Abstracts of Presented Papers

Session 5

05.13
The Strong, Spatially Extensive Magnetic Fields of the dm flare star AD Leo
S. H. Saar and J. L. Linsky (JILA, Univ. of Colo. and NBS)

A high resolution infrared spectrum of the dm3.6e flare star AD Leo, obtained with the Kitt Peak 4 meter Fourier Transform Spectrometer, clearly shows the presence of widespread photospheric magnetic fields of large absolute strength. Several absorption lines in the 4400-4600 cm⁻¹ (2.27-2.17 μ) region exhibit distinct, resolved Zeeman splitting proportional to their respective Landè g values. The inferred field strength is nearly 4 kilogauss. The relative weakness of central components in several lines influenced by the "anomalous" Zeeman effect indicates that most of the star's surface is covered by these magnetically active areas. This represents the first positive detection of photospheric magnetic fields on a dm star. Simultaneous 8m observations exhibit no evidence of unusually strong flare-like emission; our observations thus represent AD Leo's "guescent" magnetic flux level. We discuss the implications of these results for the atmospheric structure of flare stars and for stellar activity in general.

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Session 13

13.12
Crab pulsar: statistical studies of giant radio pulses in the three pulse components.
Friedman, J.F., (University of Puerto Rico and University of Oklahoma), Borkiakoff, V. (NAIC)

A statistical study of giant pulses was done at 430 MHz with the Arecibo radiotelescope using a 80 microsec time resolution. All three pulse components (precursor, main pulse and interpulse) are included in the study with a total sample of 600,000 pulses.

Session 43

15.91
Are Baldwin Effect: A Consequence of Lensing?
J.M. Barnothy (Evanston IL), M.P. Barnothy (U. Illinois)

The Baldwin effect is an anticorrelation between the strength, equivalent width (EW) of an emission line and the continuum luminosity of the QSO. The negative slope of the regression line connecting the two quantities results from the circumstance that the continuum luminosity figures also as a denominator in EW. The effect can be due to an external factor affecting the luminosity of the line emission differently from that of the continuum emission. This happens whenever the object, the nucleus of a Seyfert 1 galaxy is brightened through a gravitational lens (A.J. 1965, 72, 666; Sky Telescope 1968 Nov.). To obtain a significant brightness amplification, the axis of the lens has to pass close to the small area from which the continuum radiation originates. The amplification factor of a gravitational lens upon an element of the object being inversely proportional to the distance of the element from the lens axis, the continuum flux will be more strongly amplified than that of the line, the latter originating in farther areas from the optical axis. EW is an indicator of the probability that lensing has occurred. Lensing may occur within the redshift range 1<z<5. For z<1, the chance of a massive lens being in the path of the light ray is small, whereas for z>3, in a static closed universe, such as the FNB model, the global lens effect, with no well defined lens axis will take over. In an evolutionary universe a Baldwin effect may arise when line emission changes relative to the continuum as a function of time (distance, i.e., of redshift); hence EW will be a function of z. On the other hand, if the effect is caused by lensing, EW should be independent from z. Indeed, the samples of Osmer & Smith, 100 objects (A.P.J.Suppl. 1979, 42, 333), and that of Wampler et al, 40 objects, (A.P.J. 1984, 276, 403) do not show any dependence of EW from redshift, while both samples display a very significant correlation between the luminosity of the QSO line and the brightness of the continuum at λ1550, (corr. coeff.: 0.79 and 0.77, respectively). No correlation is expected for nearby Seyfert 1 galaxies.

43.16
Optical and Infrared Studies of Galaxy Clusters with Cooling Accretion Flows
W. Romanishin (Arizona State University)

What is the final fate of the gas that x-ray observations indicate is accreting onto the brightest cluster members in some galaxy clusters? Are the accretion rates inferred from the x-ray models accurate? We explore several ways that optical and infrared observations can help answer these questions. To search for star formation in the accretion flow gas, new V-K colors are presented for 8 brightest cluster members in x-ray clusters with a range of accretion flow rates, and published optical data for other clusters is analyzed. Except for A 426 (Perseus), color data does not provide evidence for star formation in any accreting cluster. Using H-K colors, we search for evidence that the accreting gas is fueling a non-thermal nuclear source. Again with the exception of A 426, no evidence of this is found. Two other consequences of star formation in accretion flows, changes in galaxy absolute magnitude and changes in M/L ratio, are discussed. No definite evidence for either of these effects is found. Thus, only in A 426 do we find evidence for the "final" fate of the accreting gas. However, if the accreting gas in other clusters