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1993 BVRI 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. However, BH Vir has been observed too infrequently during this time period to provide information on the spot evolution. We therefore started a program to systematically observe BH Vir.

We observed BH Vir on the nights of 22, 24, 25, 26, 27, 28, 29, and 30 July 1993 using the San Diego State University 61-cm telescope on Mt. Laguna. The telescope is equipped with a photometer using a Hamamatsu R943-02 tube operated at -1450V and cooled to -15°C. The BVRI filters are chosen to closely match the Johnson Cousins system. Our comparison star was star 0476 in region 4968 of the Hubble Guide Star Catalog. July is rather late in the observing season for BH Vir, so we were only able to observe it for a short time each night. Therefore our light curves have only 60 points, and contain significant gaps. We do however have enough data to model the spots. 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, latitude, and radius of circular spots at 0K. The fits for each wavelength are performed independently. We get:

	B band	V band	R band	I band
Longitude	282.5±4.9	271.4±5.3	281.9±6.7	278.7±6.4
Latitude	81.7±0.8	80.5±0.9	83.1±0.9	83.0±0.8
Radius	38.2±0.5	34.1±0.5	35.1±0.5	35.6±0.5
χ^2	84.36	56.1	50.1	51.8

Figures 3 and 4 show our initial binary star fit and our spot 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, with the spot being in the 270° ALB. It is difficult to be certain because many latitudes were adopted values, but the spot models of Zeilik et al. (1990) tend to be at mid latitudes (~45°) and about 10° in radius. Our 1993 models show a much larger high latitude

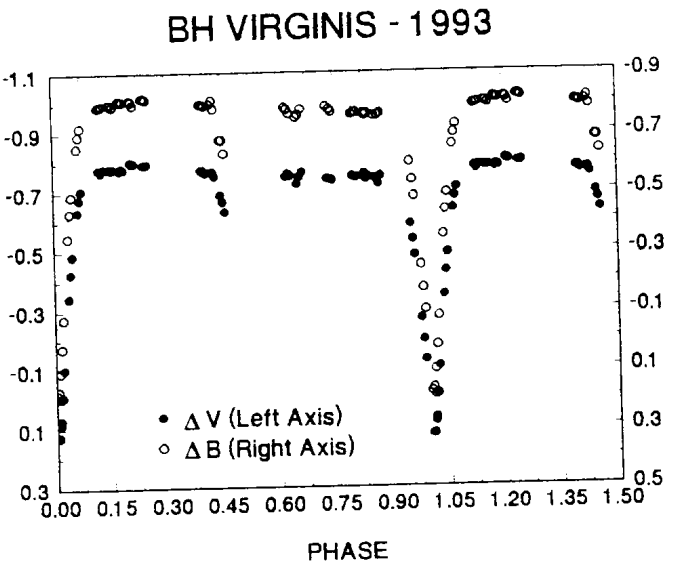

Figure 1

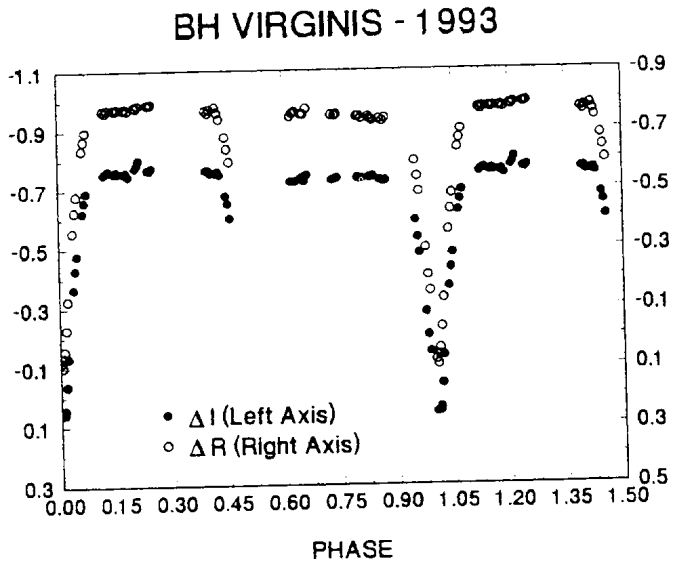

Figure 2

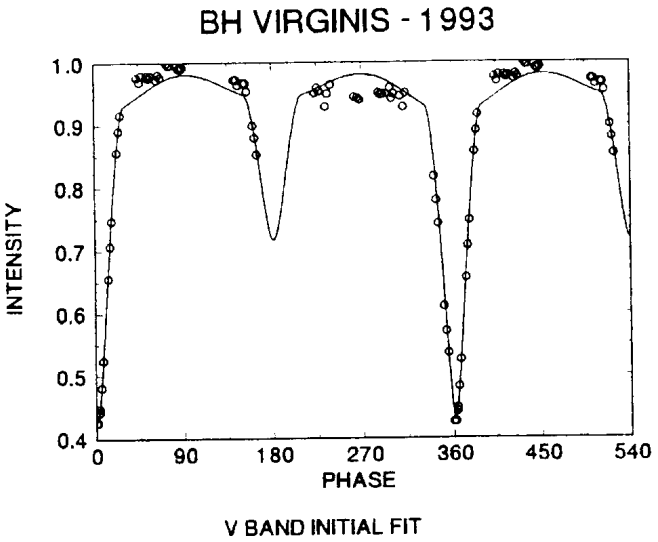

Figure 3

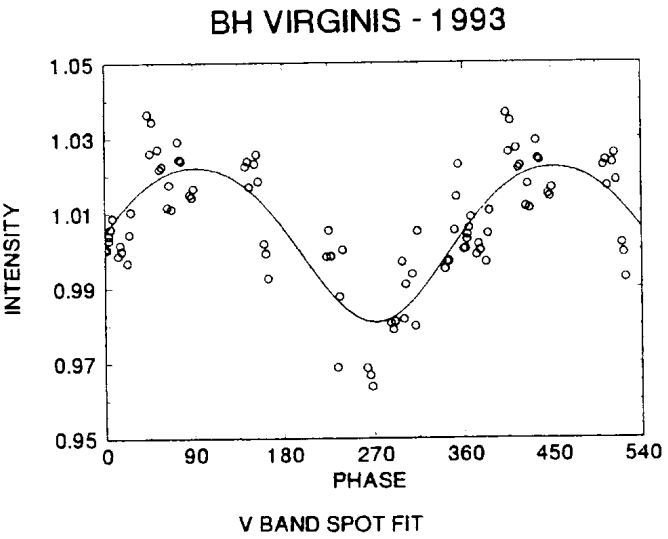

Figure 4

spot, indicating that the spots on this star can vary considerably in latitude. Consistent observations over a longer time period are needed to unravel the behavior patterns of the spots on this system.

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