QUASAR GALAXIES: TWO-DIMENSIONAL IMAGE DECONVOLUTIONS

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Studies of quasar images which have adequate spatial resolution and reach sufficiently faint surface brightness levels indicate that virtually all low redshift ($z \lesssim 0.6$) quasars are surrounded by faint nebulosities extending $\sim$ 3-20 arcsec from the quasar nucleus (at 26 R mag arcsec^{-2}) (Wyckoff et al. 1980, 1981, Hutchings et al. 1981, Wehinger et al. 1983). Furthermore, the average integrated absolute magnitude and average metric diameter of the quasar nebulosities (quasar nucleus removed) are roughly those expected for galaxies at the corresponding (cosmological) quasar distances. Moreover, statistical support for the cosmological interpretation of the redshifts as well as the galaxy interpretation of the fuzz was found in correlations between the angular isophotal diameters of the quasar nebulosities and the redshifts, and between the integrated apparent magnitudes and the angular isophotal diameters (Wyckoff et al. 1981). Spectroscopic observations of quasar fuzz now convincingly support the galaxy interpretation for the quasar nebulosities (Boroson and Oke 1982, Oke et al. 1983).

Calibrated surface photometry of 40 quasars (34 radio and 6 optically selected) and 7 BL Lac objects have been analyzed (Wehinger et al. 1983). Isophotal maps to $\sim$ one percent the surface brightness of the night sky ($\sim$ 26-27 R mag arcsec^{-2}) were derived for each quasar image, a star in each field (defining the point spread function), and for the quasar nebulosities after a two-dimensional deconvolution of the nucleus. Essentially all quasars with $z \lesssim 0.4$ were found to be resolved for these prime-focus photographic observations which were obtained with the 3.6-m ESO and the 4-m CTIO telescopes. The angular diameters and integrated magnitudes of the deconvolved images are for this larger sample of objects again entirely consistent with the hypothesis that quasars are the luminous nuclei of distant galaxies.

The present sample includes quasars in the redshift range $0.1 < z < 2.5$ with three quasars having $z \gtrsim 1$. None of these high redshift quasars was resolved to the detection levels achieved. This

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result is also consistent with the galaxy nucleus interpretation of quasars. A detailed report of this work will appear in The Astrophysical Journal.

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