Rocket Measurements of the Solar Surface in the Light of Lyman Alpha, 1216 Å. WILLIAM A. SLOAN, *E. O. Hulburt Center for Space Research at U. S. Naval Research Laboratory and Yale University*.—A Cassegrain telescope with a resolution of 2 sec of arc was successfully flown in an Aerobee-Hi rocket from White Sands Missile Range on 20 October 1965. A pinhole, 33 μ in diameter, was placed at the focus of the telescope, followed by a photo-ionization detector with a lithium fluoride window. The instrument was kept pointed at the sun by a biaxial solar pointing control.

Results indicate that in Lyman alpha the solar surface shows structures whose characteristic dimensions can be as small as 2 sec of arc, which corresponds to the limit of instrument resolution. Larger structures with very sharp gradients have also been found. Intensity ratios between bright and dark areas are typically a factor of two. Isophote maps of small selected areas will be presented.

This research was supported by the E. O. Hulburt Center for Space Research and the National Science Foundation.

An Active Center and its Magnetic Field Recorded on 6 July 1965. SARA F. SMITH AND HARRY E. RAMSEY, *Lockheed Solar Observatory*.—On 6 July 1965, $H\alpha$ time-lapse photographs with resolution of approximately 1 sec of arc were taken of an active center at the Lockheed Solar Observatory. During the same hours of observation, three fine-scan magnetograms with resolution of 10 sec of arc were obtained at the 150-ft solar tower at Mt. Wilson. Comparison of these observations reveals an excellent correlation between the $H\alpha$ fine structure and the longitudinal component of weak and moderately strong photospheric magnetic fields. The periphery of the active center contains long, large fibrils representing longitudinal fields of approximately 6 G or less. Toward the center of the region, the fibrils become successively shorter and gradually merge into fine mottles. The field strengths in these areas range from approximately 6–40 G. Areas of bright plage with no fine structures resolved generally represent areas with photospheric fields in excess of 40 G.

Sections of the neutral line, the line in the region where the longitudinal component of the magnetic field is 0, are marked by fibrils running perpendicular to the neutral line or by small filaments appearing to parallel the neutral line. The two major segments of the importance one flare which occurred in this region were separated by the neutral line. As the flare developed the two major segments rapidly lengthened in a direction approximately parallel

to the neutral line and toward areas of weaker field. Simultaneously, the segments were displaced in opposite directions perpendicularly away from the neutral line. Analysis of these lateral motions reveals that velocities in the flare segments increase from 0 to 12 km per sec with increasing distance from strong fields. A deceleration occurs as the lateral displacement runs in the direction of increasing field strength.

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Electron Temperatures of H II Regions Related to O9V and B0V Stars. SABATINO SOFIA, *Yale University Observatory*.—Thermal equilibrium temperatures of optically thin H II regions related to O9V and B0V stars are computed for a variety of electron densities and dilution factors and for an element distribution which takes detailed account of 59 ions ($\chi < 200$ eV) of the 10 most abundant elements in proportions as listed by Aller.

The heating of the electron gas is due to photo-ionization by the central star's ultraviolet radiation, whose spectrum is approximated by blackbody segments corresponding to temperatures equal to predicted critical radiation temperatures.

The cooling processes considered include free-free transitions, plus collisional excitations both of low-lying terms and fine-structure levels of the ground states. Collisional deactivation is taken into account where necessary.

The electron temperatures which turn out to be strongly dependent on the assumed parameters, i.e., the star's spectrum, the electron density and the dilution factor, may vary from 6000–13 500°K, in general agreement with recent observations by O'Dell.

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Interstellar Molecule Formation. THEODORE P. STECHER AND DAVID A. WILLIAMS, *Goddard Space Flight Center*.—The formation of interstellar molecules is shown to be the result of chemical reactions on the surfaces of the interstellar grains. Previous investigation has shown that the formation of molecules by physical adsorption of the molecular constituents on the grain with a subsequent three-body reaction is inoperative on ice. It is shown here that it is also of no consequence for graphite and Platt particles. The formation process described involves exchange reactions between incident atoms and atoms chemically bound into the grain. The theory of chemical exchange is shown to apply to all types of grain and is then illustrated with graphite