objections to prompt acceleration of cosmic rays (CR) in SN ejecta since neither adiabatic deceleration in the expanding magnetic bubble (Kulsrud and Zweibel, 1975) nor the inhibition of nuclear K-capture in fully stripped isotopes (Casse and Soutoul, 1975) apply to the shock acceleration model. Finally we predict that some matter will be ejected as relativistic grains.

**PG.11.09 Particle Streaming: Is the Alfvén Velocity the Ultimate Speed Limit?** G.D. Nolte, J.A. Ionson, and J.S. Scott, U. of Md. - We show that, due to the resonant damping of waves by thermal protons, non-thermal particles in a hot plasma can in fact stream at a speed which is on or greater than the ion sound speed in the background plasma. This result is in contradiction with previous results which had indicated that in all cases the particle streaming speed is limited to the Alfvén velocity due to particle scattering by self-generated hydromagnetic waves. We consider in particular the propagation of relativistic electrons in the Coma cluster of galaxies and within the supernova remnant Cas A. Recent observational studies indicate that a significant fraction of interstellar space is occupied by a hot (T = 10^6 K), tenuous gas. If this is so, the considerations discussed here lead to a solution to the oft-discussed problem of cosmic ray escape from supernova remnants.

**07.02.03 Formation of the Solar Mg I Spectrum. A.L. Zachary, E.H. Averett, R.L. Kurucz, R.K. Loeser, and J.E. Vernazza, Harvard-Smithsonian Center for Astrophysics.** We have calculated the solar Mg I line and continuous spectrum by solving the radiative transfer and statistical equilibrium equations for an 11-level Mg I atom, including the effects of partial redistribution in the resonance line. We have used three temperature models of the solar atmosphere, with temperature minima 4200K, 4300K, and 4400K. In order to match the observed Si I continuum with a continuum model the minimum temperature must be less than 4200K, but in order to match the Ca II and Mg II H and K lines the minimum value must be about 4400K. Our results for Mg I support a temperature minimum of at least 4300K.

**07.03.33 Observations of Long Period Solar Oscillations.** Robin Stebbins, Sacramento Peak National Observatory, AURA, Inc. New observations designed to detect limb darkening variations have been carried out. The technique is a generalization of the one previously used to detect the normal mode pulsations of the Sun. The extension of the method tests oscillatory signals for a signature of solar origin. Acquisition with a different instrument and new internal consistency checks can be used to further test for oscillations of atmospheric or instrumental origin. Preliminary analysis of this data indicates that the technique is successful in reducing undesirable noise. Complete analysis of several long time strings will be reported.

**MONDAY, 9 JANUARY**

**Session 7: Room 2-120, 0945-1200**

**07.31.03 Molecular Hydrogen in the Solar Atmosphere.** G. Brueckner, J.D.F. Barbado, G.B. Sandlin, M.S. Vannhooser, Naval Research Laboratory, Washington, D.C., G. Jordan, Univ. of Oxford, England. 120 emission lines in the solar ultraviolet spectrum have been identified as due to transitions in the Lyman bands of molecular hydrogen. Strong transitions are excited by fluorescence from H I. The lines are enhanced in the sunspot spectrum because of the larger intensity of H LyA above the spot, a lower opacity to the H LyA radiation in the layers between 6000 K and 10,000 K, and the lower temperature causing a higher abundance of H₂. Most of the lines are also detectable in the quiet solar atmosphere close to the limb. Some of them are strongly enhanced in very small areas of the quiet sun, which are only recognizable in H₂. The abundance of H₂ in the solar atmosphere and stellar atmospheres will be discussed.

**07.04.32 The Relationships between EUV Flares and Surges.** E.J. Schmahl, Center for Astrophysics. The HGO spectrophotometer aboard Skylab acquired data on more than 250 flares and subflares. Of these events, 24 were recorded in continuously scanning spectrophotograms which show the EUV flare maximum and flare fall. Each EUV flare corresponds spatially and temporally to an Hα flare, and most cases, precedes a dark Hα surge. In all but one of the 24 flares, EUV surging is visible. These surges fall into four classes: (1) The flare appears near or on a pre-existing EUV loop along which the surge emanates out of the flare. (2) The surge emanates from the flare site before EUV flaring. (3) The surge follows the flare but appears on a loop not connected to the flaring region. (4) No EUV surge follows the flare. Of the 24 flares, 19 are events of type (1). Two of the remainder may have produced surges outside the field of view.

The evidence indicates that surges may be driven by pressure gradients, possibly generated by chromospheric evaporation. Logarithmic intensity gradients along a surging EUV loop are approximately 1/7000