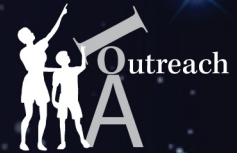




INSTITUTE OF ASTRONOMY PUBLIC OPEN EVENING

— 18 DECEMBER 2019 —



New exoplanet-hunting mission, CHEOPS, blasts off



An artist's impression of CHEOPS leaving Earth. Image: ESA.

Early in the morning on December 18th, 2019, a new exoplanet-hunting mission launched on a Soyuz rocket from Guiana Space Center in Kourou, in French Guiana.

Cheops (the Characterising Exoplanet Satellite) is a collaboration between the European Space Agency (ESA) and Switzerland, and is the first European mission designed specifically to find and understand exoplanets.

Since astronomers found the first ever planet orbiting a distant star in 1995 (a finding which earned its discoverers, Didier Queloz and Michel Mayor, the 2019 Nobel Prize for physics), around 4000 exoplanets have been discovered. Now, scientists are keen to learn more about these alien worlds.

"After the discovery of thousands of planets, the quest can now turn to characterisation,

investigating the physical and chemical properties of many exoplanets and really getting to know what they are made of and how they formed.", said Günther Hasinger, ESA Director of Science.

Importantly, CHEOPS isn't designed to find new planets. Instead, it will follow up on hundreds of planets already found, in order to give us a better understanding of their sizes and properties. By measuring the planets as they transit their parent stars, CHEOPS will discover how large these planets are -- which, in turn, tells astronomers whether they are gassy or rocky worlds.

CHEOPS will also allow the study of the atmospheres of these planets, including the presence (and composition) of clouds, and possibly even allow astronomers to see moons and rings.

TONIGHT'S SPEAKER



Emma Curtis-Lake
The James Webb Space Telescope

Our weekly welcome

WELCOME to our weekly public open evenings for the 2019/20 season. Each night there will be a half-hour talk which begins promptly at 7.15pm. Please note that the talk will be recorded and archived for online streaming.

The talk is followed by an opportunity to observe if (and only if!) the weather is clear. The IoA's historical Northumberland and Thorrowgood telescopes, along with our modern 16-inch telescope, will be open for observations. In addition, the **Cambridge Astronomical Association** will provide a floorshow outdoors on the Observatory lawns, relaying live images from their telescopes and providing a commentary. If we're unlucky and it's cloudy, we'll offer you a conciliatory cup of tea after the talk (with perhaps some more astro-information in the lecture theatre for those who want to stay on).

If you have any questions, suggestions or comments about the IoA Open Evenings please contact Matt Bothwell at bothwell@ast.cam.ac.uk.

The talk schedule for this term can be viewed at: www.ast.cam.ac.uk/public

More galaxies without dark matter found



Dwarf galaxy NGC 5477, as seen by the Hubble Space Telescope,

Recently, a team of astronomers published a paper which argued that they had found two galaxies which seemed to be completely devoid of dark matter. This was understandably controversial, as dark matter is thought to be a critically-important building block of the Universe, responsible for providing the 'framework' around which galaxies form.

Now, a paper published in *Nature Astronomy* has announced the discovery of a further 19

galaxies, all seemingly without any observable dark matter.

"This result is very hard to explain using the standard galaxy formation model," said lead author Qi Guo of the Chinese Academy of Science "and thus encourages people to revisit the nature of dark matter."

Dark matter was originally found in spiral galaxies by Vera Rubin and Kent Ford, who found that galaxies were rotating faster than they should, implying they were responding to the gravitational pull

of hidden matter. And these new galaxies have been measured in a similar way: by observing hydrogen gas, the team was able to gravitationally 'weigh' the galaxies. And out of the 324 galaxies observed, 19 of them seemed to weigh exactly as much as you'd expect -- with no mysterious dark matter needed!

Currently, dark matter is thought to be required for galaxies to form. This new discovery suggests that current models of galaxy formation may well be incomplete.

Astronomers find source of Geminids



The annual Geminids meteor shower lights up the night sky every December 13-14 (for those lucky enough to have clear skies to see it). But, until now the origin of these meteors has been something of a mystery.

Most meteor showers are caused by a comet. Comets are basically giant dirty snowballs in space, and as they orbit the sun small fragments get broken off and form a 'meteoroid stream'. When

the Earth crosses the debris stream, we see a meteor shower.

The Geminids are an exception, though, as they do not come from a comet's debris. Now, NASA's Parker Solar Probe has confirmed that the Geminids originate from a rocky asteroid, known as 3200 Phaethon.

A rocky body shouldn't be able to create a debris stream, leaving astronomers to wonder if

something violent happened to 3200 Phaethon in the past, to create the Geminids.

The Parker Solar Probe wasn't designed to hunt for the origins of meteor showers, of course. The NASA mission is designed to study our Sun, but stumbled upon the meteor's debris trail by accident.

"The truly remarkable thing about the Parker Solar Probe mission is that it's also giving us answers to questions that we weren't even asking," said Karl Battams, who works on the mission. "We've seen something in the data that we have never seen before with any of our instruments."

Joke of the Week

What do you get if you cross Santa Claus with a space ship?
A u-f-ho-ho-ho!