Editorial

Exoplanet Earth 2.0: Is There Anybody?

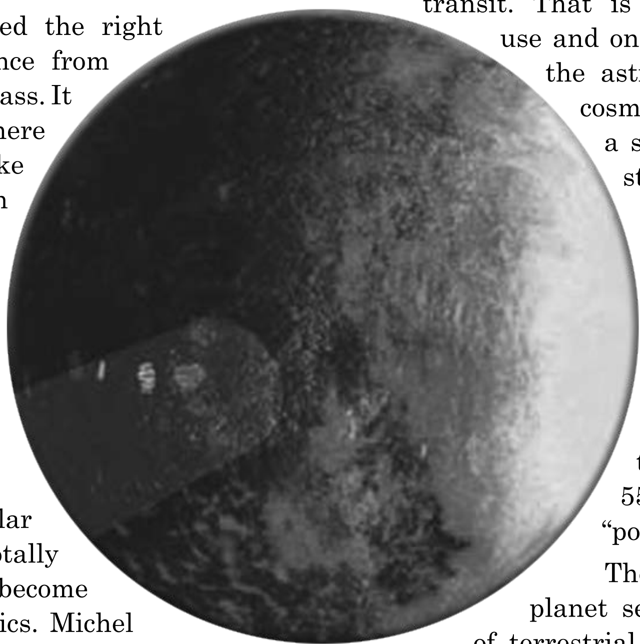
Exoplanets: With always much elaborated methods the astrophysicists search for the distant earths.

These are always again and again in the news. Newly discovered planets which are almost more or less similar to the earth revolve there in outer space round the distant stars. The US researchers have discovered water vapour in the atmosphere of K2-18b and this has made a headline.

Have they discovered a second earth?

Not exactly. The planet is so big and besides not sufficiently dense and also did not correspond to the details with all previous discoveries.

The earth 2.0 required the right density, the right distance from their stars and the right mass. It had to have in its atmosphere moreover biomarker like ozone or methane or even water. Also rigorous requirements are tied with accompanying stars. It must be sufficiently active so that it heats its planets; but it might not again be too active.



The search for a solar system that fulfils totally the assumptions has become grail search of astrophysics. Michel Mayor, Swiss astronomer was the first to discover extra solar planet in 1995. On Monday of the previous week of 27, September 2019 in the European planetary Science Congress, in Geneva, the pioneer Mayor naturally did not make mistake in the platform of the participating researchers as the ESA gave an update to their most up-to-date planet search mission. It is named Cheops, Characterizing Exoplanets Satellites. Behind that sticks a relatively small telescope which in that manner ESA project scientist Kate Isaak should have started in the middle of December 2019 from space station Kourou in French, Guyana.

Mayor emphasized that 20 years ago for the first time an exoplanet was observed in transit. That is the method the Cheops use and one of the many with which the astronauts establish that in cosmos a planet revolves round a star. When we look at the star and a planet passes the sight line before the star, and then the brightness diminishes.

In the meantime more than 4000 exoplanets are known. The University of Puerto Rico has given these planets marks and 55 of them for the title “potentially habitable”.

The researchers on their planet search, not only make use of terrestrial but also the outer space infrastructure. For the mass determination they

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use big telescope on the earth at the southern observatory in Chile as for example.

The planets turn to their stars periodically so that the collective centre of gravity does not lie in the middle of the stars. In course of a planet year the star moves once round the earth once from its way. This radial speed of the star is as red-blue displacement is measurable with the help of Doppler Effect. In order to determine all crucial densities, the researchers need still volumes and that is more to be determined from the earth. Then one expects on transits. The Jupiter could be looked on from outside eclipse1% of the sun, the earth only 0.01%.

For this art of measurement it requires powerful space telescope like Kepler, Tess and that is for 2021 planned James Webb. But for planets of earth's size the modest Cheops-Mission is sufficient, which before all should further research on known exoplanets.

Both the methods find before all planets, which closely rotate round their star, while it several periods requires before one can go out of a planet reliably. For the 2026 planned ESA Mission Plato should observe longer and therefore the planets find with longer rotation period. Plato with 26 cameras with each one of 11 cm aperture is set up which each one can observe a segment of the sky for three to four years. The cameras reach individually for the brightest of stars. For the weakest we can manage together – says the Plato responsible researcher Heike Raner.

The technologies, with which the researchers in future go on with the planet research, belong to the most fastidious projects of space journey. The challenge with that may not be getting blindfold. The fundamental problem lies in that the planets are of increasingly much lower light intensity than the stars, says the astrophysicist Stefan Dreizler of Göttinger and terms as brightness difference of factor 10^9.

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