ABSTRACTS

23.07 Power Density Spectra of X-Ray Sources Exhibiting Aperiodic Variability. H. BRADT, J. DOTY, J.G. JENKINS, R. KELLEY, E. MORGAN, L. PETRO, R. REMILLARD, and B. SCHMATZ, Massachusetts Institute of Technology -- The characterization of aperiodic variability in X-ray sources is one objective of a major reanalysis of the SAS-3 data base. Currently we are presenting data in the form of Power Density Spectra on log-log plots to characterize the broadband temporal behavior of the sources in frequency space. The behavior of sources as diverse as Cyg X-1, cir X-1, GX301-2, and Sco X-1 will be presented. One objective of this program is to define empirical parameters (e.g. power-law indices) which might be useful in the description of the several states of the several types of sources. In turn these might be amenable to comparison with theoretical models.

This work has been supported in part by NASA contract NAS5-24441.

23.08 High Energy X-Ray Studies of the 35d Cycle of Her X-1. A. GORECKI, R. BAUTZ, F. LANG, A. LEVINE, F. PRIMAK, W. H. G. LEWIN, and D. GRUBER, W. BAITY, R. ROTHCHILD, UCSD -- Her X-1 was observed in high energy X-rays (13-80 keV) over 2 complete 35d cycles in 1978 with the UCSD/MIT instrument (AX) aboard HEAO-1. Both the normal (N) state and short (S) state are apparent in the results. The "short" (S) state occurs during days 20-27 after the "normal" (N) state begins. The average intensity of Her X-1 in this interval is ~30% of the intensity during the "normal" (N) state. Pre-eclipse and anomalous dips are also detected during the "normal" (N) state.

*This research was sponsored in part by NASA under Contract Grant NAS8-27975.

23.09 X-ray Timing Observations of 4U1626-67. D. LEAHY, W. Barbro, R. F. Elsner, M. C. Weisskopf, NASA/MSFC; P. G. Sutherland, Univ. of Texas; J. E. Grundlay, S. M. Kohn, CFA -- The pulsed X-ray source 4U1626-67 was observed with the Monitor Proportional Counter (MPC) on the Einstein (HEAO-2) Observatory on two occasions in February and March 1979. The mean 2-10 keV X-ray luminosity during these observations is 6x10^{34} erg s^-1, where d is the distance in kpcs. For the same energy band, this is roughly comparable to that observed earlier by SAS-3 and HEAO-1. These data also show flares similar to those discovered by SAS-3. Using high time resolution data from the Time Interval Processor (TIP) circuitry of the MPC, we utilize a cross correlation technique to generate pulse arrival times for each day of observation. These times are then analyzed in standard ways to determine the pulse period and to search for orbital motion. Our best present value for the pulse period is 7.677631 ± 0.000013 s on JD 2443,946.5. At the reported orbital period (~419s) we find an upper limit to a8,9+n/2 of 0.5 It is 295 confidence), providing confirmation for the slightly lower upper limit (0.04 it s) obtained from HEAO-1 data. The overall spin-down continues at a rate found in earlier observations, and we discuss the period history of this source. Finally we discuss the behavior of the pulse shape as a function of time.

23.10 Einstein X-ray Observations of the 5.2 Hour X-ray Binary 4U2129+47, J.R. McCLOEDT, MIT, R.A. LONDON, CFA, S. R. RICHARDS, LSU, and A.D. GRAUER, LSU/AUUIL -- We observed the 5.2 hour X-ray binary 4U2129+47 for a full orbital cycle using the Einstein IPC and MPC detectors. We also made simultaneous photometric observations at the LSU and the Magraw-Hill Observatories. The two most important findings are: (1) The shapes of the 5.2 hour X-ray light curves are independent of energy (E < 7 keV); (2) A partial X-ray eclipse occurred during a well-defined interval which lasted 20% of the orbital period. During this interval the intensity varied smoothly by a factor of 3 and the light curve was symmetric relative to the time of minimum. These findings argue that the X-ray emitting region is extended (~10^3 cm) and highly ionized. We present a coronal model for the X-ray source.

This research has been supported in part by NASA contracts NAS5-24441 and NAS8-27972 and AFOSR grant 77-3218.

23.11 Tentative Identification of the Flaring X-Ray Source HDE256514. R.B. DOGGETT, J.R. McCLOEDT, L. PETRO and R. REMILLARD, Massachusetts Institute of Technology, D.A. SCHWARTZ, Harvard-Smithsonian Center for Astrophysics -- The transient X-ray source HDE256514 was observed by HEAO-1 during a one day flare of intensity ~15 μJy (1.5 - 15 keV) on 12 August, 1978. Several possible precise positions for the source have been determined with the A-3 Scanning Modulation Collimator experiment. A photoelectric photometry survey of the objects in these high latitude (b ≥ -42°) fields has revealed only one likely candidate, an object with F ~ 1.6 ± 0.5, U - B = -0.5 ± 0.5, B - V = 0.49 ± 0.05. Subsequent spectroheliometry revealed that the object has the spectrum of a normal G type star. The ultraviolet excess is somewhat larger than that of a line of extreme P and additionally very large (~3). Follow-up optical and X-ray studies with the Einstein Observatory will be discussed.

This work has been supported in part by the National Aeronautics and Space Administration under contracts NAS8-27972 and NAS8-30543.