



<p>ESOCast Episode 20: Richest planetary system discovered</p>	
<p>00:00 [Visuals start]</p> <p>[Narrator]</p> <p>1. Astronomers using ESO's world-leading HARPS instrument have discovered a planetary system containing at least five planets, orbiting the Sun-like star HD 10180. The researchers also believe the system has two other planets, one of which would have the lowest mass ever found, making the system similar to our own Solar System in terms of the number of planets. Furthermore, the scientists find that the location of the planets follows a regular pattern, as also seen in our own Solar System.</p>	
<p>00:35 ESOCast intro</p> <p>2. This is the ESOCast! Cutting-edge science and life behind the scenes at ESO, the European Southern Observatory. Exploring the ultimate frontier with our host Dr J, a.k.a. Dr Joe Liske.</p>	<p>ESOCast introduction</p>
<p>01:00 [Narrator]</p> <p>3. The team of astronomers used the HARPS spectrograph, attached to ESO's 3.6-metre telescope at La Silla, Chile. HARPS is an instrument with unrivalled stability and great precision, and the world's most successful exoplanet hunter.</p> <p>The astronomers, led by Christophe Lovis from the Geneva Observatory, studied the Sun-like star HD 10180 over a period of six years!</p> <p>This star is located 127 light-years away in the southern constellation Hydrus ("the Male Water Snake").</p>	

<p>01:41 [Narrator]</p> <p>4. Thanks to the 190 individual HARPS measurements, the astronomers detected the wobbles of the star caused by five or more planets.</p> <p>The five strongest signals correspond to planets with Neptune-like masses — between 13 and 25 Earth masses — which orbit the star in between 6 to 600 days.</p> <p>The astronomers have also strong reason to believe that two other planets are present. One would be a Saturn-like planet orbiting in 2200 days. The other, having a mass of only about 1.4 times that of the Earth would be the least massive exoplanet ever discovered. This suspected planet is very close to its host star and so it is likely to be very hot. One ‘year’ on this planet lasts only 1.18 Earth-days!</p>	
<p>02:35 [Narrator]</p> <p>5. The newly discovered Solar System is unique in several respects. First of all, with at least five Neptune-like planets lying within a distance equivalent to the orbit of Mars, this system is more populated than our own Solar System in its inner region, and has many more massive planets there. Furthermore, the system probably has no Jupiter-like gas giant. In addition, all the planets seem to have almost circular orbits. Dynamical studies of the new system reveal complex interactions between planets and give us insights into its long-term evolution.</p>	
<p>03:13 [Narrator]</p> <p>6. Using the new discovery as well as data for other planetary systems, the astronomers discovered that the locations of the planets seem to follow a regular pattern — similar to the “Titius-Bode” law that exists in our Solar System. This could be a general signature of how planetary systems form.</p>	

<p>03:34 [Narrator]</p> <p>7. Another important result is that all very massive planetary systems are found around massive and metal-rich stars, while the four lowest-mass systems are found around lower-mass and metal-poor stars. These properties confirm current theoretical models.</p> <p>There is no doubt that this remarkable discovery highlights the fact that we are now entering a new era in exoplanet science: the study of complex planetary systems and not just of individual planets!!</p> <p>And with HARPS, European astronomers will be a driving force behind this transition.</p>	
<p>04:16 [Outro]</p>	<p>ESOcast is produced by ESO, the European Southern Observatory.</p> <p><i>ESO, the European Southern Observatory, is the pre-eminent intergovernmental science and technology organisation in astronomy designing, constructing and operating the world's most advanced ground-based telescopes.</i></p>

05:08
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