18.02 The Ratio of Extinction to reddening in four compact H II Regions. P. DISIS, Inst. Astron. UNAM, México. Interstellar extinction is believed not to follow the same law in every direction in the galactic plane. It is presumed moreover that in regions near hot stars the ratio of extinction to reddening is larger than the "normal" value. We have found evidence that in four optically compact H II regions despite the high value of their internal reddening and extinction the ratio of total to selective extinction, R = A*(B-V), is the same as in the intervening interstellar space, independent of the value of the ratio. Thus there does not seem to exist abnormality in these dense regions. Arguments leading to this conclusion are based essentially on Fabry-Perot interferometry of two double nebulae, S148, 149, S152, 153, of one triple object S254, 257, 255, and on the UVW photometry of their central ionizing stars.

18.03 The Profile of the 4430 Diffuse Interstellar Band, Observed with the MAMA Detector, T.P. SNOW, J.G. TIMOTHY, S. SAKI, LASP, Univ. of Colo. Profiles of the diffuse interstellar band at 4430 Å were obtained on the 2.2-m telescope at the Mauna Kea Observatory of the University of Hawaii, using the Multi-Mode Microchannel Array (MAMA) detector developed at the University of Colorado. One of the goals of this study was to determine whether the profile varies as a function of grain size, as indicated by such measures as the ratio of total to selective extinction and the wavelength of maximum polarization. The presence or absence of profile dependence on grain size may prove to be a valuable discriminant in testing theories of the origin of this unidentifiable interstellar feature.

18.04 Variations in the [S II] and [O II] Doublet Across the Hourglass Region of M8, B.T. LYNDN and E.J. O'NEIL, JR., KPMO. Long slit image tube spectra of M 8 have been obtained with the 92-cm telescope of KPMO. Each spectrometer records the 3727/30 [O II] doublet in second order (29 A/mm) and the 6717/30 [S II] doublet in first order (58 A/mm). The spectrograms were reduced using the FDS microdensitometer and preserving a spatial resolution of 2.7 seconds of arc per pixel along the slit. Both the [O II] and [S II] doublets show a regular variation across the Hourglass region and indicate a change in electron density from about 200 to 2400/cm³. Calculations of 5-level S II and O II atoms were made using Pradhan's collision strengths. The variations in the two ratios agree very well with the model. The 7320/30 doublet of [O II] was also measured and its ratio was found to be 1.3 in excellent agreement with the theoretical ratio of 1.28.

18.05 The Outlying Condensations Around Eta Carinae, K. DAVIDSON, Univ. of Minnesota, N.R. WALBORN, CITO, and T.R. MULL, NASA/Goddard. Condensations outside the "homunculus" of Eta Carinae were ejected from that very massive star before about 1840. These condensations now show nebular spectra, and are probably excited by shock fronts. IUE spectra, in combination with ground-based observations, lead to remarkable conclusions about the composition of the ejecta, and therefore, about the outer layers of the central star. Processed material is present there. This is one of the most definite clues yet discovered, regarding the nature of Eta Carinae.

18.06 Effects of a Weak Shock on Depletion in the ζ Ophiuchi Cloud, K.A. NEYERS, T.P. SNOW, LASP, Univ. of Col., S.R. FEDERMAN, M. BREGER, Univ. of Texas, Austin. We have studied the effect of a low-velocity shock on depletion in interstellar clouds. High-resolution Copernicus observations of interstellar absorption lines toward five stars in the ζ Ophiuchi cloud complex were used to measure differential depletion in interstellar clouds separated by velocities of 10-20 km s⁻¹. Optical observations of CH and OH⁻ were used as indicators of shock strength and direction of propagation. Our observations indicate the presence of a shock with velocity 210 km s⁻¹ expanding away from the sun into the ζ Oph cloud. The existence of this shock is supported by other observations quoted in the literature. We have found two distinct regions in the lines of sight. A low-density, less depleted, predominantly atomic region is associated with pre-shock gas, while post-shock gas accounts for a predominantly molecular, more highly depleted region. Apparently a weak shock, such as the one discussed here, has the effect of enhancing grain formation or grain growth as a result of increased density in the post-shock gas. These results are consistent with published models which predict grain destruction only for shocks with velocities >30 km s⁻¹. It is possible for grain growth by sputtering to occur in the shocked gas on timescales short compared with the cooling time of the shock.

18.07 The Production of HCO⁺ in a Shocked Interstellar Cloud, G.F. MITCHELL and T.J. DEVEAU, Saint Mary's U. We find that the passage of 10 km s⁻¹ shock through an interstellar cloud of initial density 100 cm⁻³ produces a large increase in the fractional abundance of HCO⁺. We suggest that the enhancement of HCO⁺ in the shocked gas of the supernova remnant IC443 and the lack of enhancement in a number of other sources is due to the strong dependence of the chemistry behind a shock on the abundance of ionized carbon in the pre-shocked cloud. If the pre-shocked region has a high C⁺ abundance, then the abundance of HCO⁺ can reach a high value. The predicted HCO⁺/CO column density ratio of 7.6 x 10¹⁴ agrees well with the observed ratio (deNoyer and Prepelka, Ap. J. (Letters), 246, L7, 1981). The reaction sequences which culminate in HCO⁺ are initiated by the high temperature reactions C⁺ + H₂ + M↑ + H and O + H₂ + OH + H.