system also develops a guiding-error signal used to refer corrections to the telescope guiding.

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Munch, Guido. The mass of M 81.

A number of the brighter HII regions in the spiral system M 81 have been observed with the coude spectrograph of the 200-inch telescope, with a dispersion of 2.6 km/sec per micron. The resulting radial velocities, supplemented by those of fainter outlying emission patches derived from plates taken with a nebular spectrograph with dispersion 4.6 km/sec per micron, have been used to make a provisional estimate for the mass of the system. The radial velocities of the bright HII regions on the major axis give, on the assumption of rotational symmetry, a radial velocity for the center of mass of the system $V_0 = -45$ km/sec, in comparison with the value $V_0 = -55 \pm 30$ km/sec given in the Humason-Mayall catalogue. The mass resulting from assuming Keplerian motion of an emission patch discovered by Baade at $17'$ (13.4 kpc) is $M = 9.7 \times 10^{10} \odot$ adopting the distance modulus $m - M = 27.1$ ($r = 2.6 \times 10^6$ pc) determined by Sandage. The radial velocities of the HII regions in the bright arms, about $6'$ (5 kpc) from the nucleus, give a mass $M = 6.8 \times 10^{10} \odot$, if circular orbits around a mass point are also assumed.

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Olsen, Kenneth. Relative f -values for lines of CaI.

The graphite-tube furnace is being used to measure the relative f -values of most of the lines of astrophysical interest in the spectrum of neutral calcium. Calcium has presented some special problems of which the most serious is to relate the f value of the resonance line $\lambda 4226$ with those of the very much weaker lines from high-energy levels. In attempting to do this a preliminary study of pressure broadening by helium gas in the furnace has been made, using FeI lines whose relative f -values are known. The results suggest that this type of study may prove generally useful in determining collision cross-sections of interest to astrophysicists.

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Orrall, F. Q. and Athay, R. G. Physical conditions in solar prominences.

Spectra of four solar limb-prominences, obtained with slitless spectrographs at eclipse, are analyzed to determine electron density, N_e , and kinetic temperature, T_e . For three of the prominences, the data consist of the continuous emission $\lambda\lambda 6500-3500$. Data for the fourth prominence include the continuous emission $\lambda\lambda 4100-3600$ and line emission in several hydrogen, helium and metal lines. We assume that T_e and N_e are constant throughout each prominence.

From the ratio of the Balmer free-bound emission to the remaining components of the continuous emission at $\lambda 3647$, we limit T_e in the four prominences to the range 5200 to 2.5×10^4 . We reduce the upper limit on T_e to 2×10^4 for the three prominences for which we have extensive continuum data. At $T_e = 5500$; $N_e = 10^{10}$ and at $T_e = 2 \times 10^4$, $N_e = 2.7 \times 10^{11}$.

Analysis of the hydrogen and helium line data for the fourth prominence yields the following conclusions: (1) the optical thickness of the central part of the prominence in the center of $H\alpha$ is less than or near unity and none of the observed hydrogen and helium line intensities are seriously affected by self-absorption; (2) the hydrogen energy levels and the helium triplet energy levels are over-populated relative to the thermodynamic equilibrium populations at T_e ; (3) helium is predominantly singly ionized if the hydrogen:helium ratio is near 10:1; (4) T_e is near the upper limit of 2.5×10^4 and $N_e \gtrsim 10^{11}$; (5) the prominence is in a steady-state with the energy radiated balanced by an external energy supply.

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Osterbrock, Donald E. Comet-tail structures in emission nebulae.

A catalogue is given of a large number of "comet-tail" or "elephant-trunk" structures in several emission nebulae whose distances are known from spectroscopic parallaxes. The dimensions of the comet-tail structures and the orientations of their axes with respect to directions to the O stars exciting the nebulae are listed. The statistics of these dimensions show that the forms of these structures are in general agreement with