

VSOTY 2025

GK Persei

On the morning of February 22nd 1901, the Rev. Thomas David Anderson observed a new second magnitude star shining in the constellation of Perseus from his home in Edinburgh. As one of Britain's finest ever observers, this was his second Nova discovery following T Aur in 1892, in addition to over fifty variable star discoveries [1]. The first Nova of the 20th century had been discovered, and more than 120 years later Nova Per 1901, or GK Per as it is now known, continues to keep amateur and professional astronomers interested.

The nova peaked at magnitude +0.2 a few days after discovery, then faded slowly to magnitude 4 in two weeks. Three weeks after discovery, the nova displayed 1.5 magnitude oscillations around a period of 4 days during a transition phase which lasted several months, before returning to minimum brightness eleven years later in 1912. Pre-discovery images were detected on photographic plates obtained at Harvard University, showing GK Per at a minimum brightness of a photographic magnitude of 13.0_{pg}. This equates to a 10,000 increase in the star's luminosity during the nova outburst.

In 1966, some 54 years after GK Per returned to minimum brightness, the first nova of the 20th century entered a second active phase with an outburst to magnitude 10.7 during the month of August. The outburst lasted around 16 days before GK Per returned to below magnitude 12, and then continued in its usual magnitude 12.0-13.0 variations. In the lead up to this outburst, the North American observer Leslie Peltier had recorded a short duration brightening to just below magnitude 11.0 during April of 1960, with no further unusual activity recorded until the 1966 outburst [2].

Following on from this outburst, GK Per has undergone regular outbursts to magnitude 10 roughly every three years, the last occurring during December 2022, with outbursts lasting on average 6-8 weeks and usually peaking just below magnitude 10, although the 2010 and 2015 outbursts were slightly brighter at around magnitude 9.5 visual. The old nova had now become a new 'Dwarf Nova.' Following an outburst in 1978, astronomers from Leicester University discovered X-ray flares using the Ariel 5 satellite, and further observations were undertaken with EXOSAT during the outburst of 1983, which pinned the X-ray pulsation period to 351 seconds. We now know that the magnetic field within the system is strong enough to truncate the inner areas of the accretion disc surrounding the white dwarf. These systems are called DQ Her stars (after Nova Her 1934, discovered by JP Manning Prentice, director of the BAA meteor section). To include the interesting history of this star into its official 'type' designation, GK Per is now classified as a NA/DQ+UG type object.

GK Per can be located at 03h 31m 12.01 +43 54 15.5 (J2000.0). The nearest naked eye star to the field is nu Per at magnitude 3.8, with GK Per lying some 2.9 degrees to the NW (PA 297.8 degrees) of this star. The field is circumpolar from 52 degrees north but passes a mere 6.5 degrees above the northern horizon during late spring, making May and June the most difficult times of the year to observe the field. When at quiescence, GK Per varies between magnitudes 12.5-13.5, and should be visible with 20cm telescopes in all but the most heavily light polluted skies. Being a cataclysmic variable star, it is recommended that the field be observed on a nightly basis.

The BAA Variable star section has been monitoring GK Per since the dwarf nova outbursts began in 1966. The light curve included here shows the last 50 years of activity recorded in the BAAVSS database. Charts are available for download from the BAAVSS web page:

<https://britastro.org/vss/xchartcat/gk-per .html>

References

1: The 'astronomizings' of Dr. Anderson and the curious case of the disappearing nova.
Jeremy Shears JBA 123, 5, 270-279, 2013

2: AAVSO Light Curve Generator <https://www.aavso.org/LCGv2/>

Light Curve for GK PER

