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## Three Extra-Solar Planets Discovered in One Shot

### *And an asteroid belt*

Astronomers have discovered three extra-solar giant planets that seem to be made of rock and ice, instead of being giant gas planets like Jupiter. The planets have stable orbits around a small star just 41 light-years away from Earth. The star has a visual magnitude of 5.95 and it's just visible with the unaided eye. This find excites the scientists as it supports the idea that rocky planets are not very unusual across the universe. Moreover, the star also appears to have an asteroid belt. However, this solar system looks very weird when compared to our own. Two of the "super-Earths" revolve around the star on orbits smaller than that of Mercury, the closest planet to the Sun, while the third revolves around the star on an orbit smaller than that of Venus, the second planet from the Sun. The discovery was made by a team led by astronomers Michel Mayor and Didier Queloz of the Geneva Observatory in Switzerland who monitored a southern hemisphere star called HD 69830.

**The planets** Astronomers found the planets using a combination of theory and observation. The only thing that can be directly observed is the star. But due to the planet's gravity the star "wobbles" a little on the sky. By studying how it "wobbles" and knowing how gravitation functions, scientists can deduce various details about the planets - details such as their number, size, orbits and even composition. "A planet in orbit around a star will manifest its presence by pulling the star in different directions, thereby changing by rather small amounts its measured velocity. Astronomers therefore measure with very high precision the velocity of a star to detect the signature of one or more planets." From this "wobble" scientists deduced that the first two planets, with estimated masses of 10 to 15 times that of Earth, take just 9 days and 31 days to orbit the star. This means that they must be very close to the star. But they are so close that it's pretty obvious they cannot be gas giants, because such an atmosphere would have been blown away by the solar wind stripping the planets to a much smaller size than they are actually found to be. Therefore they must be rocky giants. The third planet is at least 18 times as massive as Earth and orbits the star in 197 days. It probably has a thick mantle of gas blanketing a large core of rock and ice.

According to Christophe Lovis, a graduate student at Geneva Observatory and main author of the paper published today by Nature, although the orbit of this outer world is smaller than Venus' orbit around the Sun, it travels in a mild realm where liquid water might exist on the surfaces of rocky satellites. **What about the asteroids?** The infrared Spitzer Space Telescope has detected last year a warm dust in that region. So, scientists now wondered whether this could be an asteroid belt. If it was it would be much larger than the asteroid belt of our solar system. Knowing the planets' orbits, scientists could now find out whether this planetary system would eject everything in its way or on the contrary would allow asteroids to be captured on a certain orbit. Lovis' colleagues simulated the long-term motions of the planets and found two such regions where asteroids can drift calmly around the star. Insofar astronomers have discovered almost 200 planets orbiting other stars than our own. This planetary system seems one of the most interesting. *Image: Planetary System Around HD 69830 (Artist's Impression). Credit: European Space Agency*