COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 2201

Konkoly Observatory
Budapest
1982 September 29
HU ISSN 0374-0676

PERIODIC VARIATIONS IN THE POLARIZATION OF V 603 Aql[+]

In August and September 1981 the linear and circular polarization of the old nova V 603 Aql has been observed (partly simultaneously with photometric observations) using the ESO two channel polarimeter at the 1m and 61cm telescopes. By technical reasons the observations have been performed during two sections separated by a gap of 11 nights. From the radial velocity measurements published by Kraft (1964) a low inclination angle of the nova system must be deduced. Therefore an extremely weak intrinsic polarization has to be expected and only a large number of measurements allows to draw conclusions about the system. This conflicts with the long integration time necessary for a single polarization measurement of a V~11.9 star (Haefner, 1981). As a compromise all measurements have been carried out with an integration time of 160 sec in the white light. Altogether 470 linear and 310 circular observations have been collected. The instrumental polarization was determined each night by measuring near distant stars. Since there is a clear difference between the spectroscopic period ($3^h19^m.5$) reported by Kraft (1964) and the photometric period ($3^h28^m.6$) found by Haefner (1981) it was a main point to check the polarimetric results for periodicities by correlation and periodogram techniques.

[+] Based on observations collected at the European Southern Observatory.

In the linear polarization no high significant period could be detected in the range from 3 min. to 6 hours. Only one period with $3^h33^m.8$ was more pronounced (see Fig. 1). Since this period does not coincide either with the spectroscopic or the photometric one an interpretation is difficult at the moment. However, it should be emphasized that this periodic variation was completely absent during the first section of observation and may be correlated with a special hump phenomenon in the light curve: During the second observation section an increase in the intensity with a duration of ~ 3 min. and an amplitude of ~ $0^m.2$ could be observed sporadically. This peak was superimposed to the broad hump observed by Haefner (1981) and had a mean period of about 3^h39^m. Shortly before and after this peak a remarkable increase in the scatter of the polarization values could be noticed.

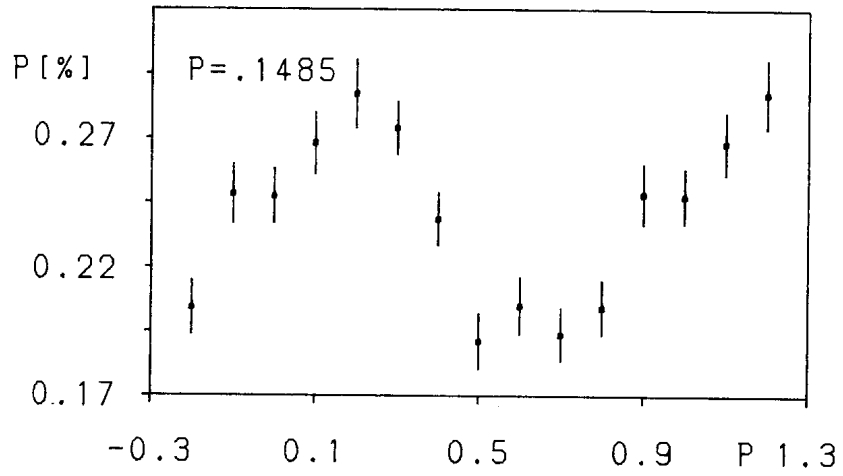

Fig. 1: Phase diagram of the degree of the linear polarization during section 2 (315 values). The vertical bars give the mean error within phase bins of 0.2.

In the circular polarization a highly significant period of $3^h18^m.2$ is present (Fig. 2). In terms of the usual model of

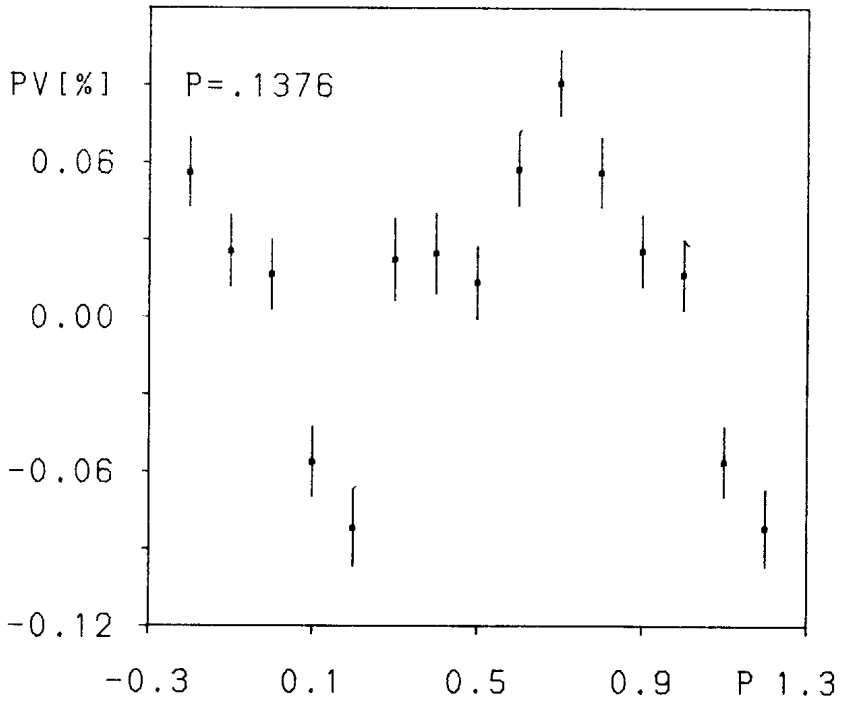

Fig. 2: Phase diagram of the normalized Stokes parameter V (310 values). The vertical bars give the mean error within phase bins of 0.2.

cataclysmic variables this polarization has to be ascribed to the white dwarf. Shape and change in sign of the Stokes parameter V suggests a magnetic rotator. However this would imply that the white dwarf would rotate almost synchroneously like the AM Herculis type stars.

More detailed results which also take into account spectroscopic and photometric measurements will be published elsewhere.

K. METZ
Universitäts-Sternwarte
Scheinerstr. 1
D-8000 München 80
Germany

References:

Kraft, R. P. 1964, Astrophys. Jour. 139, 457
Haefner, R. 1981, IBVS, No. 2045