calculated as a function of z. The range of parameters was

\[ 400 < B_z < 2000 \text{ Gauss} \]
\[ 10^{16} < \phi < 10^{18} \text{ Maxwells} \]
\[ 12 < r < 280 \text{ km} \]

where \( B_z \) is the vertical component of the magnetic field, \( \phi \) is the magnetic flux and \( r \) is the radius of the filigree. Since all of the physical parameters vary across the magnetic element, average values were computed.

The models were compared to the observations of the filigree and very good agreement was found. Contrasts \( (|I_y - I_{HSRA}|/I_{HSRA}) \) of \( \approx 12\% \) are predicted in the absence of seeing. The models show temperature excesses \( 0 < \beta < 600 \) in the line formation region \( 0 < \log T_{5000} < -2 \).

19.10.03 Identification of HS Macrospicules with EUV Macrospicules and with Flares in X-Ray Bright Points.
R.L. Moore, F. Tang, BBSO, Hale Obs., CIT, J.D. Bohlin, NRL, and L. Golub, ASUAE - The EUV observations from Skylab show small limb surges, called macrospicules, in the polar regions (Bohlin et al. 1975, Ap.J. 197, L133; Withbroe et al. 1976, Ap.J. 203, 528). Similar HS limb events, which we call HS macrospicules, are observed in quiet regions at all latitudes including the polar regions (Moore and Tang 1975, BAAS 7, 423). X-ray bright points, which are the X-ray images of ephemeral active regions and which sometimes flare, are also observed at all latitudes (Golub et al. 1974, Ap.J. 189, L93). We report direct identifications of HS limb events with He II 304 Å macrospicules. Out of 6 different He II 304 Å 10 sec exposure spectroheliograms (which show only the more intense He II 304 Å macrospicules) for which there was simultaneous HS coverage, 7 out of 28 He II 304 Å macrospicules were found to have coincident HS events. There were no HS macrospicules not accompanied by He II 304 Å macrospicules. Hence, it appears that HS macrospicules are the HS counterpart of a certain subset of the more intense EUV macrospicules, perhaps those of unusually high density. We have found for 4 different flares in X-ray bright points on the limb for which there was simultaneous HS coverage, each X-ray event was coincident with an HS macrospicule. This shows that at least some macrospicules are eruptions produced by flares in ephemeral active regions, and suggests that all macrospicules may be produced by similar, but usually even weaker, micro-flare activity.

19.11.03 Emergence of Small-Scale Magnetic Fields on the Sun.
L. Golub, A.S. Krueger, ASUAE, & G.S. Vaijanat, NSF - We attempt to assess the contribution of small-scale emerging magnetic fields on the Sun relative to the larger and longer lived active regions using soft X-ray images obtained by the S-054 experiment on Skylab. A spectrum of the relative number of compact emission features emerging as a function of lifetime during the declining phase of the most recent solar cycle is presented. An estimate of the magnetic flux contribution from various size features is obtained and the overall distribution and variations in that distribution are presented.

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20.01.08 Distant Galactic Structure and the Galactic Rotation Curve. M.P. Fitzgerald and P.D. Jackson, U. Waterloo - For about 50 extreme Population I groups of stars lying between 10 and \( \sim 18 \) kpc from the Galactic Centre we have obtained UBV photometry, MK slit spectra and image tube radial velocities. The initial indications are that (i) extreme Population I objects are found beyond 15 kpc from the Centre, (ii) the Galactic rotation curve does not bend down as indicated by the Schmidt model (a minimum mass solution), but flattens out beyond the solar vicinity, indicating a mass for the Galaxy at least \( \sim 2 \) times the currently accepted mass. This conclusion is supported in part by the National Research Council of Canada.

20.02.04 The Importance of NGC 2420 and 47 Tuc, for Galactic Evolution. Pierre Démare & Robert D. McClure, Yale U. OBS. - Attention is drawn to the old disk "metal-poor" cluster NGC 2420 (McClure, Forrester and Gibson, Ap.J. 189, 409, 1974), and the "metal-rich" globular cluster 47 Tuc (Hartwick and Besser, Ap.J. 194, L119, 1974) a member of the spheroidal component of the Galaxy, which have approximately the same metallicity index \( \alpha \) (U-B) = 0.11 mag. for 47 Tuc. and \( (U-B) = 0.10 \) mag. for NGC 2420. This similarity in metal abundance allows an instructive comparison to be made of the two components of the Galaxy. The C-M diagrams of the two clusters reveal differences which cannot be explained in terms of a difference in age alone. We conclude that the two clusters differ in their abundances of chemical elements other than those which contribute to the ultra-violet excess, i.e. either helium or the CNO-elements. Comparison with theoretical isochrones (Demarque, Schild and Prather, to be published) yields agreement provided that either of two conditions is satisfied: 1) the helium abundance of 47 Tuc. is greater than that of NGC 2420; 2) the CNO-content of 47 Tuc. is less than that of NGC 2420. The implications of these alternatives in terms of plausible models of galactic nucleosynthesis and galaxy formation are briefly discussed.