field strength $B$ and loop length $L$ (various expressions have been tried); and (3) a prescription for the distribution of the heating along the loop. For a given distribution of 'magnetic sources' below the photosphere we trace out field lines and solve the equations of energy balance separately for each 'coronal loop'. The equations include heating, thermal conduction, optically-thin radiative losses, and convective energy transport by a steady siphon flow. We then integrate $\alpha_T$ along various lines-of-sight (LOS) through the magnetic structure, producing images of the active region in certain temperature bands. By comparing these images with EUV data from Skylab we hope to derive observational constraints on the expression for the heating rate, $E_H(B).$ Preliminary results from this project will be presented.

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7.02
Chromospheric 300 $\mu$m Oscillations in Flaring Regions
J.B. Gurman (NASA/Goddard SFC) and S.A. Drake (STX at NASA/Goddard SFC)

SMM Ultraviolet Spectrometer and Polarimeter (UVSP) observations of continuum intensity near 1757 Å show oscillations in the chromospheric network with significant power at frequencies of 2.8 to 3.5 mHz. In addition, in all observed cases, 10x10 arc sec pixels with uv bursts $\Delta p$ to and including small flares lie within 10 arc sec of local maxima in the spatial distribution of 2.8 - 3.5 mHz power. We investigate possible interpretations of the observed oscillations, and discuss the predictive value of such observations for locating potential flare sites.

7.03
A Theory for the Scattering of Solar P-Mode by Sunspots
K. Jensen (STX/GSFC) and J. Davila (NASA/GSFC)

Below the solar photosphere waves are energetically unimportant. Most of the energy is carried by the convective or radiative flux. However, waves in the convection zone can serve as powerful probes of the internal structure of the sun. Most of these studies have concentrated on the large scale properties of the solar interior. Recently however, observations of the scattering of solar p-modes from sunspots have been made by Braun, Duvall and Labonte (1987). These observations present us with the opportunity to study the subsurface structure of active regions semi-empirically for the first time. Simple analytic models for the interaction of subsurface p-mode oscillations with magnetic structure of the sunspot have been developed. These models will be compared with with observations of the scattered wave modes.

The results obtained from this preliminary work will be important for the formation of more detailed theories of the interaction of p-modes with active region structures. Eventually it is hoped that this work can lead to important constraints for theories of active region formation, sunspot structure and the solar dynamo. The results of this study will also provide important support for projects like the Orbiting Solar Laboratory (OSL) and the Global Oscillations Network Group (GONG). In addition, these models will be of direct application to the seismology data obtained with the Solar and Heliospheric Observatory (SOHO).

7.04
Observations of Running Penumbral Waves
R. Shine, T. Tarbell, A. Title, K. Topka, Z. Frank (LPARL), G. Scharmer (SSO)

Running penumbral waves, also known as Stein waves, are concentric circular waves propagating outwardly in sunspot penumbra seen in H$_\alpha$ movies. We have a number of excellent examples of this phenomena in movies taken at NSO/Sacramento Peak during May and August 1987 and at the Swedish Solar Observatory on La Palma, Canary Islands during September 1988. These data were obtained with the SOUP tunable filter (75 mA bandpass) and the HRSO/OSL 1024 x 1024 CCD camera and consist of sequences of continuum images, longitudinal magnetograms, and Dopplergrams, as well as H$_\alpha$ line center and wings. We will present results on the periods, horizontal velocities, azimuthal coherence, and the relationship of these waves to penumbral fluctuations and flows seen at photospheric levels.

This work was supported by Lockheed Independent Research Funds and NASA contracts NAS8-32805 (SOUP), NAS8-26813 (HRSO), and the Swedish Royal Academy of Sciences.

7.05
Magnetic Field Inclination in PENUMBRAS of a Round Sunspot Observed at Very High Spatial Resolution
A. M. Title, Z. A. Frank, R. A. Shine, T. D. Tarbell (Lockheed PARL), and G. Scharmer (Swedish Solar Obs.)

Longitudinal magnetograms are presented which follow the evolution of an active region over a seven day period. The original image data were taken in two circular polarisations of Fe I 5302 using the OSL 1024 x 1024 brassboard CCD camera and SOUP tunable filter at the Swedish Solar Observatory, La Palma, Canary Islands. Observations of NOAA active region # 5148 were made on September 13 - 18 and 20, 1988. The region included a round, stable sunspot of leading polarity and a grouping of smaller sunspots and pores following. Full coverage of the main sunspot occurs on four of the seven viewing days (9/14, 9/16, 9/17, 9/20) and the region crossed disk center on 9/17. The inclination of the penumbral magnetic field is demonstrated by an apparent polarity change with aspect angle as the region crosses the disk. The orientation of the average polarity pattern is a smooth function of sunspot position relative to disk center throughout the progression, as expected for nearly radial fields. The best magnetograms have resolution approaching 1/3 arcsecond; they show very large inclination gradients across penumbral filaments.

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7.06
Investigation of Active Regions at High Resolution by Balloon Flights of the Solar Optical Universal Polarimeter (SOUP)
T. Tarbell, C. Gilbreath, R. Shine, A. Title, K. Topka, J. Wolfson (Lockheed Palo Alto Research Labs)

SOUP is a visible-light solar observatory, built for space or balloon flight. It is designed to study magnetic and velocity fields in the solar atmosphere with high spatial resolution and temporal uniformity, which cannot be achieved from the surface of the earth. It will fly on a NASA balloon gondola and pointing system to study active regions and flares during the coming a-