20 JUNE 1983
MONDAY MORNING
Session 1: Supernovae, Variable Stars
0900–1200 (East Ballroom)

Invited Talk (0900–0950)

01.01 The Next Decade in Planetary Exploration
D. MORRISON, U. HI.

01.02 Cygnus X-1: Optical Counterparts of the 294-day X-ray Period. J. KEMP, G. HENSON, D. KRAUS, T. NOLT, J. RADOStITZ, Physics, U. of Oregon; M. BARBOUR, CSTM, Hawaii; W. PRIENDHORSKY, J. TERRELL, Los Alamos; and E.N. WALKER, BDO. Relative to the newly found 294-day X-ray modulation (1,2,3,4), optical data from up to 15 years' observations show: (a) A direct 294-day light variation of 0.01 peak/peak amplitude in B and U bands. The light and X-ray curves are non-sinusoidal with coincident eclipse-like minima, epoch JD 2440000.25. (b) Shape changes in the 516 orbital B and U curves, on the 294-day cycle; around orbital phase 0.5 (unseen secondary in front) the curves are oddly shielded from the 294-day process, while at other phases the light varies on that cycle. This again suggests an "inner eclipse" (5) near phase 0.5. And (c) a polarization modulation; the 7-year V-band record shows dip-like excursions coinciding with the 294-day X-ray and light minima.

(1) Priendhorsky and Terrell, BAAAS, 14, 618.
(3) Sky & Te/l., March 83, News Letters.

01.03 EINSTEIN OCS/NPC OBSERVATIONS OF CYGNUS X-1.* S. DIL VETTLEK and S.M. KARN, Columbus U., F.D. SMYRNO and J.F. CRIMMELAY, CFA - We present observations of Cygnus X-1 (4U 2125+38) obtained simultaneously with the Einstein Objective Grating Spectrometer (OCS) and the Monitor Proportional Counter (NPC). Approximately 1.6 x 10^6 seconds of data, contiguous except for earth occultation, were analyzed. Both the OCS (0.3–2 keV) and the NPC (2–10 keV) data are well fitted by a thermal bremsstrahlung model with kT ~ 5 keV. The data show evidence of quasi-periodic dips in intensity in both the OCS and NPC. These range from 100–700 seconds in duration spaced ~2000 seconds apart. Spectral fits indicate slight increases in absorbing column density during the dip; however, the reduction in intensity is not consistent with absorption by neutral/cosmic-abundance intervening material. Possible implications of these results in terms of the structure of accreting material in the Cyg X-2 system will be discussed.

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01.04 New Optical Identifications of X-ray Sources from the HEAO A-3 Scanning Modulation Collimator.
J. PATTERSON, W. ROBERTS, D.A. SCHWARTZ, CFA; R. RIKILLANG, E. MORGAN, N. BRADY, MIT. - The modulation collimator experiment on HEAO-A is designed to produce fairly precise (~2 arc-min^2), multiple error regions for strong X-ray sources. There are still ~100 sources which are detected by this experiment with F(2-6 keV) ~ 1-2 solar, but remain optically unidentified. From optical photometry and spectroscopy, we have been systematically searching these error regions in an effort to detect the optical counterparts. Here we report 6 new and very likely identifications: HZ252+468, a possible BL Lac object: HZ502+035, a Type I Seyfert galaxy with a redshift z ~ 0.02; 11413-18, another Type I Seyfert galaxy with a redshift z ~ 0.02; HZ519+286, a 6th magnitude Be star; HZ504+04 (+602504-03), a 7th magnitude B star; and 400614+15, a faint ultraviolet-excess star with possible Hz emission. We will present photometry, spectroscopy, and finding charts for each of these suggested counterparts.

01.05 Origins and Ages of X-Ray-Luminous M Dwarf Stars, H.M. JOHNSON, Lockheed. - The nearby M dwarfs for which published X-ray data are available are assembled and examined for kinematical and other evidence of their age. Those with the highest order of X-ray luminosity are presumably young, but subsets of them fall kinematically into old disk as well as young disk populations. The youthful "old disk" M dwarfs may have formed recently in the interstellar high-velocity clouds or intermediate-velocity clouds from which they derive their kinematical properties.