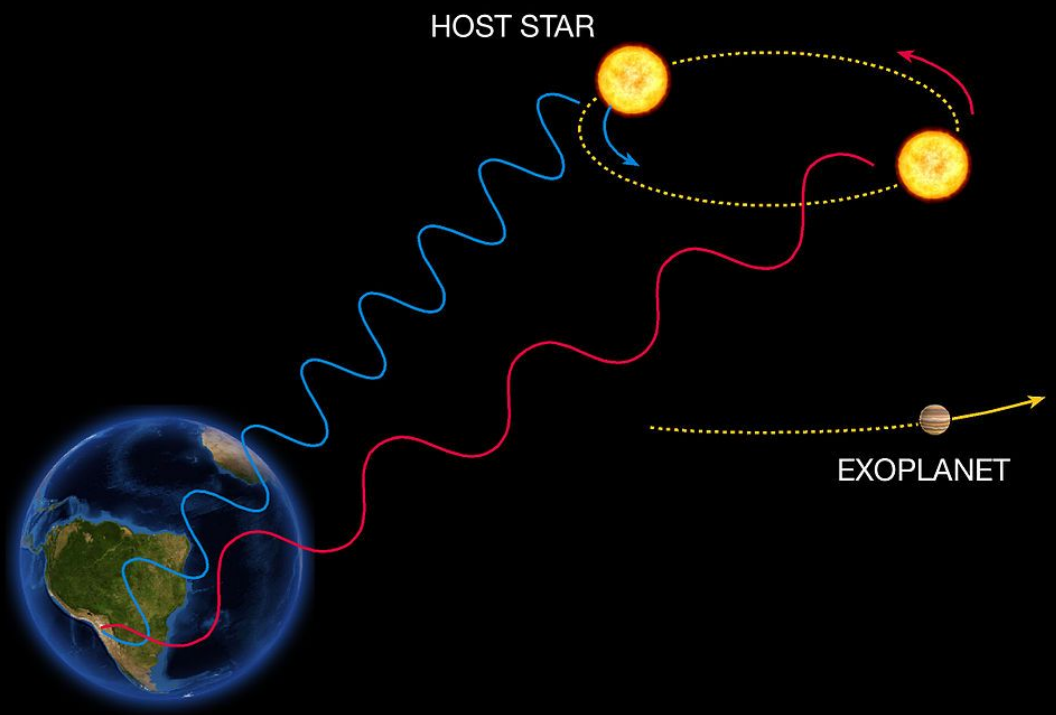

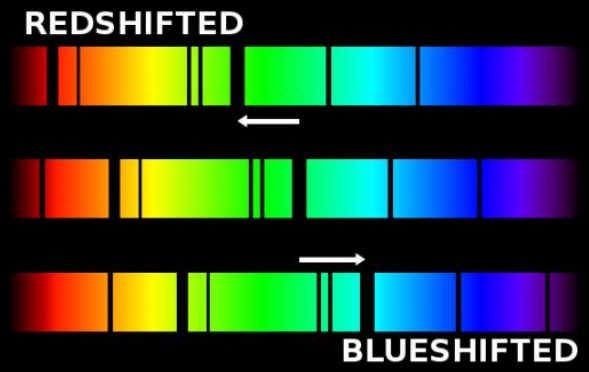

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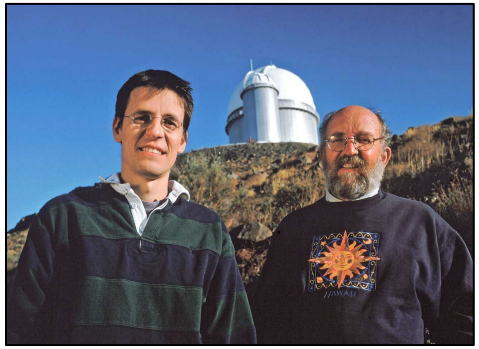
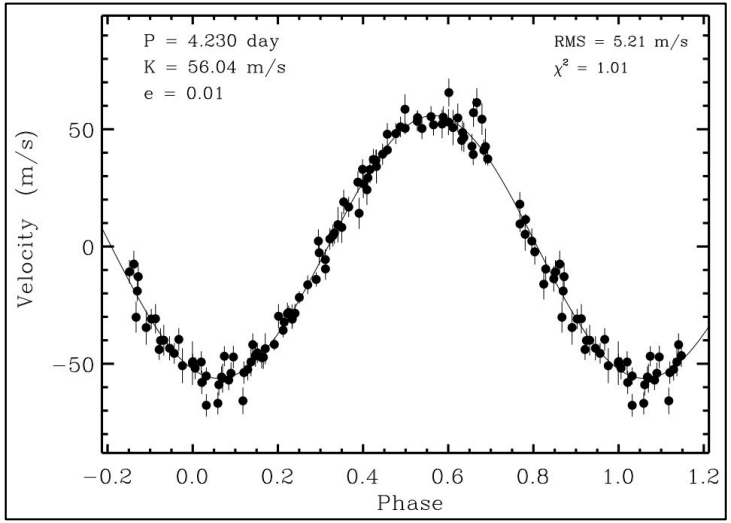
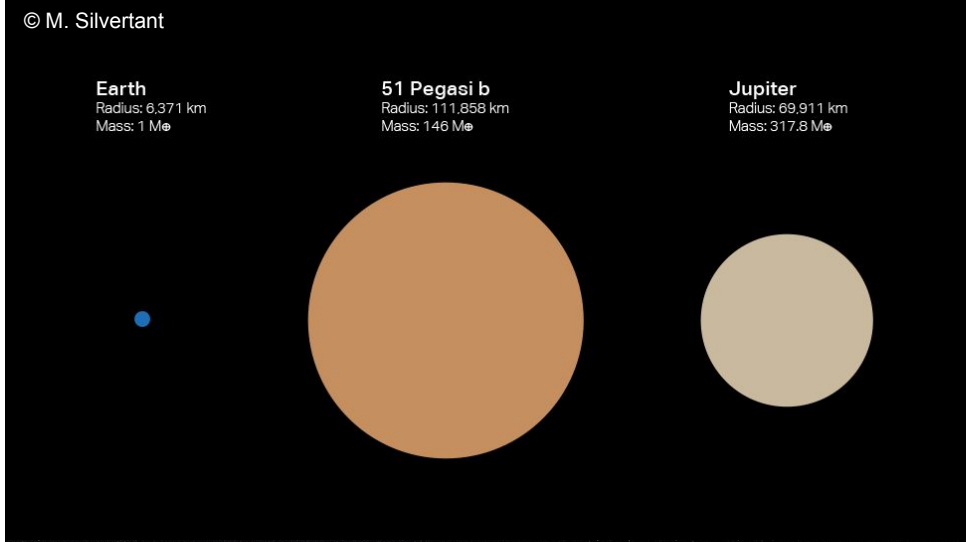
51 Pegasi b

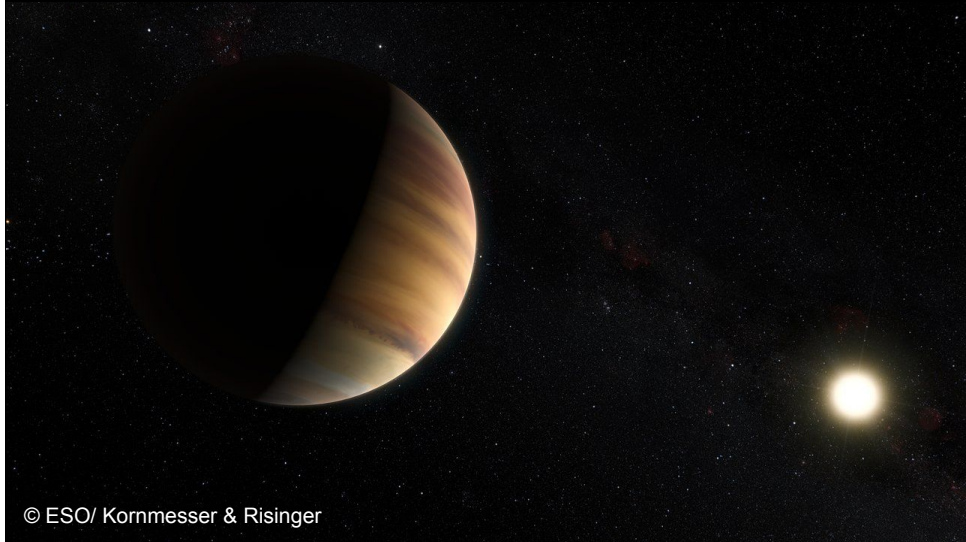


Didier Queloz
& Michel Mayor

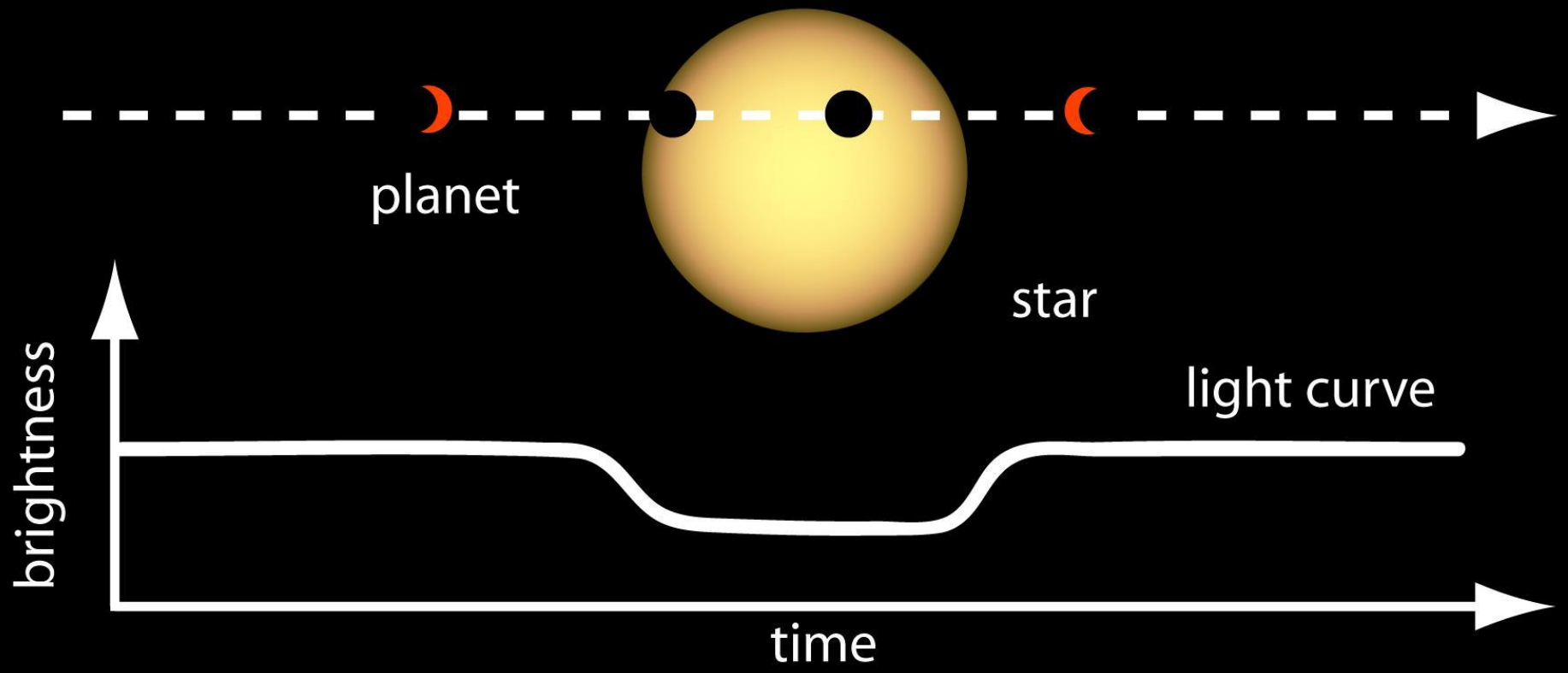


Zdroj: Marcy et al. 1997





Fotometria tranzitov



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HD 209458 b

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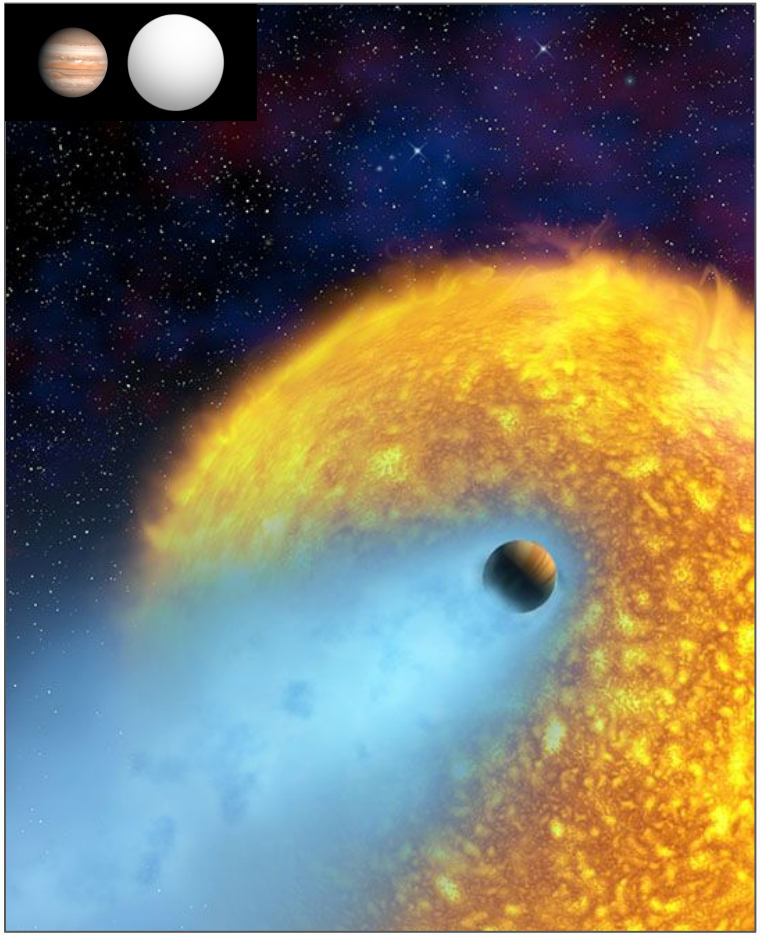
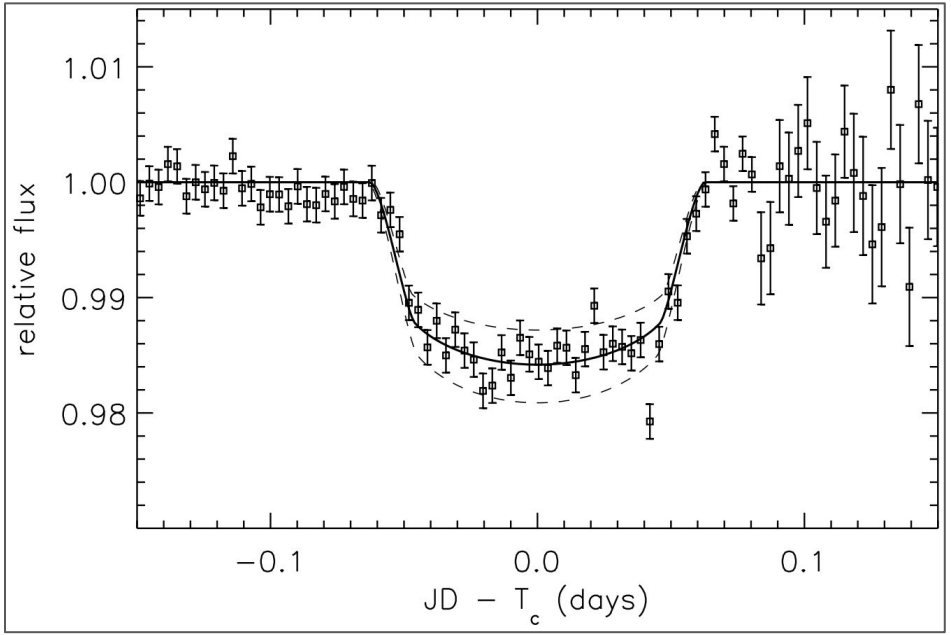
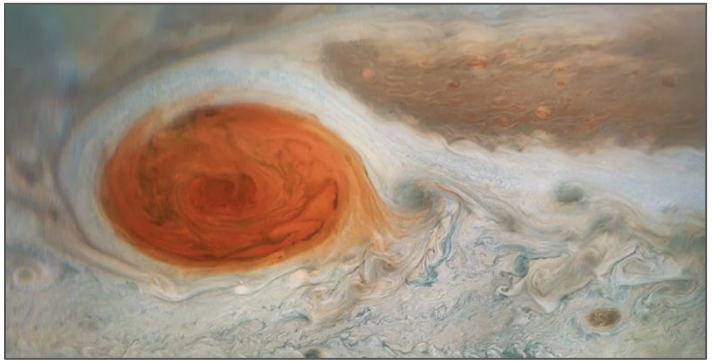


Zdroj: Charbonneau et al. 2000





Veľká červená škvrna, Jupiter

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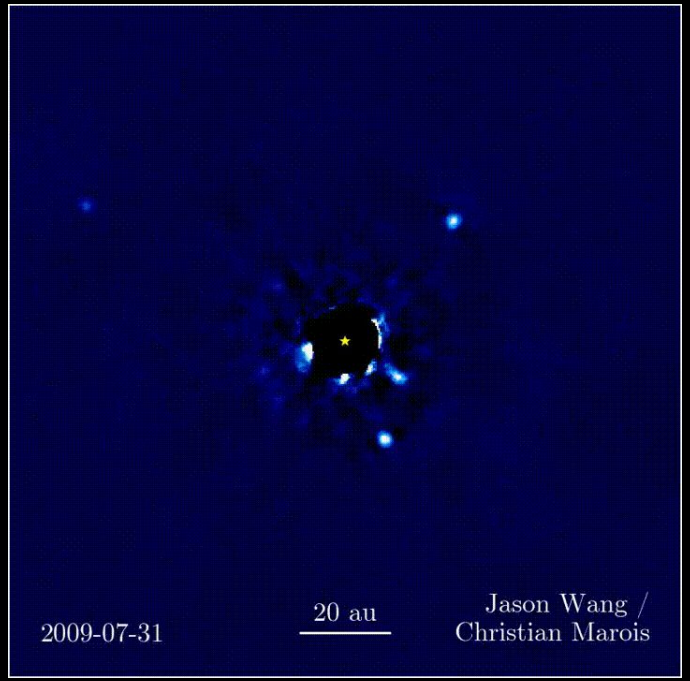
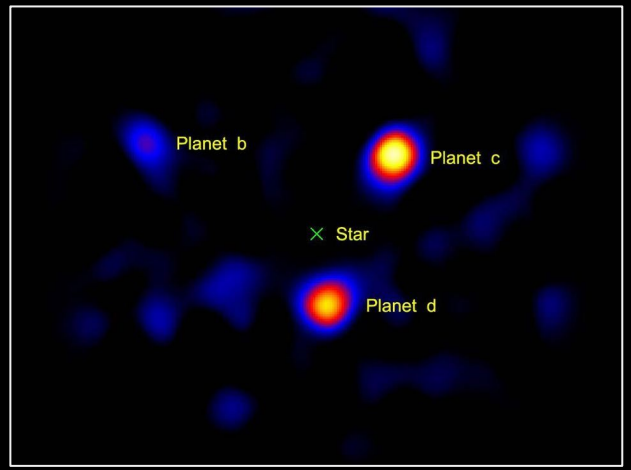
Priame pozorovanie



Planetárny systém
pri hviezde HR 8799

Hnedý trpaslík 2M1207
s exoplanétou?

© NaCo, VLT, ESO



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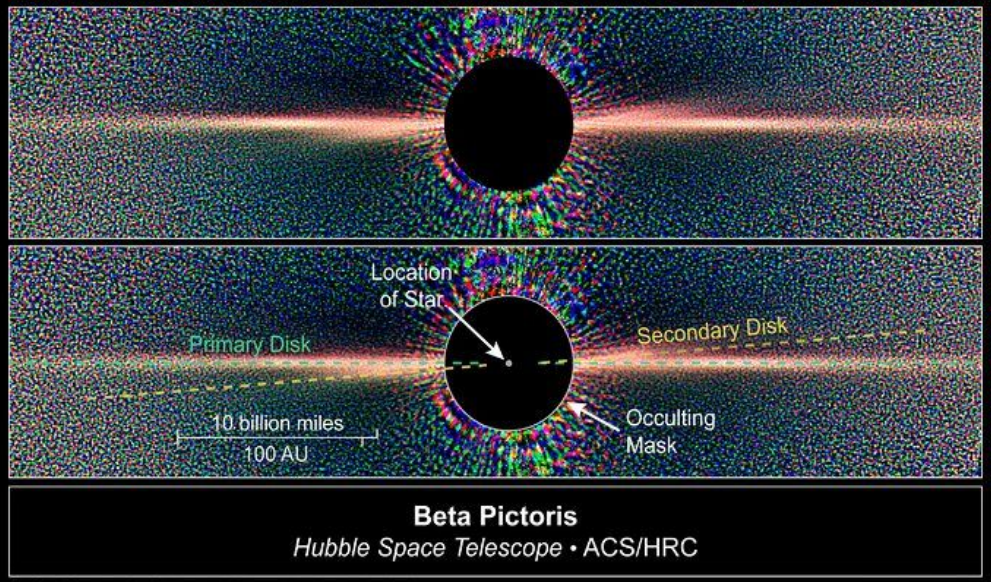

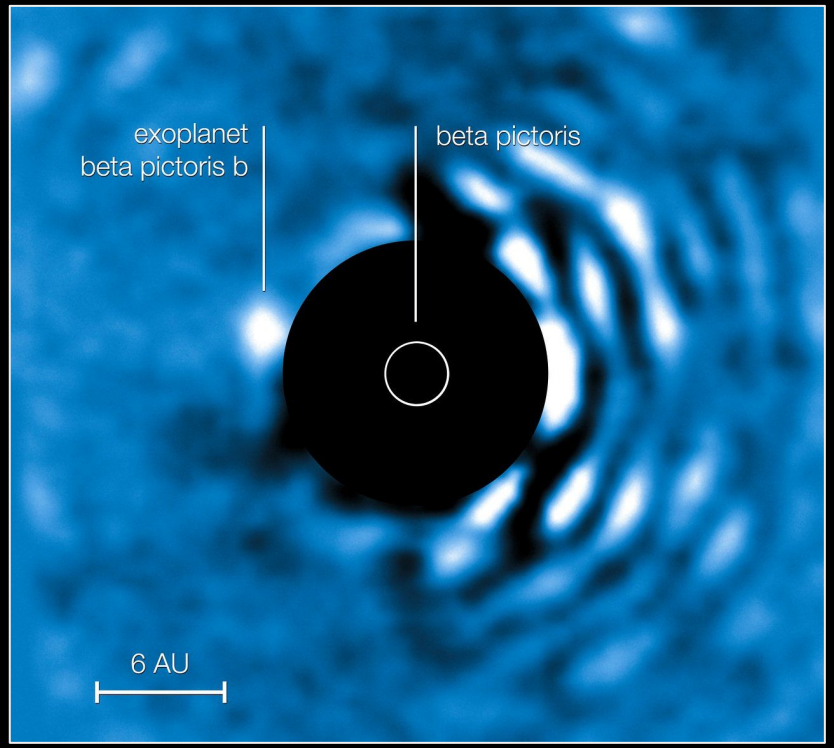

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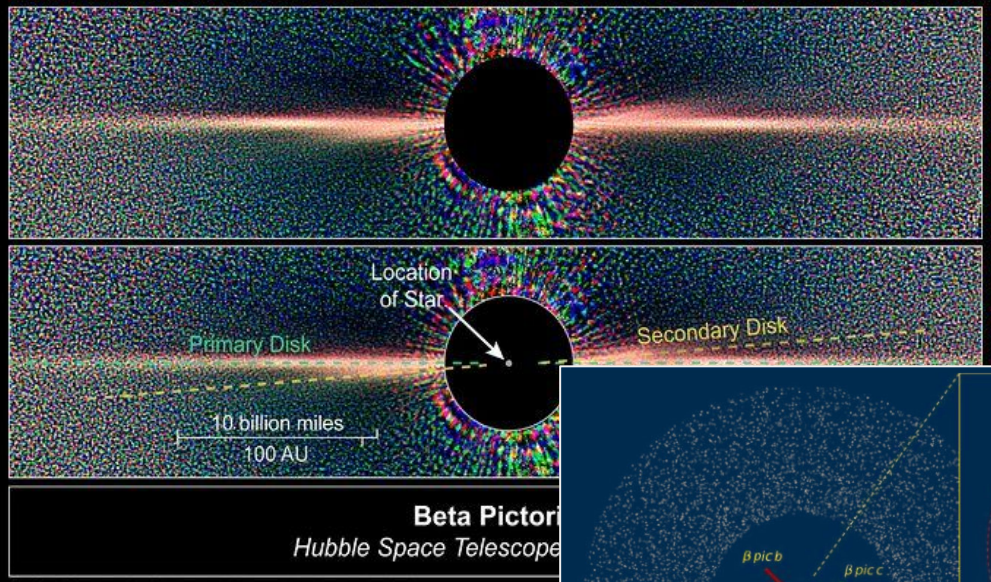
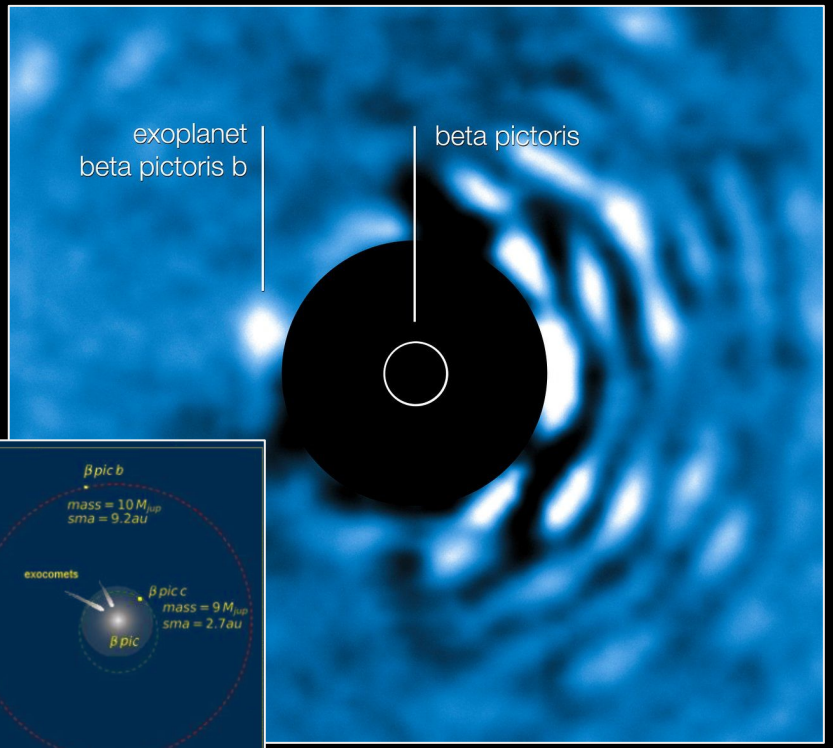


NASA, ESA, and D. Golimowski (Johns Hopkins University)



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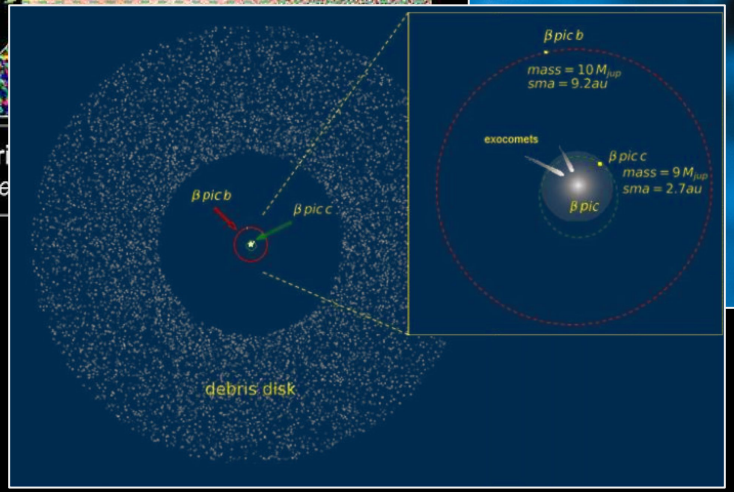

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Éra vesmírnych teleskopov

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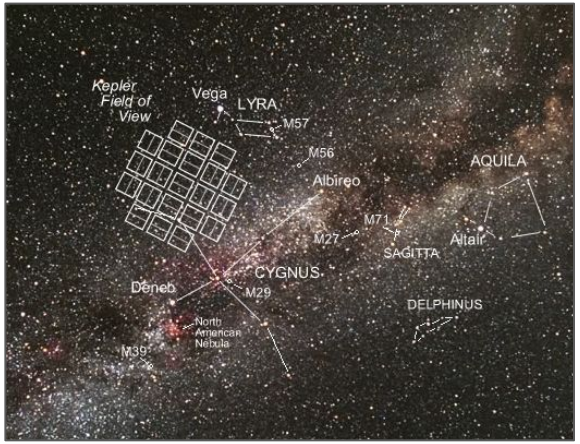

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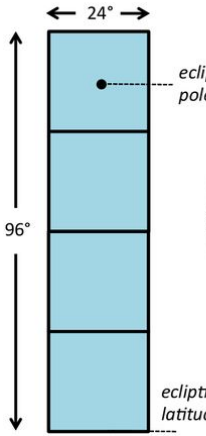
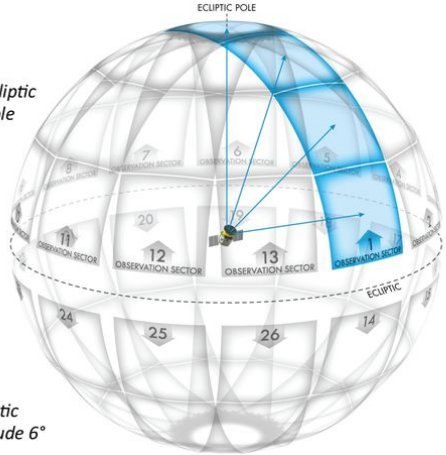
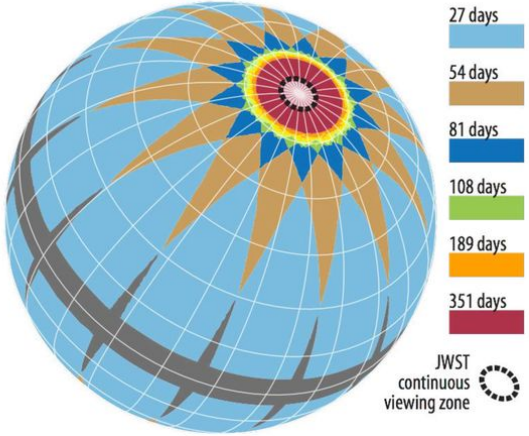






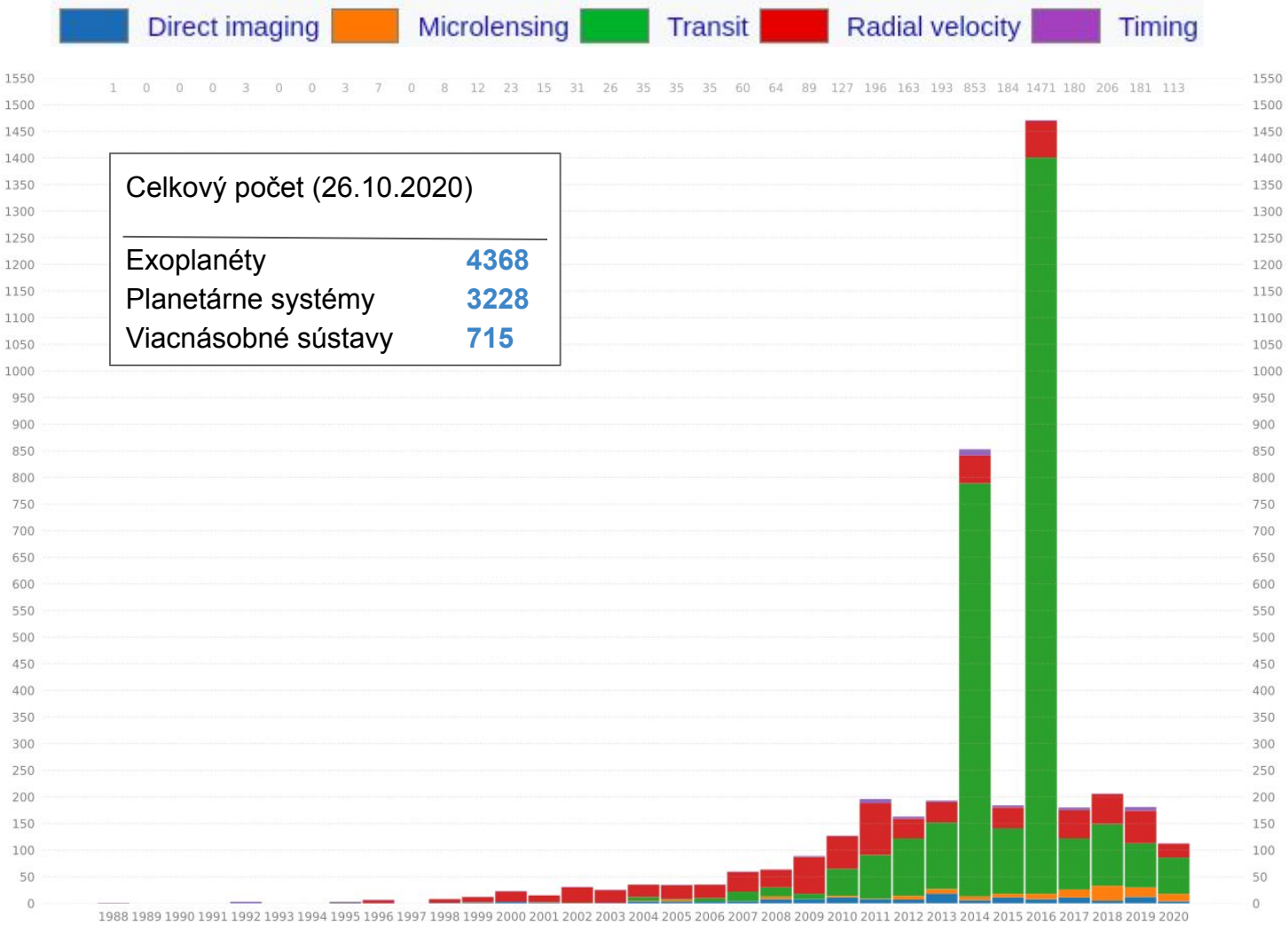
Údaje prevzaté z NASA Exoplanet Archive, október 2020

All Exoplanets	**4284**
Confirmed Planets with Kepler Light Curves for Stellar Host	**2412**
Confirmed Planets Discovered by Kepler	**2392**
Kepler Project Candidates Yet To Be Confirmed	**2368**
Confirmed Planets with K2 Light Curves for Stellar Host	**443**
Confirmed Planets Discovered by K2	**422**
K2 Candidates Yet To Be Confirmed	**889**
Confirmed Planets Discovered by TESS [1]	**74**
TESS Project Candidates Integrated into Archive (2020-10-06 13:00:02) [2]	**2321**
Current date TESS Project Candidates at ExoFOP	**2321**
TESS Project Candidates Yet To Be Confirmed [3]	**1409**

[1] *Confirmed Planets Discovered by TESS* refers to the number planets that have been published in the refereed astronomical literature.

[2] *TESS Project Candidates* refers to the total number of transit-like events that appear to be astrophysical in origin, including false positives as identified by the TESS Project.

[3] *TESS Project Candidates Yet To Be Confirmed* refers to the number of TESS Project Candidates that have not yet been dispositioned as a Confirmed Planet or False Positive.

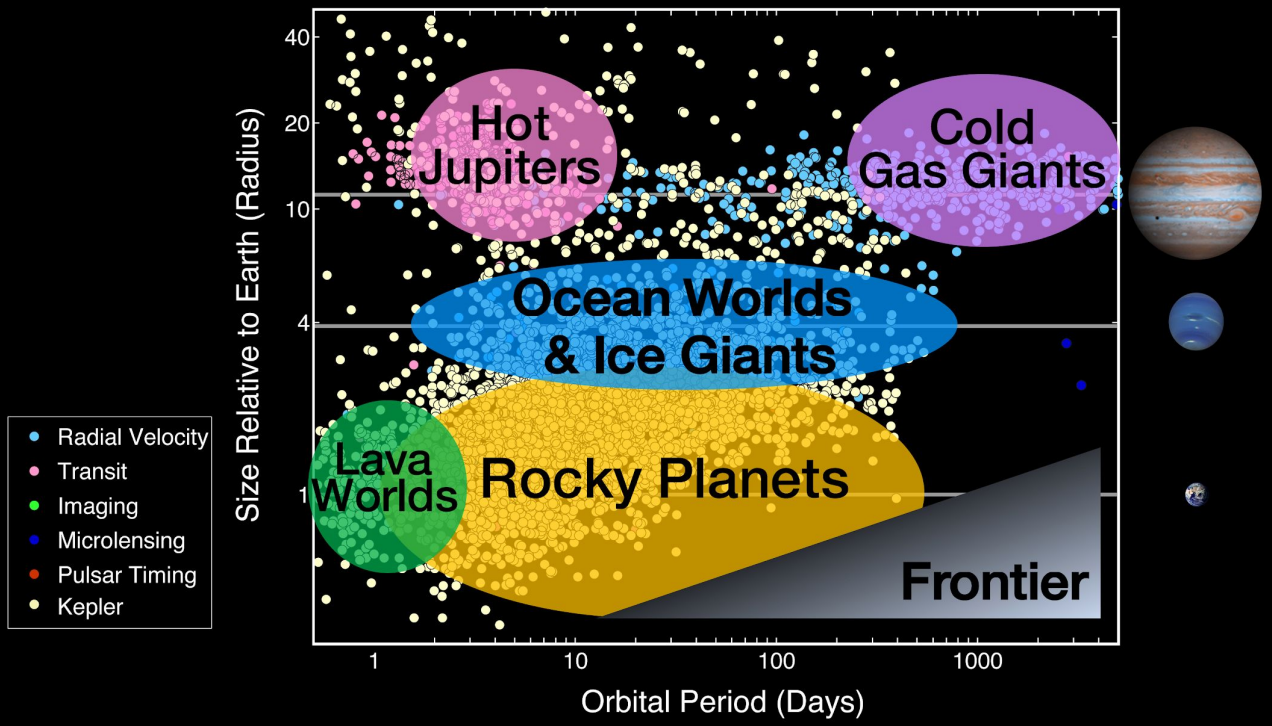


Celkový počet (26.10.2020)

Exoplanéty	**4368**
Planetárne systémy	**3228**
Viacnásobné sústavy	**715**

Zdroj:
exoplanet.eu

Exoplanet Populations



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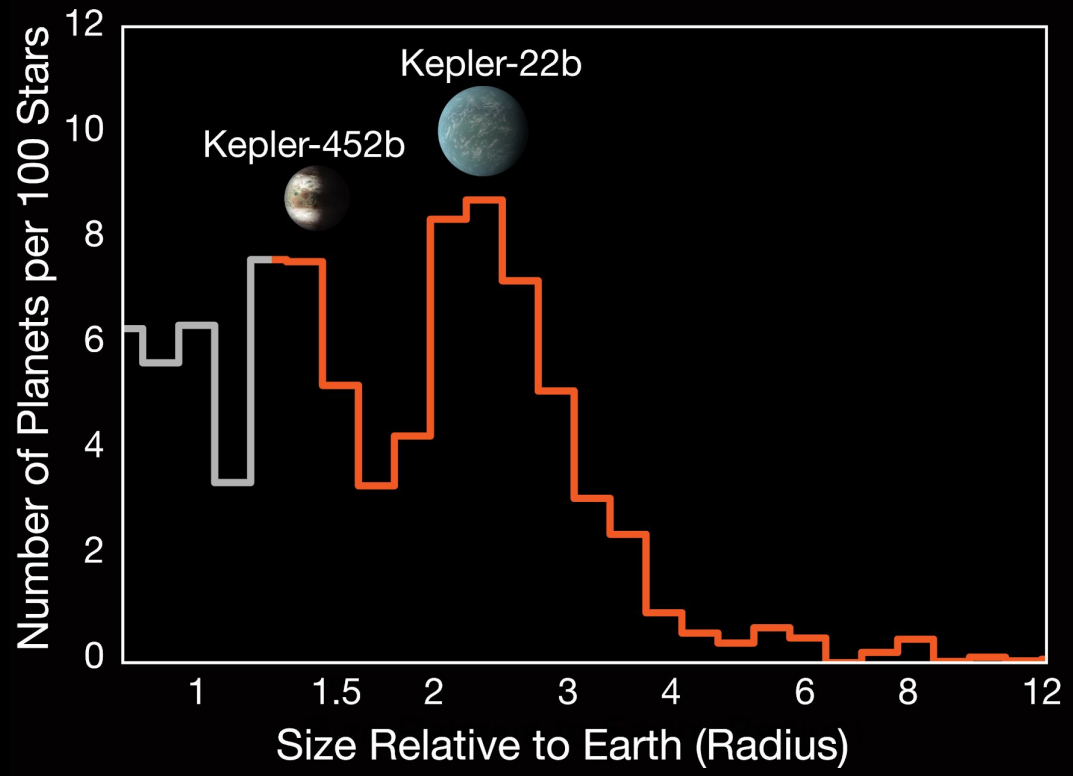
Small Planets Come in Two Sizes



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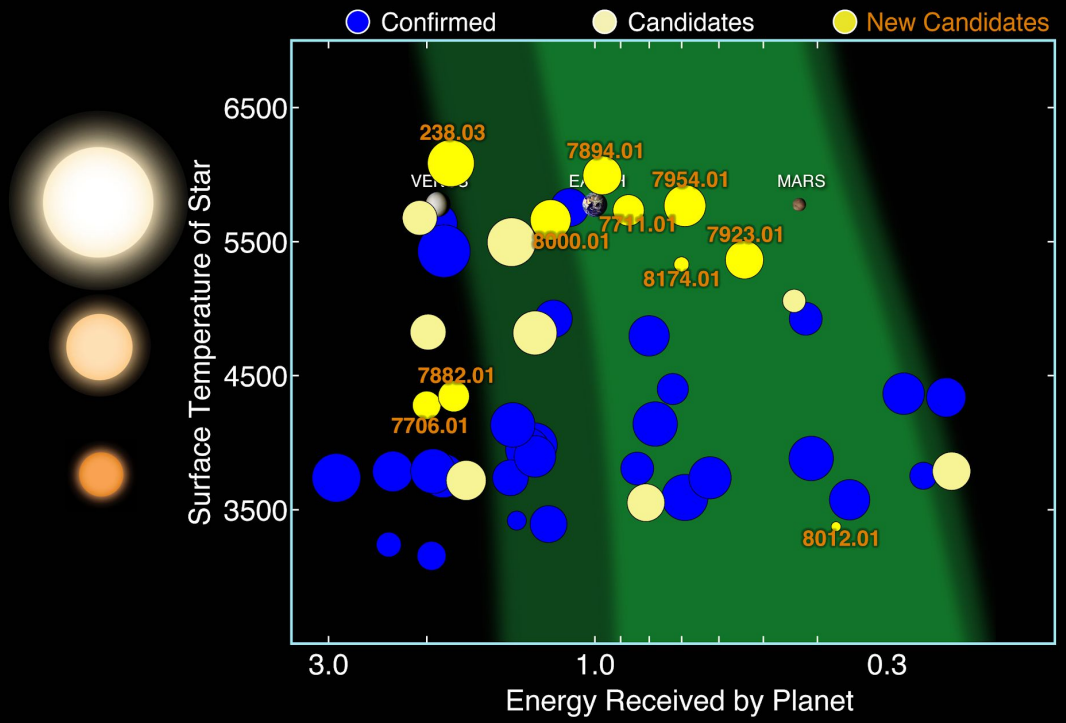
Kepler Habitable Zone Planets

As of June 2017



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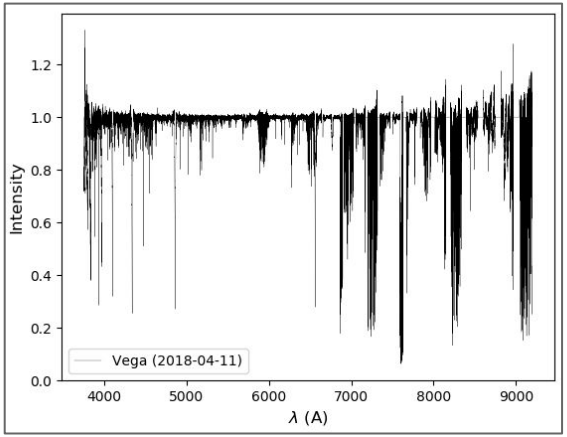
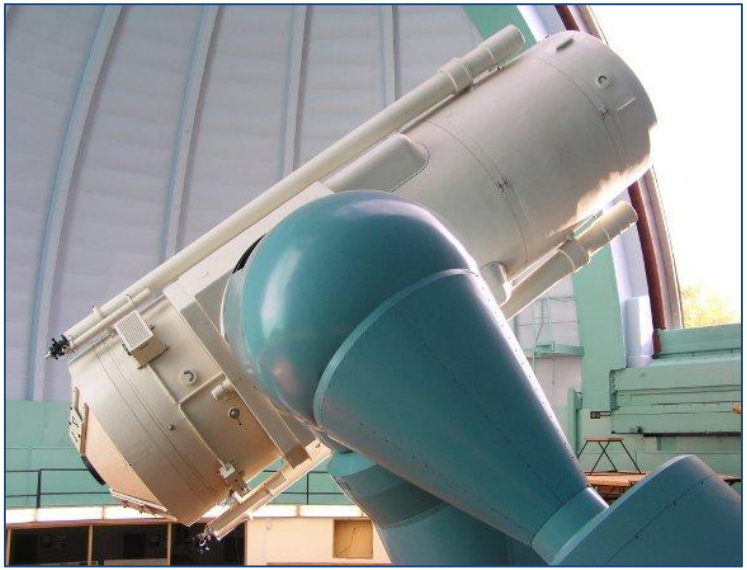
Výskum u nás



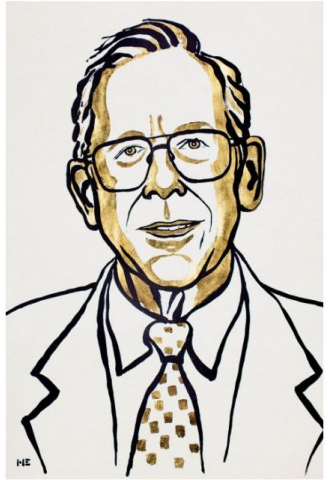


PLATO Mission Consortium
PLAnetary Transits and Oscillations of stars

plato

Nobelova cena za fyziku v roku 2019

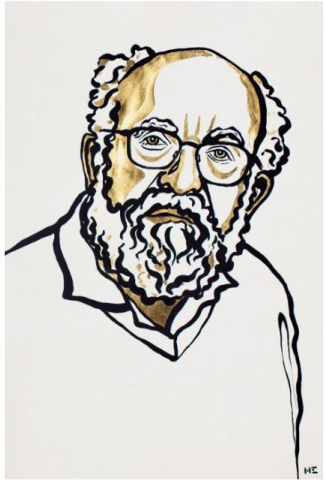
The Nobel Prize in Physics 2019 was awarded "for contributions to our understanding of the evolution of the universe and Earth's place in the cosmos" with one half to James Peebles **"for theoretical discoveries in physical cosmology"**, the other half jointly to Michel Mayor and Didier Queloz **"for the discovery of an exoplanet orbiting a solar-type star."**



Ill. Niklas Elmehed. © Nobel Media.

James Peebles

Prize share: 1/2



Ill. Niklas Elmehed. © Nobel Media.

Michel Mayor

Prize share: 1/4

Ill. Niklas Elmehed. © Nobel Media.

Didier Queloz

Prize share: 1/4

ďakujem za pozornosť

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Astronomický ústav AV ČR

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Univerzita Karlova

Referencie

Mayor M., Queloz D. (1995): A Jupiter-mass companion to a solar–type star. Nature 378, 355–359

Marcy G.W., Butler R.P., Williams E., et al. (1997): The planet around 51 Pegasi. ApJ 481, 926–935

Charbonneau D., Brown T.M., Latham D.W., Mayor M. (2000): Detection of Planetary Transits Across a Sun-like Star. ApJ 529 1, L45–L48

NASA Exoplanet Archive
https://exoplanetarchive.ipac.caltech.edu/docs/counts_detail.html

The Nobel Prize in Physics 2019. [online] NobelPrize.org. Nobel Media AB 2020. Mon. 20 Jan 2020. Retrieved 2020-01-20 from https://www.nobelprize.org/prizes/physics/2019/summary/