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The Changing Blazhko Effect of XZ Cygni

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Abstract. An analysis of new and old photometry of the RR Lyrae star XZ Cyg indicates that both its primary period and its Blazhko period have undergone significant changes.

1. Introduction

Blazhko (1922) discovered that the RRab star XZ Cygni displays what has come to be known as the Blazhko effect, a modulation of the primary light curve of an RR Lyrae star with a period typically of tens of days. Later studies found that the Blazhko period of XZ Cyg increased from about 57.3 to 58.3 days near JD 2438500, coincident with a decrease in the primary pulsation period (Baldwin, 1973; Smith, 1975; Kunchev, 1975; Pop, 1975). The reported change in the Blazhko period of XZ Cyg is of interest because several theoretical explanations of the phenomenon require that the Blazhko period equal the rotation period of the star (e.g. Shibahashi, 2000). Because it is difficult to envision a mechanism for causing such a large sudden change in the rotation period of an RRab star, the reported change in the Blazhko period might cause difficulties for some theories of the Blazhko effect. We have analyzed old observations and obtained new observations of XZ Cyg to verify the reported changes in its Blazhko period.

2. CCD Photometry

Beginning in 1999, we used the 60-cm telescope of the Michigan State University Observatory to obtain V band photometry of XZ Cyg. The resultant light curve (Fig. 1) shows that XZ Cyg is still subject to a substantial Blazhko effect, a result also confirmed by recent AAVSO visual observations.

3. The Blazhko Period

Our analysis confirms previous results that the primary period of XZ Cyg decreased from about 0.46658 d to 0.46645 d after JD 2438500. We also confirm

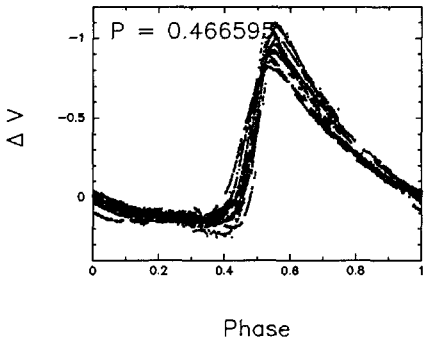

Figure 1. The light curve of XZ Cygni folded with a period of 0.466595 d, based upon CCD photometry obtained from 1999-2001.

previous results that the Blazhko period increased at that time. More recently, the primary period of XZ Cyg has increased to 0.4666 d, close to the value it had before its decrease. A preliminary analysis of recent observations indicates that the Blazhko period of XZ Cyg decreased to near 57 d coincidentally with the increase in the primary period.

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