grounds and identifies cores. For regions with $|b| > 30^\circ$ and 
[Ecliptic latitude] $> 20^\circ$, 581 individual $\Delta l_{90}$ cores have been identified. 
The distribution and physical properties of the cores will be presented. Results 
are compared with previous observations and new directions for millimeter 
line observations are suggested.

This work was performed while S. J. C. held a National Research Council - Phillips Laboratory Research Associateship.

17.06

SPINR — A System for Three Dimensional Ultraviolet Imaging Spectroscopy of Interstellar Gas and Dust

T.A. Cook, V.J. Taylor, S. Chakrabarti (Boston U.)

We are currently constructing the Spectrograph for Photometric Imaging with Numeric Reconstruction (SPINR) for high spectral resolution (5A over 
a 900 to 1400A bandpass) imaging of the Scorpius region from a sounding 
rocket. The system is designed to map (in two spatial dimensions and one 
spectral dimension) the ultraviolet spectral properties of a ten by ten degree 
field using a novel spinning spectrograph technique. We discuss the design 
and status of the hardware as well as simulations of the software needed 
deconvolve the data.

By using SPINR to measure the spectral properties of the scattered light 
from the interstellar medium (ISM) as well as the absorption spectra to the 
collection of stars at different depths in the field we can constrain the physical 
properties of the ISM more closely than with either method alone.

17.07

Recent Results from the Antarctic Submillimeter Telescope and Remote Observatory (AST/RO)

T.M. Bania, J.M. Jackson, A.D. Bolatto, M. Huang, J.G. Ingalls (Boston U.), S. Balm, A.P. Lane, A.A. Stark (CfA), J. Staughun, J. Stutzki (Cologne)

The Antarctic Submillimeter Telescope and Remote Observatory (AST/RO) is a 1.7 m diameter off-axis submillimeter-wave telescope operating at 
the South Pole. Since its installation in the 1994-95 austral summer, AST/RO has been observing the [C I] 492 GHz fine-structure line toward a variety of 
Galactic and extragalactic objects. The goal is to investigate the photodissociation 
of molecular gas by ultraviolet radiation in a broad range of physical 
environments.

This poster summarizes the major scientific results thus far. (1) To investigate 
a low-metallicity environment, we have detected and analyzed the 
[C I] emission from the Magellanic Clouds. (2) We determine the scale 
height of [C I] emission in the Galaxy by measuring several strips at constant 
Galactic longitude. (3) We have detected [C I] in absorption against the 
reference lines toward the Galactic Center, providing evidence that 
much of the neutral carbon present in the galactic disk resides in very cold, 
translucent clouds. (4) We have detected [C I] emission from 8 high latitude 
clouds. These translucent clouds, exposed to modest UV fields, are the 
simplest laboratories to study the transition between molecular and atomic 
matter. (5) We have surveyed 50 southern H I regions and detect [C I] toward 
every object.

17.08

CH$^+$ Production in J-type Shocks

A. Peimbert (Princeton U.)

Numerical models of the chemistry of multi-fluid MHD shocks in diffuse 
 molecular clouds have been calculated; 36 species were studied obtaining 
column densities and line profiles; special attention was given to CH$^+$, CH 
 and OH production. Particular attention has been given to J-type shocks, 
which have thus far been unexplored, for densities in the range of 
15 cm$^{-3}$ < $n_H$ < 50 cm$^{-3}$ with molecular hydrogen abundance of 0.2 < $n_H$ < 0.5. Excitation of $H^+$ in the shock was studied with predicted column 
densities of rotationally excited levels. Implications for the production of 
interstellar CH$^+$ will be discussed.

17.09

A Search for the CO-H2 dinner in the Galaxy

R.J. Allen, L. Loinard (STScI, A.R.W. McKellar (NRC of Canada), J. 
Lequeux (DEMIRM, Obs. de Paris)

We have used the 30m IRAM millimeter radio telescope to search for two 
low-lying rotational transitions of the CO-H2 dimer in the emission spectra 
of 3 Galactic sources and in the absorption spectrum of a low-latitude extragalactic continuum source. The transitions are the 111- $\rightarrow$ 000+ line at 
109.21 GHz, and the 110+ $\rightarrow$ 101- line at 90.84 GHz. The search targets 
were the TMC 1 and L 134 dark clouds, the L 1157 bipolar outflow, and the 
compact radio continuum source 2013+370. The spectral search covered the 
frequency ranges from 90.58 - 91.10 GHz and from 108.95 - 109.46 GHz. 
Several known emission lines were found including HCN(12-11),HCN(10-9), OCS, SO, and HNC, but no other features were 
seen in the spectra. The rms noise was typically 5 nK per 1 MHz channel 
($\sim$ 3 km s$^{-1}$).

17.10

Interstellar Hydrogen and Deuterium toward Alpha Aql, Alpha Cep, and Alpha Hyi

W. Landsman (Hughes STX), T. Simon (U. of Hawaii)

We present high S/N GHRS G140M spectra of the nearby stars Altair 
($\alpha$ Aql), A7 V, d = 5.0 pc, l = 48, b = -9), $\alpha$ Cep (A7 V, d = 15 pc, l = 
101, b = 9), and $\alpha$ Hyi (FO V, d = 21 pc, l = 289, b = -54), which were 
obtained as part of a program to study the onset of chromospheric activity in 
late-type stars. These three stars are valuable probes of the local interstellar 
medium because they are of sufficiently early spectral type to have a large 
rotation ($v\sin i > 150$ km s$^{-1}$), and yet are sufficiently cool to show Ly$\alpha$ in 
emission. The short line of sight toward Altair is particularly interesting 
because Ca II and UV absorption line studies have indicated the presence of 
three distinct interstellar components.

The GHRS spectrum of each star shows a broad Ly$\alpha$ emission cut by 
interstellar hydrogen and deuterium. We will fit the Ly$\alpha$ profiles to derive 
column densities and broadening parameters along the lines of sight.

17.11

Abundance Determinations in Emission-Line Objects: The Revised Emission Line Chart

J. B. Kingdon, R. E. Williams (Space Telescope Science Institute)

We present a revision of the Emission Line Chart (Williams, 1995), which 
displayed selected emission lines of different ions excited under nebular 
conditions in a convenient format. We have calculated an extensive grid of 
photoionization models, covering a wide range of hydrogen densities ($n_H$) 
and stellar temperatures ($T_e$). The results of this grid are used to identify 
line ratios which are insensitive to conditions in the gas and which are 
therefore good for deriving abundances. These ratios are highlighted on the 
revised chart, where we indicate in which region of the ($n_H$, $T_e$) plane they 
are most useful. We suggest that researchers give preference to utilizing 
the networks when deriving gas-phase abundances in emission-line objects.

17.12

HST/GHRS Observations of 61 Cyg A and 40 Eri A

B.E. Wood, J.L. Linsky (JILA, U. Colorado)

We present new HST/GHRS observations of interstellar absorption lines 
seen in UV spectra of 61 Cyg A (K5 V) and 40 Eri A (K1 V). These include 
the Lyman-$\alpha$ lines of H I and D I, and the Mg II h and k lines. We use these 
data to measure the properties of the local interstellar medium (LISM) and to