is more efficient than the process which assumes that the initial conditions of a structured universe are density fluctuations. We are thus led to the conclusion that the universe is differentiated into structures of matter and antimatter such as galaxies and antigalaxies, and that in all probability there is a particle-antiparticle population symmetry in the universe.

Contamination of "Optical" Surfaces in Space.

C. L. HEMENWAY AND D. S. HALLGREN, *Dudley Observatory and the State University of New York at Albany*.—During the Gemini program two recoverable experiments S-10 and S-12 were flown to measure micrometeorite fluxes in the near-earth vicinity.

The S-10 experiment was launched on the Agena for Gemini 8 and retrieved during Gemini X. During this experiment four polished stainless steel plates having a total area of approximately 94 cm² were exposed for about four months in space. Study of these surfaces has revealed three large micrometeorite impact craters 17, 160, and 280 μ in diameter and 7, 70 and 30 μ deep respectively. Relatively large numbers of small impact sites of uncertain origin less than 1 μ in size have also been observed. Typical thruster contamination particles are also shown.

The S-12 experiment contained 24 slides each with an area of about 8.7 cm². These slides which contained various thin and thick film sensors were exposed during astronaut sleep periods for 16^h47^m during Gemini IX and 6^h24^m during Gemini XII. Evidence is presented suggesting the presence of a weak atmosphere in the vicinity of the space craft and the fragile nature of the impacting particles. Typical electron micrographs of penetration hole structures in thin films are shown.

Northern Galactic Plane. A. P. HENDERSON, *University of Maryland*.—Recent 21-cm radio observations, taken with the 300-ft telescope at NRAO indicate a definite structure to the plane of the neutral hydrogen in the Galaxy as seen in the northern sky. Scans of the Galaxy were taken at 5° intervals in longitude from $b = +10^\circ$ to $b = -10^\circ$ within the region $16^\circ < l < 230^\circ$. For every scan, the hydrogen in a velocity interval of 1 km/sec was integrated numerically producing a centroid of the gas at each velocity. From this centroid, the position of the hydrogen layer at a given longitude was evaluated.

As expected, the central region was found to be rather flat, usually within 50 pc from the standard galactic plane, and the plane of the outer region deviated greatly from that of the inner region. In addition to this we found:

(1) The inner portion of the northern galactic hemisphere is neither systematically above nor below the plane. However, it is possible to trace regions which are above and below. These were found to correlate directly with regions of hydrogen concentration, such that each "spiral feature" tends to remain at a specific height relative to the plane.

(2) These "spiral features" tend to alternate, relative to being above and below the plane.

(3) This alternating pattern does not destroy the picture of the inner region being a thin disk of about 200 to 300 pc in thickness.

(4) There is a "break" in the hydrogen; that is, a region of low hydrogen density separating the inner from the outer regions.

(5) The outer region is thicker and its plane deviates greatly.

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Quadrupole Damping Constants. L. M. HOBBS, AND C. R. COWLEY, *The University of Chicago*.—Calculations have been performed for the quadrupole contribution to spectral line broadening arising from the Stark effect due to perturbations by electrons and ions. A general formula is given for the damping constant in alkali-like atoms using wave functions that include electron spin. Similar calculations are being performed for the two-electron case.

The new quadrupole interaction constants have been applied to the problem of the magnesium abundance obtained from $\lambda 4481$ in the B stars. The total damping constant based on hydrogenic radial wave functions has been found to be greater by a factor of 3 to 4 than that previously used. The resulting Mg/H ratio is therefore reduced to a value that is in better agreement with the solar abundance.

Period-Luminosity Relation for the Large Magellanic Cloud. PAUL W. HODGE AND FRANCES W. WRIGHT, *Smithsonian Astrophysical Observatory*.—Using three photoelectric sequences obtained at the Mt. Stromlo Observatory, we have studied the variable stars of a section of the Large Magellanic Cloud centered at $\alpha = 5^h 12^m$, $\delta = -67^\circ 5'$. Measures in two colors, B and V , have been obtained on a series of 60 ADH Schmidt plates and measures in the blue were made on approximately 400 Harvard Bruce plates for each variable star. The period-luminosity relation for classical Cepheids has the form

$$\langle B \rangle = 17.94 - 2.45 \log P.$$