CCD PHOTOMETRY OF BX PEGASI IN 1990

Seven hundred and thirty-four CCD images of the W UMa type star BX Peg were obtained by the authors during the Fall of 1990 using the U. S. Naval Observatory 0.61-meter Cassegrain telescope at Washington, DC and a Metachrome-II coated Thomson CSF THX31156 1Kx1K CCD. The effective field of view is approximately eight arc minutes square at prime focus. A "wide red" (H alpha-H beta-calcium) filter was employed for 706 images and "v" (GG495(2.6mm) + BG39(1.8mm)) was used for 28 images.

The DAOPHOT photometry package, Stetson (1987), was used in synthetic aperture mode for five of the brightest stars in the CCD field. Differential instrumental magnitude light curves were constructed for each night's run. The method of Kwee and van Woerden (1956) was used to determine the times of minima. Ephemerides given by Samec (1990) produced light curves where the primary minima were shifted approximately -0.1 phase. An O-C diagram based on Samec's linear ephemeris and table of times of minima and our time of minima reveals an apparent instantaneous period change which occurred near Julian Date 2446700.0. Photoelectric and CCD times of primary minima from Samec and wide red filter primary times from this study were used in a linear least squares fit to improve the ephemerides. The following new linear ephemerides were found for the associated time intervals.

2443790 to 2446700
$$\text{JD Hel Min I} = 2445651.32225 + 0.28042068 * E \qquad (1)$$
$$\pm 28 \qquad\qquad \pm 6$$

2446700 to present
$$\text{JD Hel Min I} = 2448174.53105 + 0.28041747 * E \qquad (2)$$
$$\pm 31 \qquad\qquad \pm 10$$

Figure 1 is the "wide red" filter differential magnitudes versus phase computed using Equation 2. Cycle to cycle variations in the light curve are evident. Table 1 gives the times of primary and secondary minima found in this study reduced to Equation 2. Figure 2 is a plot of the O-C's of all known photoelectric and CCD determined minima reduced using Equation 2. Minima given in Samec are denoted with asterisks and minima from this work with filled circles. Secondary minima were shifted by one half cycle for plotting. Lines indicate the two periods over the interval of applicability.

Table 1. New observed epochs of primary and secondary minima
fit to Equation 2.

PRIMARY MINIMA

Filter	HJD	Mean Error (Days)	Cycles	O-C (Days)
"wide red"	2448174.5303	0.000119	0.0	-0.0008
"wide red"	2448213.5094	0.000113	139.0	0.0003
"wide red"	2448225.5672	0.000098	182.0	0.0002
"v"	2448225.5681	0.000697	182.0	0.0011

SECONDARY MINIMUM

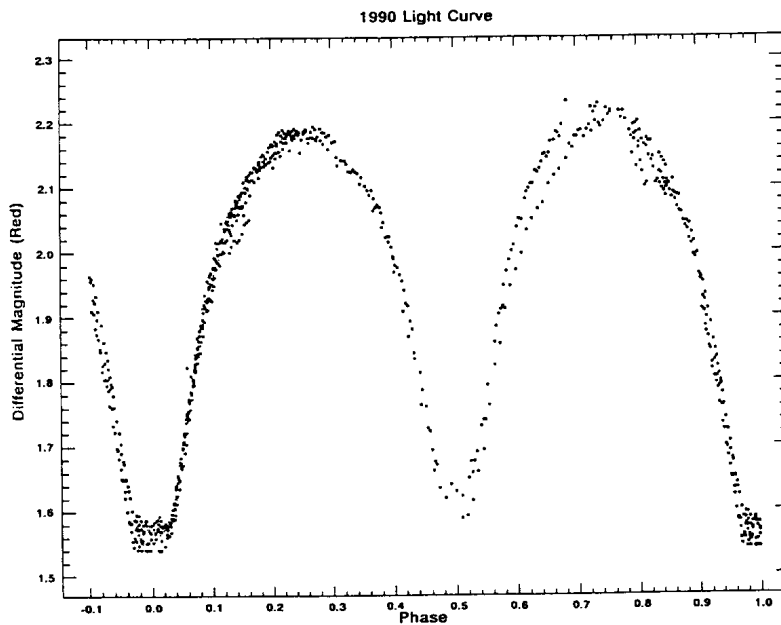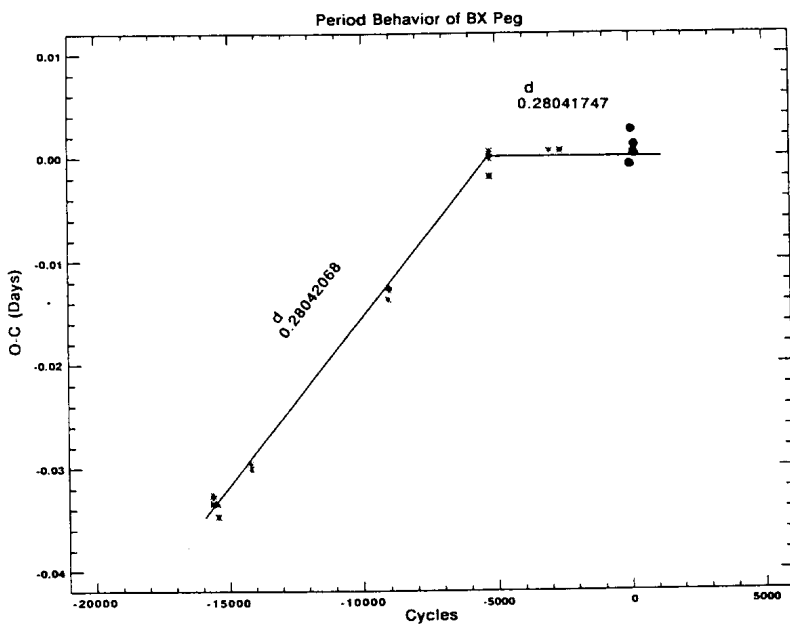| Filter	HJD	Mean Error (Days)	Cycles	O-C (Days)
"wide red"	2448191.49887	0.000151	60.5	0.0026

Figure 1

Figure 2

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Kwee, K. K. and van Woerden, H., 1956, *Bull. Astron. Netherlands* 12, 327.
Samec, R. G., 1990, *Astron. Journ.* 100, 808.
Stetson, P. B., 1987, *Publ. Astron. Soc. Pacific* 99, 191.