observations of the calibration blackbodies and horn antennas at a wide variety of temperatures. The model includes the bolometer detectors, the emissivities of the IR sources, and error parameters for vibrations, thermometer noise and calibration, and multipass radiation. The analysis of the sky includes fits to a uniform (CBR), dipole, and an average galactic spectrum. The fits, residuals, and error estimates lead to these spectra will be shown, and the spectra will be compared with predictions and the y and μ distortion. Limits for μ and y will be reported along with the best values and their errors for the CBR temperature, the dipole amplitude, the dipole color temperature, and an estimate for the galactic radiation at the galactic poles.

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19.06

An All-Sky X-ray Auto-Correlation Analysis: Interpretation of Signals at Large Separation.

K. Jahoda (NASA/GSFC)

The HEAO-1 A2 all-sky survey provides an extremely sensitive data base for searching for auto-correlation signals at all angles larger than the 0.003 x beam. The sensitivity is largely due to high signal to noise in each resolution element on the sky and complete sky coverage. Though the X-ray background is "isotropic", statistically significant signals can arise from cosmic or instrumental effects including (a) X-ray emission from unresolved sources which are themselves clustered; (b) large scale structures such as the supergalactic plane; (c) a dipole anisotropy caused by our motion with respect to the rest frame of the X-ray background - the Compton-Getting effect; and (d) time dependent sensitivity variations projected onto the sky by the observing pattern of the experiment. I present the results of an all-sky auto-correlation analysis and an interpretation based on separating the signal from these different sources.

Session 19: Stellar Atmospheres: Early Type Stars

Display Session
Pavilion

19.01

AN EXAMINATION OF THE UTILITY OF THE METHOD OF PHOTOMETRIC DETERMINATION OF SPECTRAL TYPES FOR Be STARS

E.M. Halbedel (Corralitos Obs.)

Be stars have always presented a spectroscopic classification problem since their spectra are complicated by emission lines, high rotational velocities, and occasional shell lines which mimic later spectral types. In fact, a literature search has revealed that the main published spectral type range for a sample of Be stars was 3.1 subclasses, with 24% extending to 5 or more. The Q-method of determining spectral types for normal B stars has already proven its utility, but has always been considered to be inaccurate for Be stars. This study confirms this conclusion. However, further analysis has shown that the spectral type - Q relation is slightly displaced from that for the normal B stars, though it is still linear. A new series of Q-values for Be stars has been derived and is shown to be accurate to 0.1 subclasses, exactly equivalent to that for normal B stars with the old relation.

19.02

Radio VLBI Measurements of the peculiar B star σ Orionis E

K.A. Miller (Villanova), R.B. Phillips (Haystack), Ph. André (Saclay)

The chemically peculiar magnetic He-Strong star σ Orionis E is also one of the most luminous nonthermal radio sources in the sky at centimeter wavelengths. Previous radio Very Long Baseline Interferometry (VLBI) measurements have established that the emission comes from a region of very high brightness temperature (T ≈ 10^{10} K) no larger than 6 R_8 in extent.

André (1987, 1990) has modeled the radio emission as originating from a stable, dipolar magnetosphere. Since σ Ori E is an oblique rotator whose magnetic and rotational axes differ by ~ 70°, any flattened morphology for such a magnetosphere would lead to viewing-angle effects as the star and magnetosphere corotated. A series of intercontinental VLBI measurements were therefore carried out to look for a changing projected radio size versus rotational phase, which would be expected if a flattened, corotating magnetosphere is responsible for the nonthermal radio emission.

No correlation was noted with projected radio size and rotational phase. In the same measurements, a correlation between circular radio polarization and rotational phase was evident. The correlation appears to be in the sense that magnetic pole-on aspects show circular polarization, changing helicity sense as each magnetic pole moves through our field of view. During equator-on phases, the circular polarization vanishes.

These radio polarization and structural results will be discussed in the context of previously claimed correlations of total radio intensity as a function of rotational phase for this star (Leone et al. 1992). In particular, the postulated thermal jets of Leone et al. can be ruled out as a model for explaining the circularly polarized, high brightness temperature radiation from σ Ori E. A peristellar, magnetic nonthermal model is supported by the VLBI and polarization results.

19.03

2-D Hydrodynamical Simulations of the Wind-Compressed-Disk Model for Be Stars

S. Owocki and S. Cranmer (Bartol/UDel), J. Blondin (UNC)

We use a 2-D PPM code to simulate numerically the hydrodynamics of a radiation-driven stellar wind from a rapidly rotating B-star. The results generally confirm predictions of a semi-analytic "Wind-Compressed-Disk" model recently proposed by Bjorkman and Cassinelli to explain the circumstellar disks inferred observationally to exist around Be stars. However, this numerical simulation is able to incorporate several important effects not accounted for in the simple model, including a dynamical treatment of the outward radiative driving and gas pressure. This enables us to model quantitatively the compressed wind and shock that forms the equatorial disk. The simulation results thus do differ in several important details from the simple model, showing, for example, cases of inner disk inflow not possible in the heuristic approach of assuming a fixed outward velocity law. This poster paper will present a detailed comparison of the analytic and numerical models.

19.04

ROSAT Observations of Near Main Sequence B-Stars


X-rays from eleven nearby early B-stars have been observed with the PSPC instrument on the ROSAT satellite. The stars chosen have very small interstellar column densities, so as to insure the ability to observe soft X-rays. All of the stars in the survey were detected. Model spectra have been fit to the observations and ratios of X-ray luminosity to bolometric luminosities have been derived. The spectral fits indicate that the B-star winds have temperatures.