

COMMISSIONS 27 AND 42 OF THE IAU
 INFORMATION BULLETIN ON VARIABLE STARS
 Number 4225

Konkoly Observatory
 Budapest
 10 August 1995
HU ISSN 0374 – 0676

1994 PHOTOMETRY OF BH VIRGINIS

BH Virginis (#117 in the catalog of Strassmeier et al., 1993) is a member of the short period eclipsing RS CVn class of stars. Budding and Zeilik (1987) first modeled the spots on this star. Zeilik et al. (1990) modeled the spot structure for available data from 1953 to 1986. Heckert and Summers (1994) modeled 1993 light curves. In this work, we continue to observe BH Vir.

We observed BH Vir on the nights of 13, 14, 15, 16, 17, 20, and 21 May 1994 using the San Diego State University 61-cm telescope on Mt. Laguna. We used the same instrument and comparison star as for the 1993 data (Heckert and Summers 1994). Our data, plotted in Figures 1 and 2, are differential magnitudes (star-comparison) in the standard Johnson Cousins system.

To model the data, we used the Information Limit Optimization Technique (ILOT) described in detail by Budding and Zeilik (1987). From the initial binary star fits we extract a distortion wave. We then fit the distortion wave for the longitude and radius of two circular spots at 0K. Being unable to fit the latitudes, the most difficult parameter to fit, we held them constant at 45° for both spots. After fitting the spots, we remove the spot effect to find a clean fit for the binary star parameters. The fits for each wavelength are performed independently. We get:

Spot fits

	B band	V band	R band	I band
Longitude ₁	45.2±5.3	53.3±6.8	50.5±15.2	42.6±15.3
Latitude ₁	45	45	45	45
Radius ₁	13.8±0.5	12.3±0.7	10.5±1.6	10.8±1.5
Longitude ₂	133.1±4.3	142.7±6.4	138.5±11.6	145.0±10.4
Latitude ₂	45	45	45	45
Radius ₂	15.8±0.5	13.4±0.8	13.1±1.5	14.0±1.4
χ ²	156.3	98.4	21.2	16.9

Clean fits

	B band	V band	R band	I band
L ₁	0.654±0.017	0.628±0.022	0.620±0.028	0.608±0.033
k(=r ₂ /r ₁)	0.918±0.033	0.936±0.042	0.917±0.053	0.924±0.062
r ₁	0.245±0.004	0.245±0.005	0.249±0.007	0.248±0.008
i(deg)	86.8±0.4	86.8±0.4	87.3±0.6	87.1±0.6
L ₂	0.329±0.018	0.356±0.023	0.363±0.029	0.378±0.034
χ ²	144.8	85.4	73.2	57.8

BH VIRGINIS - 1994

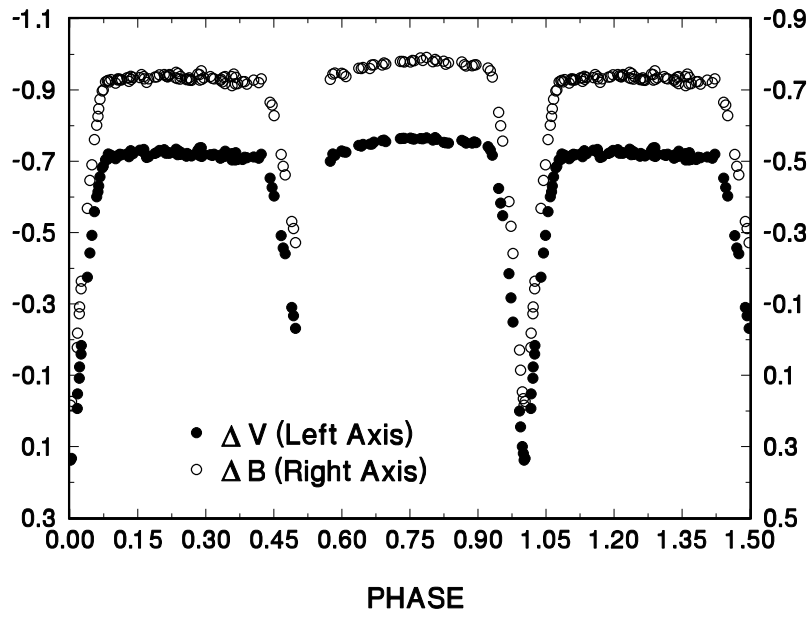


Figure 1

BH VIRGINIS - 1994

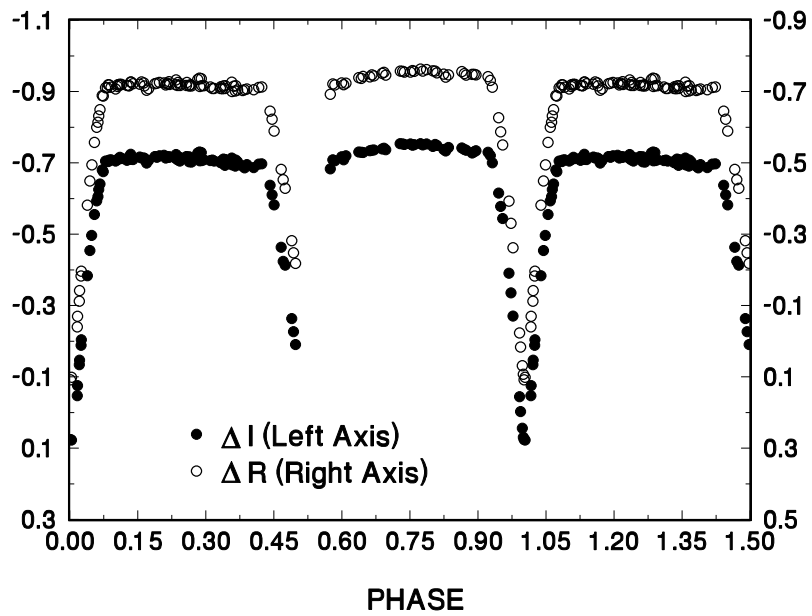


Figure 2

BH VIRGINIS - 1994

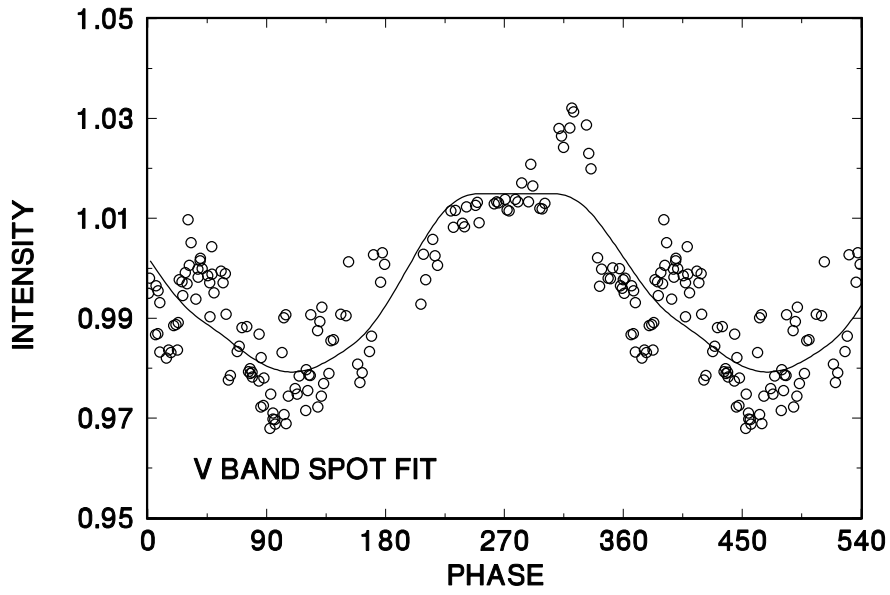


Figure 3

BH VIRGINIS - 1994

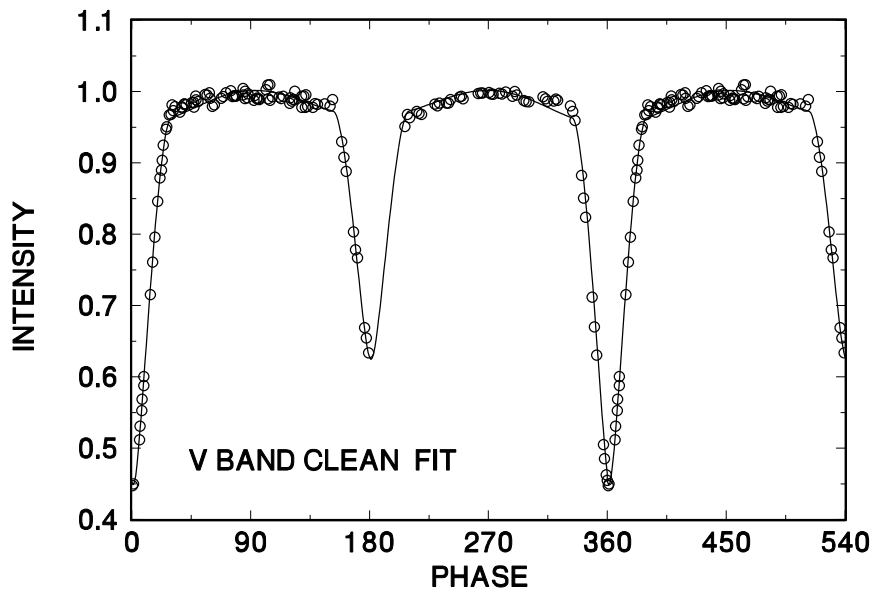


Figure 4

The clean fit parameters are as defined by Budding and Zeilik (1987). L_1 and L_2 are the fractional luminosities of the primary and secondary stars, and i is the orbital inclination. The primary and secondary radii, r_1 and r_2 , are in units of the semi-major axis of the orbit. Figures 3 and 4 show our spot fit and final clean fit for the V band. Note that the models in the different bands agree well. Zeilik et al. (1990) find that the spots for BH Vir tend to cluster in Active Longitude Belts at 90° and 270° . Our models show the same phenomenon. During 1993 the spot was in the 270° ALB, but during 1994 the spots were both in the 90° ALB. Two spots in the same ALB is rather unusual for these short period RS CVns, however two spots fit the data much better than a single larger spot. The results of our clean fits agree well with those of Zeilik et al. (1990).

We thank Ron Angione for scheduling generous amounts of observing time at Mt. Laguna. PAH received support from a Cottrell College Science Award of The Research Corporation for this work.

P.A. HECKERT
 Dept. of Chem. & Physics
 Western Carolina University
 Cullowhee, NC 28723
 USA

D.L. SUMMERS
 Kitt Peak National Observatory
 National Optical Astronomy
 Observatories
 Tucson, AZ 85727
 USA

References:

- Budding, E. and Zeilik, M., 1987, *Astrophys. J.*, *319*, 827
 Heckert, P.A. and Summers, D.L., 1994, *Info. Bull. on Var. Stars.*, No. 4062
 Strassmeier, K., et al., 1993, *Astron. & Astrophys. Suppl.*, **100**, 173
 Zeilik, M., Ledlow, M., Rhodes, M., Arevalo, M.J., and Budding, E., 1990, *Astrophys. J.*, **354**, 352