We first use a morphological method to calculate the fractal dimension of the magnetic inversion line which separates sunspots of opposite polarity and an entropy method, ROSETA, which is applied to a subarray of pixels centered on the point of maximum shear on the neutral line. We compare the results from these methods and look for correlations of the fractal dimension with the onset of a solar flare.

127.02
Eclipses of the Solar X-ray Corona by Mercury and the Moon


We have made soft X-ray observations during the recent transit of Mercury (6 November 1993), using the SXT instrument on board Yohkoh. This is the first astronomical observation of this type, and we found the soft X-ray shadow of the planet to be easily visible in exposures short enough to resolve its motion. The Mercury transit was observed for several hours, counting time well before first contact and well after fourth contact. The path of Mercury took it across a narrow coronal hole region and near a flaring coronal bright point. In addition to this, a partial eclipse of the Sun occurred on 13 November 1993. We successfully obtained observations of two eclipse episodes, one of the corona only and one of the true partial eclipse of the disk. The corona eclipse gave good images of the SW quadrant of the corona, which had the appearance of a streamer originating in the polar coronal filament zone and extending some 5 \times 10^7 km above the limb. For both sets of observation the presence of the eclipsing body gives us uniquely clear reference fields with which to correct for systematic effects such as stray light, scattered light, and dark current. The analysis of these observations, currently under way, will therefore provide the most reliable photometry of the occulted coronal regions.

127.04
Chemical Abundances in the Orion Association

K. Cunha (Observatório Nacional - CNPq), D. L. Lambert (U. of Texas - Austin)

Carlton, nitrogen, oxygen and silicon abundances are presented from LTE and non-LTE analyses of C II, N II, O II and Si III lines in the spectra of 18 main-sequence B stars from the four subgroups of different ages comprising the Orion association. Iron LTE abundances from Fe III lines are also presented. The C, N and Fe abundances show no significant variations across the subgroups, but the O and Si abundances are found to be higher for some of the youngest stars that are colocated on the sky and at a common distance. The enrichment amounts to about 40 percent. The lowest abundances are found for the stars in the oldest subgroups (Ia and Ib). The O and Si abundances are correlated. Although such a correlation may in part reflect measurement errors, it is suggested that the enrichment of young stars in O and Si arose because they were formed from regions of the molecular cloud enriched with the ejecta of type II supernovae which are predicted to be rich in O and Si but not in C and N. With the exception of one star, we see no evidence for CN-cycled material on the stars' surfaces. The stellar abundances agree, within the expected uncertainties, with published nebular analyses that show Orion to be slightly underabundant in C, N, and O relative to the Sun.

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128.01
Circular and Linear Polarization of SiO Masers

G.C. McIntosh (Univ. of Minn. Morris), C.R. Fredmore, N.A. Patel (FCRAO, Univ. of Mass.)

We have measured the circular and linear polarization characteristics of the SiO masers from several late-type stars. Both the v=1, J=2-1 (86 GHz) and the v=1, J=1-0 (43 GHz) transitions have been observed. In VT Cae, we find the lower frequency transition to be more circularly polarized than the higher frequency transition. The highest fractional polarization in the 43 GHz line is about 4%. Results from the larger data set will be presented and discussed with respect to polarization mechanisms suggested in the literature.

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128.03
UBV, uvby, H-beta Photometry for Stars in NGC 6611

D. L. Crawford (NOAO/KPNO)

New photoelectric photometry for the brighter stars in NGC 6611 (M16) has been compared with previously published data, some of which have been found to have significant systematic errors. The comparison shows nicely that one must be very careful in selecting comparison stars and in transformations to a standard system. An analysis of the new data, and the best of the older, shows the interstellar reddening law in this region is "normal," and that the ratio of total-to-selective absorption is also "normal." The variation in reddening is large in this region and so the results are rather secure. The member stars of the association are quite young and are therefore useful in helping to define a zero-age main sequence in calibrations of observed indices.

128.02
VLBI Measurements of Interstellar Scattering Towards W49N

K.M. Desai (NRAO/UCSB), C.R. Gwinn (UCSB), P.J. Diamond (NRAO)

We report on VLBI observations of OH masers in W49N. These masers, about 11 kpc distant, have angular sizes greater than those of other, closer, OH masers. We believe that these observed sizes are principally caused by interstellar scattering. The implications of this measurement for the nature of turbulence in the interstellar medium are discussed.