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The Rapid Burster

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47.06

Ultraviolet Spectroscopy of X-Ray Nova Muscae 1991 During Outburst

C.R. Shrader (CSC/GSFC)

The transient X-ray source Nova Muscae 1991, also designated GS 1124-683 and GRS 1124-684, was discovered independently by the GINGA all sky monitor experiment and the "WATCH" transient source experiment of GRANAT on January 8, 1991. It was subsequently identified with an optical counterpart which brightened to $V=13.4$ by January 15. Examination of pre-outburst plates revealed an apparent $R=21.5$ progenitor. Nova Muscae exhibited remarkable energetics in the various energy bands covered by GINGA and GRANAT with a nominal e-folding time of 40 days. We report on a series of ultraviolet spectroscopic observations made with IUE, sampling critical stages of the outburst evolution. The ultraviolet data during outburst maximum reveal a hot continuum, extending shortwards of Ly- α $\lambda 1216$ and with prominent high excitation lines at C IV $\lambda 1549$ and N V $\lambda 1240$. The spectra exhibited moderate continuum evolution as well as variation in emission line properties, and the intermittent appearance of lines at He II $\lambda 1640$, O V $\lambda 1375$ and Mg II $\lambda 2800$. Preliminary interpretation of the data in relation to observations at other wavelength bands is presented. Possible implications on current models of transient X-ray sources are discussed.

47.07

The Metallicity of Southern Hemisphere RV Tauri Stars from Moderate Resolution Vidicon Spectra

S.R. Baird (Benedictine College and University of Kansas)

A grid of model atmospheres with $4000 \leq T_{\text{eff}} \leq 8500$, $\log Z = 0, -1, \text{ and } -2$, and a range of surface gravities has been used with the spectrum synthesis program MOOG (developed by Chris Sneden) to find the metallicities of rarely observed RV Tauri and semi-regular variables visible in the southern hemisphere. The abundances have been found by comparing the strengths of twelve blended spectral features which are measurable in the observed spectra with the spectrum synthesis calculations. Five color UBVR photometry for these stars was obtained simultaneously by Dennis Dawson and the author so the phases at which the spectra were obtained have been established. This has allowed spectra contaminated by the emissions of rising light to be eliminated from the analysis and spectra taken during rapidly changing phases to be given lower weight. Spectra have been obtained for 40 stars, but it is unlikely all 40 will be analyzed by the time this paper is presented. However a cross-section of the stars will be presented, including stars toward the galactic center, stars elsewhere in the galactic plane, stars out of the galactic plane, and stars in globular clusters.

47.08

Photopolarimetry of V2051 Ophiuchi

P. Barrett (USRA)

The Cataclysmic Variable (CV) V2051 Oph is one of few stars with orbital periods less than two hours which do not belong to either the AM Her or SU UMa class of CVs. The AM Her stars are strong X-ray sources and emit highly circularly polarized light. The SU UMa stars are superoutbursting dwarf novae.

Warner and O'Donoghue (1987) suggest that V2051 Oph is a low-field polar ($B \sim 10^6$ G) which would explain the lack of circular polarization. The lack of detection as an X-ray source is explained by the disc obscuring the white dwarf in this eclipsing system.

Cropper (1986) observes the circular polarimetry of V2051 Oph to be $-0.15 \pm 0.08\%$ and the linear polarimetry to be $0.46 \pm 0.12\%$ @ 97 ± 9 deg. This paper presents new observations of V2051 Oph which sets similar limits on the circular polarization but indicate small changes in the linear polarization. The linear polarization of field stars within 1 deg. of V2051 Oph indicates that as much as 50% of the linear polarization is intrinsic and is not due to the interstellar medium. A possible reason for such linear polarization is reprocessed X-rays.

Session 48: X-Ray Binaries and Pulsars**Display Session****Grand Ballrooms I & II**

48.01

The Rapid Burster

L.M. Lubin, W.H.G. Lewin, J. Tan (MIT), J. van Paradijs, M. van der Klis (Univ. of Amsterdam), L. Stella (ICRA)

Type II bursts (due to spasmodic accretion) from the Rapid Burster can last from ~ 2 to ~ 680 sec. Short (< 30 sec) type II bursts often show successive peaks, "ringing," in their burst decay portion. When the bursts last longer than ~ 30 sec, they tend to saturate and have approximately "flat-tops" before they start their decay. Our study of burst profiles includes type II bursts of all known durations. Very globally, with increasing burst duration the relative length of the approximately flat-top of the bursts increases at the expense of the number of oscillations ("ringing") during burst decay. Additionally, as the bursts are greatly reduced in fluence, they can become completely oscillatory and erratic in nature.

Just prior to a strong and long (> 100 sec) type II burst the persistent emission, often observed between bursts, dips down or disappears all together. After the type II burst there is a mirror image. We found between several long type II bursts very unusual oscillations in the persistent emission. The oscillations, whose period (~ 25 sec) decreases as the oscillations die out, immediately follow the dip after the bursts. Independently, we found several cases whereby the profile of the persistent emission (including dips and bumps) were nearly identical.

48.02

Real and Apparent Quasiperiodicities in Pulsar Timing Residuals

M. Scott, P. Boynton (U.Wash.)

A Monte Carlo investigation is conducted of the statistical properties of simulated pulsar timing residuals. The residuals result from a polynomial fits to simulated data containing a polynomial trend and superposed random walks. The investigation was motivated by the discovery of an approximately 20 month periodicity in the timing residual of the Crab pulsar during the six