

**BBC** THE TOP NIGHT-SKY SIGHTS TO SEE IN 2024



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# Sky at Night

THE UK'S BEST-SELLING ASTRONOMY MAGAZINE

## Crash of the TITANS

Galaxy collisions wreak colossal carnage – so why does life in the Universe depend on them?

**COMET  
KUSHIDA**

When to get the best  
telescope views of  
this celestial  
visitor

**A BEGINNER'S GUIDE  
TO ASTRO CAMERAS**

**SPACE SCIENCE & CREWED  
MISSION LAUNCHES IN 2024**

**AMATEUR ASTRONOMER  
FINDS LOST SUPERNOVA**

**THE DEMON STAR: THE MYTH  
OF ALGOL EXPLAINED**

**ASKAR'S 2-IN-1 IMAGING  
TELESCOPE TESTED**

# Online astronomer finds star crash site

The nebula could be the remains of an important kind of supernova

**T**he Deep Sky Hunters are a group of online amateur astronomers who spend their spare time searching for unusual objects in images of the sky. This month's paper tells the story of one of their discoveries – a nebula now named Patchick 30, after its discoverer Dana Patchick – which has proved to be more important than anyone suspected.

Pa30, as it's known for short, was found in 2013 by Patchick while searching images taken by the Wide-field Infrared Survey Explorer space telescope, a small survey mission since repurposed as an asteroid hunter. His discovery appears as a faint disc-like nebula and was immediately flagged as a possible new planetary nebula.

Images taken that same year with the 2.1-metre telescope at the Kitt Peak National Observatory in Arizona showed structure, the kind of circular rings seen in many planetary nebulae, but it took the mighty 10-metre Gran Telescopio Canarias on La Palma to get a spectrum of the new object that showed anything at all. These observations showed oxygen and carbon – typical for a planetary nebula – but also that the gas was moving at an unprecedented speed, reaching about five per cent of the speed of light!

## Strange leftover star

Meanwhile, the central star of the nebula was also attracting attention, and not just from the discovery team. A rival group published data that suggested it was a Wolf-Rayet star, characterised by a lack of hydrogen (and hence an absence of any outer layers) and an extremely high temperature, in this case about 200,000 Kelvin (something like 40 times as hot as the Sun's surface).

This is clearly an extreme object, perhaps the product of a merger of two white dwarfs. Such an event must be rare and would presumably have produced a spectacular supernova. Data from Gaia, ESA's cosmic cartographer, puts Pa30 at about 7,500



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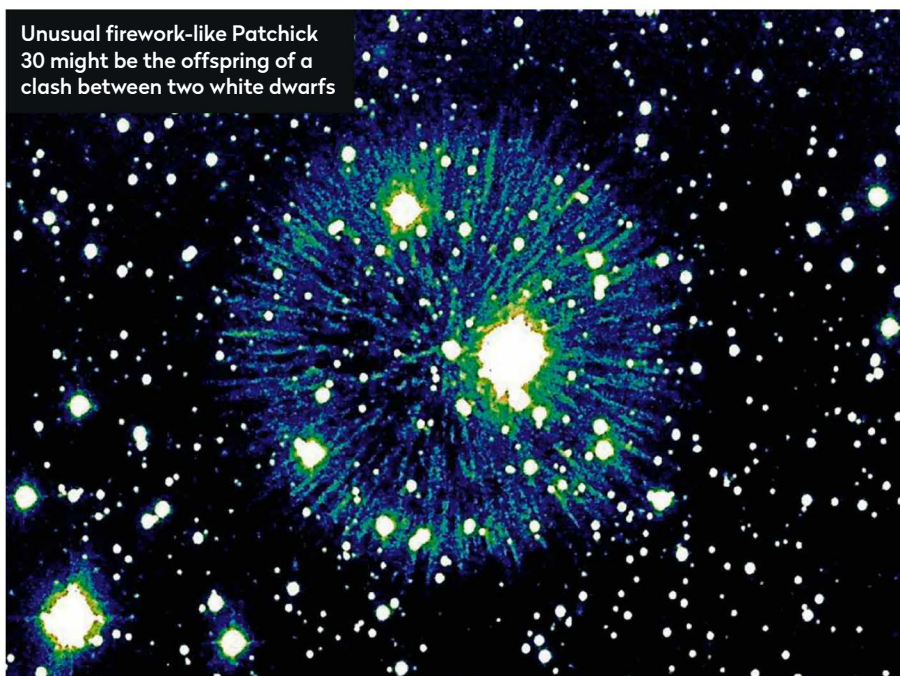
**"Chinese and Japanese observers recorded a supernova in this part of the sky in the year AD 1181. Could Pa30 be the remnant?"**

lightyears away, close enough that such an event should have been visible with the naked eye.

But when did the supernova happen? Observations with an X-ray telescope which pin down the size of the nebula suggest that it might be about a thousand years old, and here it gets really interesting. The authors point out that Chinese and Japanese observers recorded a supernova in this part of the sky in the year AD 1181. It is, in fact, the only supernova of the last millennium that doesn't have an identified counterpart – we know about the Crab Nebula, the product of a supernova just over a century earlier, so could Pa30 be the remnant of what these keen-eyed observers saw?

It seems likely to me and, if so, those records may be of more than historical interest. A collision between two white dwarfs produces, it's thought, a rare type of supernova known as a Type Ia, which can be used to measure the expansion of the Universe. If that's right, then Pa30 is a chance to study what's left of one of these explosions in our own backyard. What started as a smudge on an obscure image, noticed by Dana Patchick, may soon have an outsized influence on cosmology.

**Unusual firework-like Patchick 30 might be the offspring of a clash between two white dwarfs**



**Chris Lintott** was reading... *From an Amateur PN Candidate to the Rosetta Stone of SN Ia Research* by Andreas Ritter et al.  
Read it online at: [arxiv.org/abs/2311.03700](https://arxiv.org/abs/2311.03700)