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Session 42

42.01.02 The Structure and Development of Comet Halley's Ionosphere, H.L.F. Houpis & D.A. Mendis, UCSD. The structure of the ionosphere of comet Halley is computed, and its global evolution with heliocentric distance considered. It is shown that the nature of the solar wind interaction with the comet is not only quantitatively but also qualitatively different during different stages of the comet's motion around the sun. The effect of the impact of high-speed solar wind streams with the comet is also briefly discussed.

42.02.02 Image Enhancement of Structures in the Coma of Comet Halley 1910 II: D. A. KLINGELESMITH, III and J. RAHE, NASA-Goddard Space Flight Center, Greenbelt, Md. High resolution photographs of Comet Halley 1910 II were obtained at Helwan Observatory/Egypt in 1910. A number of these plates show circular envelopes, fuzzy condensations and fountain-like jets in the inner coma region close to the nucleus which were well known to old visual comet observers, but which are only rarely detectable on modern photographs.

Several plates obtained on May 25 and 26, 1910, were digitized with a POS microdensitometer using a 40 micron stepsize over an area of 20 mm x 20 mm. The area covered the coma region of the comet. The data from each night was added together after proper positional alignment, in order to improve the signal/noise ratio. No attempt was made to convert from density to intensity. The derivative of the nightly averages was then created. This technique produces an image of the slopes, thus greatly enhancing the edges. It allows the display of faint features against a changing background. We will show that features barely detectable on the original images are clearly visible in the derivative image, and that they wore of a short time duration.

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42.03.03 Far Infrared Continuum Observations of Solar Faculae, C.A. LINDSEY and J.H. HEASLEY, Inst. for Astron., Univ. of Hawaii - Photospheric faculae have been observed in the far infrared (10-25um wavelength) continuum using the 2.42 meter University of Hawaii telescope, and in the submillimeter (300-900um wavelength) continuum using the 3 meter IRAT at Mauna Kea. The facular excess above the quiet sun continuum is found to be much smaller than that predicted by plane parallel atmospheric models constructed from Mg II h and k line wing observations. We propose that the discrepancy results from unresolved granular structure in which the facular granules occupy only ~1% of the surface area of the low photosphere. Such a structure would be consistent with the models of Chapman, in which the photospheric atmospheres of faculae are confined to narrow flux tubes with temperatures of order 1000 K hotter than the surrounding quiet sun.

42.04.03 Correlation Tracking Techniques As A Tool For Measuring Solar Transverse Velocities, R. C. Smithson, T. D. Tarbell, Lockheed Solar Obs. - Investigations have been carried out at Lockheed Solar Observatory to determine the effectiveness of real-time correlation tracking as a means of stabilization of solar images on the Solar Optical Telescope. These studies involved computer analysis of high resolution granulation photographs made at Sacramento Peak Observatory. Correlation trackers using CCD, diode array, and television detectors have been shown to be capable of accuracies allowing measurement of transverse velocities of granulation patterns to ±24 m/sec. This degree of accuracy allows the investigation of many interesting problems in solar physics. Supergranule transverse velocities can be mapped in the interior of supergranule cells, and relative motions of the granulation pattern and magnetic features can be followed for long times compared to a granule lifetime.

This paper will discuss the characteristics of correlation trackers as a tool for solar observations and will discuss several potential applications.

42.05.09 Resonance Radiative Transfer and Cyclotron Emission in Her X-1. I. Wasserman, E. Salpeter and G. Slater, Cornell University - We present results of resonance radiative transfer calculations which may be relevant to the formation of cyclotron lines in the atmospheres of accreting neutron stars. We find that recoil of the scattering electrons must be included in the calculations for the conditions of interest (resonant energy ~ 10 - 100 KeV, electron temperature along the magnetic field ~ 1 - 10 KeV, column density of the emitting region ~ 1 g cm^-2). As a result, most escaping photons leave the atmosphere in the red wing of the line, in contrast to the zero recoil case in which the emitted photon spectrum is symmetric about zero frequency shift. The mean redshift of the escaping photons due to radiative transfer may be quite large (~ 30%) and the full width at half maximum of the emergent photon spectrum is comparable to the mean redshift. Upon applying the results of these calculations to the observed 38 KeV cyclotron line in the pulsed x-ray spectrum of the Her X-1 we obtain estimates of the surface magnetic field strength and the size of the line emitting region, modulo the unknown surface redshift of the neutron star in Her X-1.

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42.06.06 Infrared Excesses in Close Binaries, R.P. Milone and T.A. Clark, Dominion Astrophysical Observatory, University of Calgary. The discovery of infrared excesses at JHKL in a selected number of systems was made by Atkins and Hall (PASP 84, 1972), and partially confirmed by one of us (Milone in 'Multiple Periodic Phenomena in Variable Stars', ed. B. Szendi, Academic Press, Budapest, p. 32, 1976). The defined an IR excess to be that which exceeded the