to minimize this. To make possible recognition of the image strength insensitive to distortion, it is important that the photometer's response to light be linear.

The cluster magnitude sequence errors forced the rejection of the extension to the fainter cluster stars in determining the absorption law. A solution employing six cluster stars directly compared with standards at approximately the image strength insensitive to distortions indicated tentatively a selective absorption coefficient of $6.9 \lambda^{-1}$ magnitudes per parsec from extreme red to blue-violet, but changing rapidly toward shorter wave lengths to approximate independence of wave length at $\lambda 3500$. The latter property of the law is highly questionable; the ultraviolet observations may be affected by peculiarities of the hydrogen spectra of cluster stars or optical properties of interstellar matter. Simple scattering by particles from a minimum of $4 \cdot 10^{-5}$ up to $15 \cdot 10^{-5}$ cm diameter offers a partial explanation of the tentative results.

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Spitzer, Lyman, Jr. Temperature of interstellar matter.

A detailed quantitative investigation has been made of the different factors which influence the kinetic temperature of interstellar matter; i.e., the temperature corresponding to the root-mean-square velocity of the interstellar particles. Among the processes which can increase the average kinetic energy of the interstellar atoms, molecules and dust grains are: photoionization of hydrogen and other atoms; photoelectric emission from dust particles; photodissociation of molecules and negative ions, such as H^- . Among the processes which can diminish the average kinetic energy are: free-free electron transitions in the field of a proton or of some other positive ion; excitation of low-level atomic energy states by electron impact; excitation of molecular energy states, both vibrational and rotational, by electron or atomic impact; excitation of vibrational states of a dust grain by inelastic collision with atoms and electrons.

In regions where hydrogen is ionized ($H II$ regions) dust grains and molecules play a relatively minor role; excitation of atomic energy levels by electron impact can depress the kinetic temperature very appreciably. From the observed approximate equality between the intensities of

interstellar $H\beta$ and the forbidden lines of $O III$ it follows that the kinetic temperature of $H II$ regions cannot be less than 5000° and is probably at least $10,000^\circ$. The number of $O III$ atoms per cm^3 cannot exceed about 10^{-4} of the corresponding number of protons. In regions where the hydrogen is neutral ($H I$ regions), the dust grains play a dominant role. The temperature is much reduced by inelastic collisions between H atoms and the grains, but its exact value depends both on the photoelectric emissivity of the dust grains and on the number of free electrons per neutral H atom. If there are 10^{-3} electrons per H atom, the computed kinetic temperature for a moderately photoemissive surface is 400° , with values on more extreme assumptions ranging from less than 100° to about 2500° . Thus in all probability the kinetic temperature of $H I$ regions is less than $1/10$ of that in $H II$ regions. These results may have an important application to the general behavior of the interstellar medium, both in the condensation of atoms into dust and in the condensation of dust into stars.

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Stebbins, Joel and A. E. Whitford. Infrared radiation from the region of the galactic center.

During the summers of 1945 and 1946 a search was made at Mount Wilson for evidence in infrared light of a nucleus or bright region at the center of the galaxy. Using the 60-inch reflector with a photocell and filter giving effective sensitivity at $10,300 \text{ \AA}$, the procedure was to keep the telescope stationary and allow the sky to drift past a focal diaphragm of 8.6 diameter for 15 or 20 minutes of time. With galvanometer readings at intervals of 30 seconds, any object would be measured once in passing across the field. Similar sweeps with a red filter with sensitivity at $7190 \text{ \AA}$ served to identify foreground stars or star clouds by their color.

In 1945 the area 1° each side of the galactic equator from longitudes 325° to 329° was covered with sweeps at intervals of $6'$, allowing for some overlap, while in 1946 the area was extended in both latitude and longitude with sample sweeps at intervals of 0.5° . A persistent series of maxima appeared near the equator of the Lund tables with pole at $12^h 40^m$, $+28^\circ (1900)$. This elongated bulge is roughly outlined by a figure some 8° long and 3.5° wide with center at longitude 326.5° . The ratio of the red and infrared intensities give a color excess near 2 magnitudes, international,