Campaign '04: AAVSO Observing Campaigns in 2004

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Presented at a memorial symposium in honor of Dr. Janet A. Mattei, Brandeis University, Waltham, MA, October 29, 2004; received May 5, 2005; accepted May 7, 2005

Abstract Dedicated, intensive observing campaigns on specific targets can help to uncover much about individual variable stars. We discuss three of the AAVSO's dedicated observing campaigns undertaken in 2004: the dwarf novae BZ UMa and Var Her 04, and the extrasolar planet transit candidate IL Aqr.

1. Introduction

For many years, the AAVSO has provided support to professional astronomers conducting large observing campaigns. In the past, we have supported target-of-opportunity program observations at nearly all wavelengths from the radio to the X-ray, and AAVSO observations have often played a pivotal role in the rapid triggering of satellite observations of time-critical events such as dwarf novae outbursts. This scientifically fruitful work is part of the core mission of the AAVSO and will continue in the future. However, in addition to this *supporting* role, the AAVSO is undertaking a more active program of organizing and running *observing campaigns* from AAVSO Headquarters. Several members of the AAVSO staff are interested in doing their own science, and our observing community is interested in and capable of working with AAVSO staff on these new projects. We believe that the AAVSO Observing Campaigns have been and will continue to be a fruitful avenue of scientific research. We have already conducted observing campaigns on several dwarf novae and related systems and on planetary transit systems, but nearly any type of variable star is a suitable target for an observing campaign.

The AAVSO's communications infrastructure is uniquely suited to organize and run observing campaigns. The AAVSO has developed the several avenues of communication via internet that enable us to plan, announce, and collect data for our observing campaigns very quickly. The AAVSO's traditional means of rapid communication—the *Alert Notices* and *CCD Views*—have moved into the digital age, and are now distributed nearly instantaneously via our website and by email as well as by more traditional distribution methods. In addition, web features such as *MyNewsFlash* and *WebObs* enable our observing community to commence observations quickly on targets of interest, and to submit data as soon as observations are made or the digital data are processed. The AAVSO website also facilitates sharing information about the status of observing campaigns and announcing results as soon as they are obtained. This provides the observing community not

only with information about what observations are needed, but also feedback on how and why their data are being used.

2. BZ UMa

In 2004, several notable observing campaigns were undertaken, including two campaigns on new and interesting cataclysmic variables (CV): the known cataclysmic variable BZ UMa, and the newly discovered system Var Her 04. BZ UMa (R.A. 08^h 53^m $44^s.2$ Dec. +57° 48' 42" (2000)) has long been known as a dwarf nova system, but little is known about its behavior. Though suspected of being a SU UMa-type dwarf nova, BZ UMa has not exhibited common hallmarks of SU UMa behavior (such as superhumps). Also, although it is a bright X-ray source, it is not known whether it is a magnetic system. In mid-April of 2004, AP organized a CCD observing campaign on this system during quiescence, which obtained nearly continuous coverage between April 17 and 19. From an observational standpoint, the observing campaign was highly successful. Observers from around the world participated, and the AAVSO obtained nearly 17 hours of continuous coverage at one point during the campaign. The scientific results, while inconclusive, showed how enigmatic the system is. Despite the near-continuous photometric coverage, no significant periodic behavior was detected. However, AAVSO observers observed flaring activity during one night. This paper is currently in preparation.

3. Var Her 04

The AAVSO observing campaign on Var Her 04 (see Figure 1) (R.A. 18^h 39^m $26^s.6$ Dec. +26° 04' 10" (2000)) produced more concrete results. The object was discovered by Y. Nakamura of Japan on June 13, 2004, and the AAVSO quickly organized an intensive campaign of observations. Using the CCD data obtained by AAVSO observers, we were quickly able to discover a very short orbital period of 0.056 day, and the large outburst amplitude of this object suggested it could be a WZ Sge-type dwarf nova. Subsequent detection of the superhump period produced an anomalously low mass-ratio, suggesting Var Her 04 could be a "post period-bounce" object, a still more elite class of dwarf novae. Once again, AP quickly completed a paper on the campaign results, and the paper was subsequently published in *Publications of the Astronomical Society of the Pacific* (2004, *PASP* **116**, 117)—after being accepted for publication only one day after submission!

4. Planetary transits

In addition to CV research, the AAVSO has also undertaken a program to study planetary transit systems, a new type of object for the AAVSO community. These exciting new variable stars—eclipsing "binaries" in which the eclipsing secondary is a *planet* rather than a star—have been enthusiastically integrated into the observing activities of AAVSO CCD observers. In October 2004, the AAVSO

initiated a campaign on the transit candidate IL Aqr (= Gleise 876) (R.A. $22^h\ 53^m\ 17^s$ Dec. +14° 15' 49" (2000)) in cooperation with *transitsearch.org*. Observations were conducted by AAVSO observers, and are still being studied.

5. Conclusions

The internal observing campaigns run by the AAVSO in 2004 produced important scientific results, publications for AAVSO Headquarters and participating observers, and enthusiasm within the observing community. These campaigns have proven that not only can the AAVSO provide a *supporting* role for science collaborators, but it can also conduct cutting-edge science programs of its own, directly involving AAVSO staff and observers in the process.

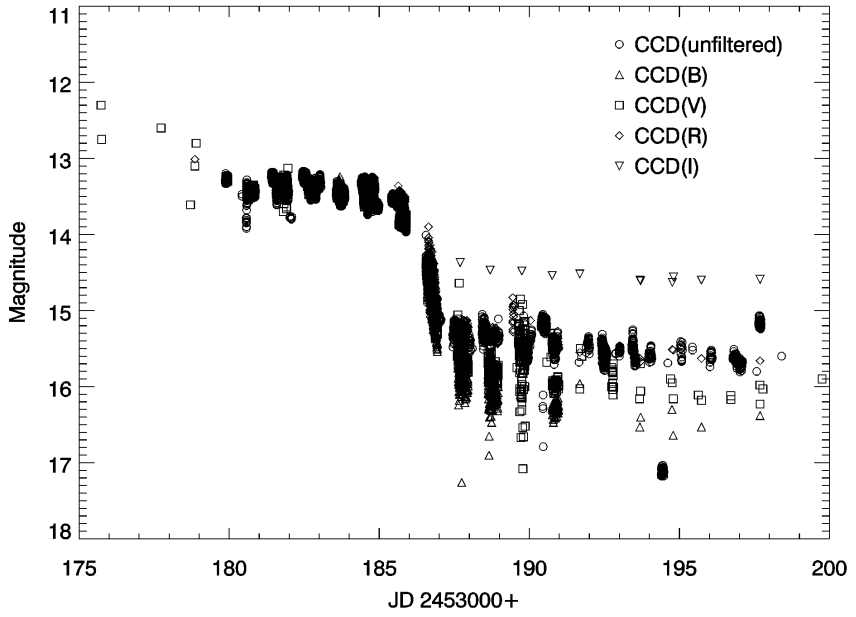

Figure 1. AAVSO CCD light curve for the Var Her 04 campaign. AAVSO CCD observers made nearly 9000 observations of this star during the campaign. Subsequent analysis of the data indicated this star is likely a WZ Sge-type dwarf nova.