

# Two new transiting extra-solar planets discovered with SuperWASP and SOPHIE

*A team of British, French and Swiss astronomers has just discovered two new transiting extra-solar planets. This double discovery was made using the British SuperWASP cameras at La Palma, Spain, and the new SOPHIE spectrograph at Haute-Provence, France. These two new planets, of the "hot Jupiter" type, join the very "exclusive club" of extra-solar planets showing transits.*

More than 200 planets are known today to orbit stars other than the Sun. Among these exoplanets, the search for and study of planets which transit their host stars lies at the forefront of exoplanetology. They associate two complementary detection methods. The first involves the drop in a star's luminosity when an orbiting body transits the star's disk, a phenomenon called a "photometric transit." The second involves the reflex motion of the star due to that orbiting body, and is called the "radial-velocity" method. The first yields information on the size of the orbiting body while the second gives crucial information about its mass which can reveal it as an exoplanet. These two parameters, radius and mass, are used to determine the densities of these exoplanets and thus constrain their internal properties and allow comparison with planets in our own Solar System. Among the 200 known exoplanets only 12 systems were known to exhibit transits. The importance of these systems is so high that the COROT satellite, to be launched late this year by ESA/CNES, has the mission to detect and identify a large number of them.

The SuperWASP program, lead by a UK team, has obtained high-accuracy photometry of more than 200000 stars, using eight robotic wide-angle telephoto lenses, to look for the very weak periodic intensity "dips" that could be due to unknown planetary companions. Several dozen candidates have been found. To establish the exoplanet nature of these candidates, the UK team joined forces with a French-Swiss team for the spectroscopic follow-up with the radial-velocity method.

The brand-new SOPHIE high-resolution spectrograph, now undergoing final tests on the 1.93-m telescope of the Haute-Provence Observatory, will be formally inaugurated on November 30. It replaces the celebrated ELODIE spectrograph which allowed the 1995 discovery of the first exoplanet by Michel Mayor and Didier Queloz, of Geneva Observatory. SOPHIE, which shows itself to be 10 times more sensitive than ELODIE, was used in early September to observe the SuperWASP candidates. In just a few nights it was possible to identify two planetary-sized objects among the candidates in the observing list. The SOPHIE instrument, while still undergoing tune-up, has demonstrated its remarkable accuracy and astonishing efficiency in detecting new exoplanets.

The two faint stars around which the new exoplanets were found are relatively similar to our Sun. Star WASP-1 is slightly hotter and larger and its located 1000 light-years away in Andromeda. Star WASP-2 is slightly colder and smaller and is located 500 light-years away in the Dolphin. Although invisible to the naked eye (both are near 12th magnitude), these stars are easily within reach of an amateur astronomer's telescope.

The two new exoplanets, which bring to 14 the number of known transiting systems, bear the names WASP-1b and WASP-2b. They are both giant planets, like Jupiter, but with much smaller orbits (2.5 and 2.2 days, respectively, compared to 12 years). Their proximity to the

host stars implies that these planets are much hotter than Mercury and belong to the "hot Jupiter" class. The analysis of the properties of this type of planet will allow scientists to better understand the formation and evolution of exoplanets and also better understand the origin of our Solar System.

SOPHIE, a project financed by INSU and the PACA Regional Council, will now start a large program of exoplanet studies. Its excellent performance augurs well for the results of the follow-up program of COROT-discovered exoplanets to start in the next few months.

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*This discovery has just been announced at Heidelberg in the course of an international conference on extra-solar planets. A publication reporting this discovery has been submitted to the "Monthly Notices of the Royal Astronomy Society".*

*The SuperWASP project:*

<http://www.superwasp.org/>

*The SOPHIE spectrograph of the Observatoire de Haute-Provence:*

<http://www.obs-hp.fr/www/guide/sophie/SOPHIE-info.html>

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