

When is a Nova Dwarf?

Nova Persei 1901, also known as GK Persei, rose to magnitude 0.2 in February 1901. Its subsequent fade back to minimum was remarkable in that it showed large cyclical variations with a period of 4 to 5 days and an amplitude of 1 to 2 magnitudes. These started about 20 days after maximum and continued for about 100 days before the smooth, final decline set in.

Over a decade later d'Esterre (in 1913) and Steavenson (in 1916) found that the nova was varying irregularly between magnitudes 11.7 and 13.2 at minimum. Further observations by Steavenson and Peek show it to have been fairly active during the years 1921 to 1932, varying more or less continually between mag 12.0 and 14.0, only occasionally settling down to quiescence at about mag 13.5. By the 1960s, however, the light-curve had become much more orderly, showing only isolated short-lived outbursts separated by long intervals of quiescence.

In 1974, GK Persei was added to the programme of the BAA Variable Star

Section. Figure 1 shows the observations that the Section has accumulated since. This light-curve shows a striking resemblance to that of a dwarf nova. Indeed, had the original nova outburst been missed then the star would probably be classified as a dwarf nova on the basis of its light-curve. This line of thought can lead to some interesting speculations. According to some theories, nova outbursts are recurrent on timescales of hundreds or thousands of years. Might not the 'truc' dwarf novae be dormant novae that will undergo further nova outbursts in the future? If this is so, then are there any indicators in a dwarf nova's light-curve that the next major outburst might be imminent?

However, before you all get carried away, I must point out that GK Persei would be a distinctly unusual dwarf nova if it were to be included in that class. The mean period between outbursts is several years rather than several months or weeks as for most dwarf novae – but there are dwarf novae known which have outburst periods measured in years. Like other novae and dwarf novae, GK Persei is a close binary system, but its orbital period is almost two days which is significantly longer than those for dwarf novae, which are all less than one day. Furthermore, its spectrum, both in quiescence and in outburst, is quite different from that of a dwarf nova.

For these and other reasons (the light echo and the expanding cloud of ejecta from the nova explosion, the surrounding cloud of gas and dust, the pulsed X-ray emissions, etc.) GK Persei is an object of great interest

to professional astronomers. However, as can be seen from Figure 1, the outbursts are relatively short and infrequent. Few professionals can afford to monitor the star continuously in the hope of detecting an outburst to study. This is one area where amateur astronomers can provide a valuable service by watching out for outbursts and alerting the professionals when they occur.

In this country (and Europe) the monitoring of 'recurrent objects' such as GK Persei is coordinated by the UK Nova/Supernova Patrol. Their Recurrent Objects Programme is a joint project run jointly by *The Astronomer* magazine and the BAA Variable Star Section. There are about 70 stars on the programme, all of which are thought to show occasional outbursts at irregular intervals. Most of these stars are fairly faint, even when at maximum, so you will need at least a medium-sized telescope (200mm aperture) to stand a good chance of catching them in outburst. This work can be quite demanding – you may have to make hundreds of negative observations before you detect your first outburst – but it can also be very rewarding.

Anyone with adequate instrumentation who is interested in joining in should contact the programme coordinator, Gary Poyner, at 67 Ellerton Road, Kingstanding, Birmingham B44 0QE.

Tristram Brelstaff, *Director, Variable Star Section*

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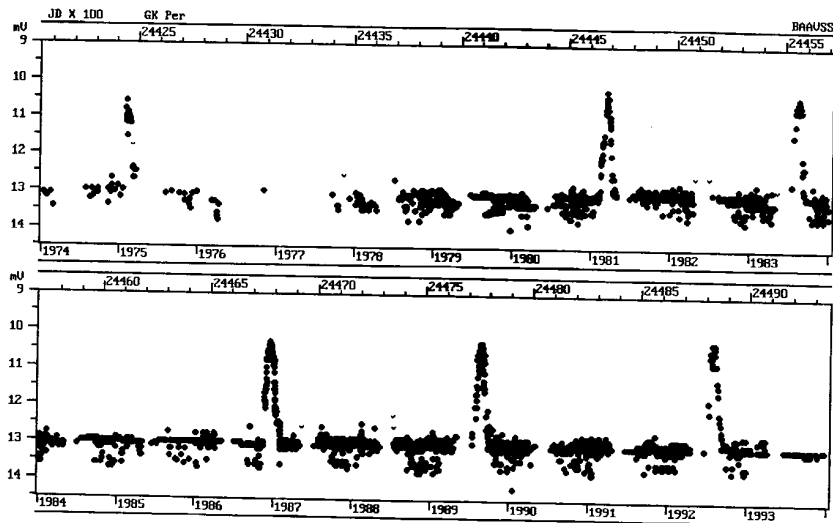


Figure 1. Visual light-curve of GK Per from 1974 to 1993, based on observations by the Variable Star Section. (Dave McAdam)