

ASTRONOMY

Light direct from an alien world

Astronomers have spotted light reflected off a planet orbiting a distant sun, by teasing it out from the background starlight. The discovery allows direct calculations of the mass and other properties of the exoplanet, rather than inferring them using other methods.

Jorge Martins of the University of Porto in Portugal and his team used the HARPS instrument at the European Southern Observatory's La Silla facility in Chile to study 51 Pegasi b, which was the first ever exoplanet found around a Sun-like star. The team subtracted the starlight, leaving only the faint planetary spectrum. From this, they calculated the planet's mass to be about half that of Jupiter.

Detecting this reflected light from other exoplanets could allow astronomers to determine more characteristics than other techniques can.

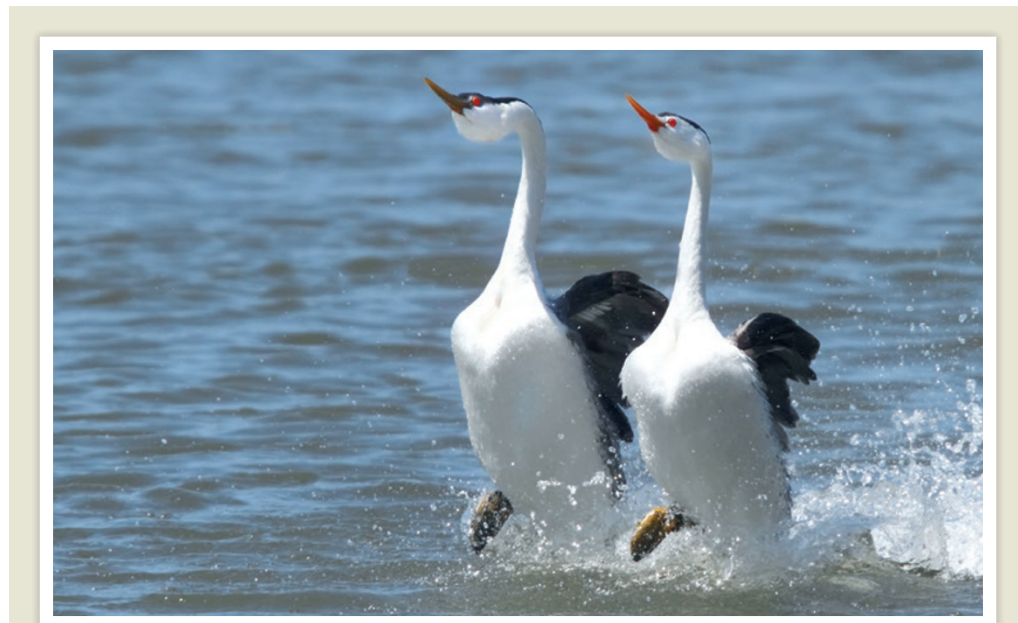
Astron. Astrophys. 576, A134 (2015)

BIOPHYSICS

Bacteria swim to form crystals

Fast-swimming bacteria that live at the bottom of salt marshes spontaneously come together to form organized crystalline structures that move through water.

The bacterium *Thiovulum majus* is a large, round cell with hundreds of small flagella, or tail-like structures, that spin to propel the organism. Alexander Petroff of the Rockefeller University in New York and his colleagues observed the behaviour of individually spinning cells under a microscope and found that each created tornado-like flows



BIOMECHANICS

How grebes walk on water

The heaviest animals known to run on water pull off the feat by using quick strides and large feet that slap the surface.

Western and Clark's grebes (*Aechmophorus occidentalis* and *Aechmophorus clarkii*; pictured) run as far as 20 metres on water and for up to 7 seconds during a mating ritual, and are among only a few animals with this ability. Glenna Clifton at Harvard University's Concord Field Station in Bedford, Massachusetts, and her

team analysed high-speed video of wild birds performing the dance and studied models of the grebe foot in the laboratory.

They found that the birds stay above the water by having a fast stride rate of up to 20 steps a second, as well as wide, flat feet that slap the water surface with enough force to support up to 55% of the bird's weight. The animal's feet are also shaped to reduce drag.

J. Exp. Biol. 218, 1235–1243 (2015)

in the liquid around them. These forces cause the cells to self-assemble into groups of between 10 and 1,000 cells, arranged in a two-dimensional crystalline hexagonal shape that rotates collectively.

Phys. Rev. Lett. 114, 158102 (2015)

HYDROLOGY

Groundwater under Antarctica

A groundwater network found beneath an Antarctic valley could support microbial life.

Jill Mikucki of the University of Tennessee in Knoxville,

Slawek Tulaczyk at the University of California, Santa Cruz, and their colleagues studied Taylor Valley using an airborne instrument to measure underground electrical resistivity, which increases as water in soil freezes. The team discovered two systems of briny groundwater, one of which connects to the Ross Sea.

This water could be home to microbes, the authors suggest, because subsurface temperatures at boreholes were within the range that can support microbial life (−3°C to −20°C). And an outflow of

iron-containing subsurface saltwater from the Taylor Glacier is known to contain microorganisms.

Nature Commun 6, 6831 (2015)

NEUROSCIENCE

Brain waves go far in tinnitus

Many people hear ringing in the ears, known as tinnitus, and researchers now think it could involve abnormally linked brain waves that extend across a large part of the brain.

William Sedley at Newcastle University, UK, Phillip Gander