ABSTRACTS

07.22.09 Initial Results from the Einstein Survey of Stellar Low-Luminosity X-ray Sources. VAITANA, G., W. FORMAN, R. GIACCONI, P. GORENSTEIN, J. PYR, R. ROSNER, F. SEWARD, and K. TOPKA, Harvard-Smithsonian CFAs -- We have discovered, from the Einstein Observatory, low luminosity soft X-rays associated with stars throughout the spectral sequence from O through M. Early indications are that for at least the early-type stars, X-ray emission is associated with luminosity classes V through I. We will discuss the evidence for stellar coronae in later spectral type stars and the implications for alternative models.

08.22.09 X-Ray Sources from O Star Associations. ROSNER, R., G. GRINSLAY, R. NARDEN, E. SEWARD, and G. VAITANA, Harvard-Smithsonian CFAs -- The Einstein Observatory has discovered soft X-rays sources associated with early-type stars in several OB associations including Cygnus OB2, η Carina region and Orion. These sources have luminosities \( \sim 10^{33}\) ergs s\(^{-1}\) and temperatures \( \sim 10^{6.5}\) K which are different from compact binary X-ray sources which are associated with early-type stars. The luminosity class of the optical counterparts of the Einstein sources ranges from V to I and includes the peculiar objects η Car and the Wolf-Rayet star WN-6. We will summarize the data and discuss the resulting constraints for possible models, including mass accretion in binaries, stellar winds, coronae, and shocked winds.

09.22.09 An X-Ray Image of Orion. D. J. HELFAND, G. A. CRAIN, W. B. M. M., and K. S. LONG, Columbia U. -- Before HEAO-2, one of the very few X-ray sources associated with a region of active star formation was the 4 Uhuur count source identified with the Orion Nebula. A 30" SAS-3 position located part of the emission in the Trapezium, but a substantial fraction of the Uhuur flux remained unaccounted for in this modulation collimator observation. We have obtained our first data from the Columbia survey of the Orion region with the HEAO-2 imaging proportional counter. More than a dozen X-ray sources are detected with a 1/4 square degree area centered near the Trapezium; the brightest source is coincident with the Trapezium; the remaining objects appear to be representative of the numerous classes of variable stars found in this region. One is a T Tauri star, one a UV Ceti-type flare star, and the majority of the remainder is identified as faint Nebular Variables (T Orionis stars). The X-ray spectral and temporal characteristics of these sources will be presented, and models for the emission will be discussed.

10.22.09 X-Ray Opacity of Stellar and Interstellar Matter. R. J. GOULD, Univ. of Calif., San Diego -- A simplified procedure has been developed for the calculation of the K-shell photoionization cross section for a general atomic system containing an arbitrary number of outer-shell electrons. Comparison with the results of more elaborate methods using Hartree-Fock numerical bound-state wave functions, computer-generated continuum wave functions, and numerical evaluation of matrix elements indicates agreement within about 1% for a range of incident photon energies. Consideration of the effects of secondary excitations, in particular simultaneous ionization from the L shell, suggests that there should be "structure" in the K-shell photoionization cross section just above threshold. These effects are computed and their relevance to the determination of element abundances from interstellar x-ray absorption observations will be discussed.

11.22.09 Enormous Periodic Doppler Shifts in SS 433. B. MARGON, S. GRANDI, and B. FORD, UCLA -- The highly variable radio and X-ray star SS 433 displays intense emission lines which change their wavelengths by very large amounts, up to 1000 Å in 50 days (Margon et al., Ap. J. Letters, 230, in press). These emissions have now been unambiguously identified as two sets of Balmer and HeI lines, one with large redshift and one with large blueshift, in addition to a stationary, zero-velocity system. Liebert et al. (preprint submitted to Nature) have independently reached a similar conclusion.