the evidence for circumstellar disks based on published polarization maps, and derive some parameters which represent best the observations.

An Average Charge Model for Time-Dependent Radiative Cooling, T.J. Gaetz, University of Western Ontario.

An approximate method for rapidly estimating the non-equilibrium emissivity of a hot optically-thin plasma is presented. The average charge of each chemical element is evolved and the emissivity is estimated by assuming that for each element only two adjacent ionization stages are populated. The relative populations of the stages are determined from the average charge. Results obtained from this approximation are compared to results from a full calculation of the ionization and excitation kinetics. The speed of the average charge model makes it appropriate for use in large-scale gas-dynamics calculations for cases in which time-independent cooling functions are inadequate.

The Origins of the 10.7 cm Solar Flux, K.F. Tapping, V. Gaizauskas, Herzberg Institute of Astrophysics, Ottawa.

The Ottawa measurements of the solar S-component at 10.7 cm wavelength are used world-wide as an index of solar activity. Its excellent continuity and consistency over a period of more than 40 years makes it invaluable for synoptic studies of both solar and solar-terrestrial phenomena. The continually expanding range of applications for the data underlines the need to improve our understanding of the origins of the S-Component.

High-resolution radio-telescopes have been used at 2.8-cm and 6-cm wavelength to study the S-component emission from solar active regions. The observations reveal several classes of radio sources. To explain this diversity, different mechanisms are invoked, involving thermal and non-thermal processes in the presence of strong magnetic fields. However the very good correlation between the 10.7-cm solar flux and plage-associated emissions (e.g. Ca II) suggests an origin in widely-distributed weak magnetic fields.

Data obtained using the 32-Element Solar Interferometer at A.R.O. often show an enhanced background level against which the more compact, brighter sources stand out. A limited study suggests that, despite the relative weakness of the diffuse background, its wide distribution could make it the dominant contributor to the 10.7-cm flux. Its origin in predominantly weak-field regions indicates thermal free-free emission as the most likely radiative process. We are therefore examining the possibility that the S-component at 10.7 cm is dominated by free-free thermal emission from large-scale changes in the solar atmosphere overlying active regions and complexes, rather than localized processes in small-scale magnetic structures.

We have calculated the integrated free-free thermal emission from the solar disc for a range of coronal and chromospheric models, and find that the difference in the microwave spectra for the active and quiet sun agree surprisingly well with the published spectrum for the S-component.

These results indicate that the S-component, as exemplified by the 10.7-cm flux, is more than an indicator of the behaviour of active regions; it is a measure of the sun as an active star.


The fibre-optic coupled aperture-plate system of the Anglo-Australian Observatory was used to obtain low dispersion spectra of 49 H II regions across the face of the southern spiral galaxy N.G.C. 2997, ranging from 0.2 to 1.2 effective radius. The 300 micron (core radius of fibre) apertures (2 arcsec