



*THE HUNT FOR ALIEN WORLDS HITS A MILESTONE*

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# Sky at Night

THE UK'S BEST SELLING ASTRONOMY MAGAZINE

## DISCOVER PLANETARY NEBULAE

6 spectacular dying stars  
to seek out in late  
summer's night skies

**SATURN  
RINGS TRUE**

The Ringed Planet  
puts on a show at  
opposition

**AN ASTRONOMER AT THE  
BOTTOM OF THE WORLD**

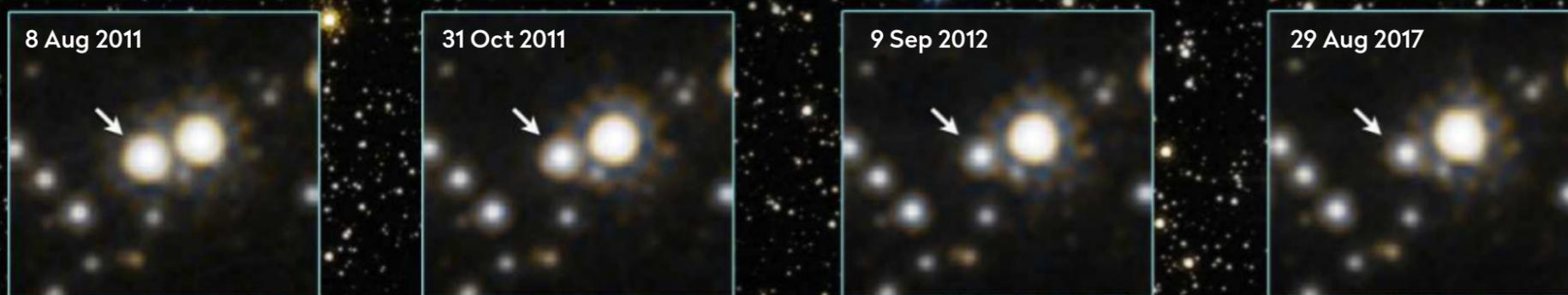
**12 ASTROPHOTO PITFALLS  
(AND HOW TO AVOID THEM)**

**CURIOSITY CELEBRATES  
10 YEARS ON MARS**

**REGION OF MYSTERY: SEE THE  
LUNAR SWIRL, REINER GAMMA**

**CHINA COMPLETES ITS  
ORBITING SPACE STATION**

First spotted in 2011, the 'wobble' in the brightness of a distant star gave away the presence of the nearby black hole



# Hubble uncovers a lone black hole

Wandering singularity discovered through microlensing as it warps distant starlight

**The Milky Way** is filled with the ghosts of dead stars. Our Galaxy is thought to be home to some 100 million black holes, the final chapter in the lives of large stars, but tracking down these elusive objects is difficult as they emit no light and can only be found through their effect on the surrounding environment.

However, after six years of painstaking observations, the Hubble Space Telescope has uncovered what appears to be a lone black hole floating through space and has measured its mass, giving the first ever direct evidence of a dark stellar remnant that's unaccompanied by stars or an accretion disc.

The black hole was found using a technique known as microlensing, when light from a distant background star is deflected by the gravity of a foreground object. Because of this, chance

alignments cause the background star's brightness to fluctuate. These alignments are rare, but if a telescope is pointed at enough stars for a long time, it should eventually see a tell-tale wobble in the background star's brightness, revealing an otherwise invisible object.

"Astrometric microlensing is conceptually simple but observationally very tough," said Kailash Sahu from the Space Telescope Science Institute, who led one of two teams investigating the discovery. "Microlensing is the only technique available for identifying isolated black holes."

Sahu's team used the pattern of changing brightness to estimate the black hole is around seven solar masses. However, another team led by Casey Lam from the University of California, Berkeley, measured it to be between 1.6 to 4.4 solar

masses. While the top end of that range would indeed be a black hole, the lower end would be a neutron star.

"Whatever it is, the object is the first dark stellar remnant discovered wandering through the Galaxy unaccompanied by another star," says Lam.

The discovery proves the validity of using microlensing to find black holes and helps provide insight into how common they are within our Galaxy. Using the data from this investigation, the team predicted that the nearest lone black hole to Earth is probably around 80 lightyears away.

In the coming years, new telescopes such as the Nancy Grace Roman Space Telescope will discover hundreds more black holes in the same way. Our journey to understanding these mysterious objects is just beginning.

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