LONG SLIT CCD OBSERVATIONS OF ACTIVE AND NORMAL GALAXIES

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I. INTRODUCTION

Most studies of active galaxies have concentrated on their unresolved nuclear regions because this is where their prodigous energy output originates. With the advent of CCDs, recent work has centered on determining how an AGN affects its host galaxy. To isolate the effect of an AGN on its host galaxy, a comparison between a set of galaxies containing active nuclei and a set of normal galaxies would be useful. In principle, if the active and normal galaxy samples are chosen properly, then any systematic differences found between the two samples in the line emission and/or continuum properties of the host galaxy can be attributed to nuclear activity.

II. OBSERVING PROGRAM

We have obtained long slit CCD observations of such a sample of active and normal galaxies (Carone et al. 1987). The sample of normal galaxies is taken from the CfA Redshift Survey (Huchra et al. 1983) while the active galaxy sample is taken from the Veron-Cetty Catalogue (Veron-Cetty and Veron 1985). The galaxies in both samples were chosen according to the following criteria: (1) $0.01 \leq z \leq 0.05$, (2) Hubble type Sa, Sb, Sab, SBa, SBb, SBab, (3) $-19 \leq M_V \leq -21$ and (4) $|b| > 20°$, where z is the redshift, M_V is the absolute photographic magnitude (Holmberg 1975) and b is the galactic latitude. Each galaxy is observed in the same manner. The long slit is placed along the galaxy major axis as defined in the UGC catalogue. The slit is 2.5" by 4.0'. We covered the 4500-7400 Angstrom spectral region with an instrumental resolution of 9-10 Angstroms. We therefore were able to measure HeII, [OIII], HeI, [OI], [NII], [SII] and the Balmer lines. The spatial resolution varied from 1.5" to 3.5". All data was reduced using the LONGSLIT package in IRAF.

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III. ANALYSIS

From the extracted spectra, line strengths were determined and the following line ratios formed: [OIII] / Hβ, [NII] / Hα, [SII] / Hα and [OI] / Hα. Line ratios are an excellent method for determining the different mechanisms responsible for the ionization in the emission line regions of galaxies. However, some of the very useful ratios are affected by uncertainties due to errors in the flux calibration and the effects of reddening. We have used the ratios given above because they are reddening free and calibration independent (Veilleux and Osterbrock 1987) and also serve to distinguish between the various ionizing continua.

The line ratios derived from the off-nuclear emission line regions in the Seyfert galaxies are similar to those found in the normal galaxies and fall in that region of the line ratio diagrams which indicate photoionization by O and B stars. The line ratios derived from the active nuclei all fall in that part of the diagrams indicating photo-ionization by a power law continuum. The average H flux in the off-nuclear regions are similar for both samples. However, there are twice as many Seyferts as normal galaxies with detectable off-nuclear H emission (this off-nuclear emission is not due to scattered nuclear light). Preliminary results also indicate an enhancement of spatial [OIII] emission in the Seyferts relative to the normal galaxies.

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IV. REFERENCES

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