cooling continues to increase with density, leading to a rapid drop in T and an unstable region in the phase diagram. Increasing the FUV flux results in both higher gas pressures (for n > 0.1 cm^-3), and a narrower range in allowed pressures for a two-phase equilibrium. Only one stable phase is possible for fluxes ≳ 1000 times the local value. Implications for the interstellar medium in the Galactic disk and the Galactic center will be discussed.

8.02
The Distribution of Neutral Gas in the Local Interstellar Medium
B.Y. Welsh (NASA/HiQ & CEA/UCB), P.W. Vedder, J.V. Vallerga, N. Craig (CEA/UCB)

We present high resolution measurements of the Na I column densities observed towards 84 early-type stars located within 300 pc of the Sun. These new results have been combined with Na I columns for a further 172 stars taken from the literature in order to produce maps of the galactic distribution of cold, neutral gas in the Local Interstellar Medium.

These maps delineate the approximate size and shape of the Local Bubble feature. The distribution of neutral gas greatly affects the observability of sources in the extreme ultraviolet (EUV). Comparisons of the Na I maps are made with the galactic distribution of EUV sources observed by the Extreme Ultraviolet Explorer (EUVE) and the ROSAT Wide Field Camera all-sky surveys.

This work has been supported by NASA contracts NAS5-30180 and NAS5-29298.

8.03
Comparisons of Diffuse Ionized and Neutral Hydrogen in the Galaxy
Stephen Turf, R. J. Reynolds, David T. Kunig (UW-Madison), Peter R. McCullough, and Carl Heiles (UCB)

We compare velocity resolved maps of the diffuse Galactic H I emission over a 10° × 12° degree region of the sky centered near l = 144°, b = -21° (cf. Reynolds 1980) with corresponding maps from 23 cm data taken with the Hat Creek 85-foot telescope (now destroyed). The H I maps have about 1° angular resolution and display the intensity distribution down to an effective emission measure of 1.2 cm^-2 pc for a series of seven narrow (12 km s^-1) radial velocity intervals between -76 and +8 km s^-1 (LSR). From 21 cm data the corresponding H I column density is mapped in the same velocity intervals allowing direct comparison of neutral and ionized hydrogen in the diffuse interstellar medium at high latitude. We find both correlations and anti-correlations between the H I and 21 cm emission regions. In particular, a ≈ 15° long, high-velocity filament and an ≈ 11° diameter ring are aligned. We also compare a 3° resolution narrow band Hα image with Aricebo 21 cm data covering the same spatial and spectral regions (≈ 1° × 1° and -76 to -64 km s^-1).

8.04
The Distribution of Neutral Hydrogen in the Local Interstellar Medium
A. Fruscione, I. Hawkins, P. Jelinsky, A. Wieregzieich (CEA/UCB)

We present an up-to-date three-dimensional map of the distribution of the neutral gas in the local interstellar medium (LISM) within a few hundred parsecs of the Sun. The map is constructed from more than 500 interstellar Ni absorption measurements towards individual stars, found in the literature. We have included results obtained only from absorption measurements toward individual stars with known distances, in an effort to construct a three-dimensional picture of the LISM neutral gas morphology. Our description of the neutral gas distribution will be particularly useful for planning observations at spectral wavelengths dominated by the neutral hydrogen interstellar absorption, for example those carried out with the Extreme Ultraviolet Explorer satellite, and represent a large database, essential for future models of the LISM.

This research has been supported by NASA contract NAS5-30180.

8.05
Filamentary Nature of the Neutral Hydrogen towards the Anticenter
C. Tamanaha (UC Berkeley)

High-sensitivity 21-cm maps made with the Hat Creek 85-foot telescope towards the Galactic anticenter reveal a wealth of filamentary structure at intermediate negative velocities. No corresponding structure is seen at positive velocities. In order to study this filamentary structure a median filtering technique is used to remove the smooth, slowly-varying background. Structures with widths less than about 5° are preserved.

The filaments are oriented primarily parallel to the Galactic plane. They cover a range of lengths between 5° and 20°. Their curvatures are similar to those of lines of constant longitude seen on the surface of a tilted sphere centered near l = 180° and b = 0° with a radius of about 25°. They are easily visible at intermediate velocities but become tangled in a web of filamentary structures at VLSR > -17 km s^-1.

In this work, I present models of filaments on the surface of such a sphere. The models are constrained to match the observations in both projected position and radial velocity relative to the local standard of rest. The most interesting and difficult fit is to the velocity information. Velocity fields resulting from systematic motion, spherical expansion, differential rotation, and tangential motion along the surface of the sphere are among those considered.

This research has been supported in part by NSF grant FD91-23362 to Carl Heiles.

8.06
Deuterium in the Line of Sight Towards Procyon and its Cosmological Significance
J.L. Linsky (JILA/NIST & U), A. Diplas (CASS/UCSD), C. Audrius, A. Brown (JILA/NIST & U), B. Savage (Astron. Dept./U. Wisc.), D. Ebbets (BASD)

We will report here on our ongoing program to measure deuterium/hydrogen (D/H) ratio and interstellar gas properties along many lines of sight through the local interstellar medium using the HST Goddard High Resolution Spectrograph. We have previously reported (ApJ 402, 694 (1993)) that for the line-of-sight towards Capella (12.5 pc, l=163°, b=+5°) that D/H = 1.65 (±0.07, ±0.18) × 10^-5, T = 7,000 ± 200 K and the turbulent velocity is 1.66 ± 0.03 km s^-1. These quantities were determined by modeling the interstellar hydrogen and deuterium Lyman-α lines and the resonance lines of FeII and MgII against the background stellar emission line profiles.

We now report on the analysis of these spectral lines for the line-of-sight towards Procyon (3.5 pc, l=214°, b=+13°). Our new data set consists of very high signal-to-noise G160M spectra of the Lyman-α lines and Echelle spectra of the FeII 2599 Å and MgII 2796, 2803 Å lines. Comparison of these new data with those for the Capella line-of-sight will provide information on the nonuniformity of the local interstellar medium and begin to tell us whether the D/H ratio is constant or varies with line-of-sight in the local interstellar medium. We infer the primordial value of D/H from Galactic evolution models and comment on the inferred baryon density of the Universe.

This work is supported by NASA grants, including Interagency Transfer No. S-56460-D to the NIST.

8.07
First Results from the Diffuse X-ray Spectrometer (DXS)
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The Diffuse X-ray Spectrometer (DXS) was flown as an attached Shuttle payload on the STS-54 Space Shuttle Endeavour mission in January 1993. DXS consists of two large-area Bragg crystal X-ray spectrometers that cover the 44 - 83 Å wavelength range, and is designed to measure the spectrum of