ABSTRACTS

17.04.03 On the Contrast of Faculae near the Solar Limb, G.A. CHAPMAN and D.P. KLABUNDE, San Fernando Observatory, CBU, Northridge. - The center-to-limb variation of the contrast of photospheric faculae has been investigated using an Extreme Limb Photometer (ELP). Observations have been obtained in 1975 and 1979 of over 40 active regions near the solar limb in a wavelength band 70 nm wide centered at 525 nm. The solar limb was scanned with 2 apertures whose effective positions were at \( \lambda_1 = 0.087 \) and \( \lambda_2 = 0.25 \) in 1975 and at \( \lambda_3 = 0.063 \) and \( \lambda_4 = 0.090 \) in 1979 (\( \lambda = \cos \theta \)). Preliminary results are that the integrated contrast ratio, \( R = G(1/2)_{\lambda_2}/G(1/2)_{\lambda_1} \), was 1.069 for the 1975 data and 0.958 for the 1979 data. These ratios are significant at about the 2% level or below. The integrated contrast refers to the entire azimuthal extent of the facular region including sunspots. These contrast ratios differ, at the 5% level of significance, from those estimated from Muller’s facular limb darkening curve, based on photometry of bright facular points (Muller, 1975). We acknowledge observing support from A.C. Meyer and financial support from NASA Grants NSG-7456 and NSG-5330.

References

17.05.03 Spatial Variation of the Solar Limb Effect, J. M. Beekers, Multiple Mirror Telescope Observatory, Tucson, AZ, and W. K. Taylor, Princeton University. The systematic blue shift of solar spectrum lines corresponding to 400 m/sec doppler velocity is called the solar limb effect. The most likely interpretation of this effect is in terms of the unequal weighting of the velocities associated with the bright and dark regions of the solar granulation. A variation of the granulation across the solar surface will lead to a variation of this so-called convective shift which, if unrecognized as such, might be interpreted as evidence for a larger scale velocity field. We examined the variation of the limb effect associated with heliographic latitude, supergranulation and active regions. There is evidence for a -10% increase with heliographic latitude which affects the solar meridional flow measurements increasing recent 30 m/sec poleward flow observations to 70 m/sec. There is no evidence for a variation across supergranules and active regions. The abnormal granulation reported in plages and supergranulation therefore does not seem to affect the limb effect.

17.06.03 Solar Periodicities, V.A. HUGHES, Queen’s University at Kingston, Ontario, and Sterrewacht Leiden, H.L. J. KEETEVEN, Queen’s University at Kingston, Ontario. - An analysis has been carried out on the daily values of \( \lambda 10 \) cm solar radio flux as measured by Covington during 1967 February and 1978 December. The object was to see if periodicities existed comparable to those measured optically by Dicke & Goldemberg (Ap.J. Suppl. 27, 131, 1974) when trying to determine the ellipticity of the sun, and to the 730 day periodicity claimed by Sakurai (Nature 278, 146, 1979) to be present in both sunspot numbers and neutrino flux. Apart from the expected 27 day and 4,000 day periodicities, persistent ones of periods 30.6 days and 25.2 days have been found and variable ones of periods 1117 days and 750 days. The 25.2 day period is twice the 12.6 day (symodic) suggested by Dicke for a feature on the Sun. The 750 day is strongly evident during 1970-75 when the neutrino flux was measured, but less so at other times. The 1117 day is persistent except for the period 1970-75. The discrepancy between solar oblateness measurements by Dicke in 1966 and Hill and Stebbins (Ap.J. 200, 471, 1975) in 1973 could be due to a change in the Sun as evidenced by the change in the 1117 day periodicity. No attempt is made at this time to assess the implications of this work to the rotation of the perihelion of Mercury, the variation in neutrino flux from the Sun, or to solar evolution.

17.07.03 Analysis of HEAO-1 Solar Gamma-Ray Spectra, T. BAI, H.S. HUDSON, R.H. LINGENFELTER, USPS. - The USPS/MIT experiment on HEAO-1 observed a solar \( \gamma \)-ray burst on 1978 July 11, coincident with a white-light flare. The spectra show the presence of the 2.223 Mev and 4.44 Mev lines previously observed, plus a steep