INFRARED IMAGING AND PHOTOMETRY OF A SAMPLE OF SEYFERT GALAXIES

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It is well know that the determination of the local luminosity function of Seyfert nuclei meets several difficulties produced by: the determination of a suitable sample, the estimation of the nuclear magnitudes biased from the contribution from the host galaxies, which may be dominant if the nucleus is faints and the presumably large errors associated with the estimated magnitudes.

We have engaged a long term observative programme with the aim of defining the properties of Seyfert 1 nuclei and their host galaxies taking into account the problems listed above.

We have chosen the sample defined by Cheng et al.(1985), when deriving the Optical Luminosity Function of low luminosity AGNs. These authors limited their analysis to Seyfert 1 and 1.5 because they apparently seem to have more uniform properties. The choice of the magnitude limit $U \leq 16.3$, $Mu \leq -18.5$ and $z \leq 0.08$ ensure the sample to be "homogeneous". Moreover a large fraction of the sample objects have been detected in the X-ray band as well as IRAS and radio bands.

The observed continuum of Seyfert galaxies ranges from radio to γ-rays. At least three different radiation mechanism have been combined to explain these phenomena: nonthermal radiation from an active nucleus, stellar emission of an underlying galaxy and reradiation from dust. The nuclear emission is difficult to study in the optical and IR bands because much of the starlight may lie within the seeing disk. Direct imaging is required to obtain reliable estimates of the starlight and nuclear contributions.

This poster presents preliminary results of the IR observations, while the optical CCD observations are presented in the poster by Bonoli et al. The combination of multiband observations should enable us to define the spectral properties of nuclei and host galaxies of our sample. In particular our optical and near-IR data togheter with the IRAS and radio data are crucial in understanding the role played by the dust and the relevance of the star formation in Seyfert galaxies (Ward et al., 1987; Rodriguez Espinosa, Rudy and Jones, 1987).

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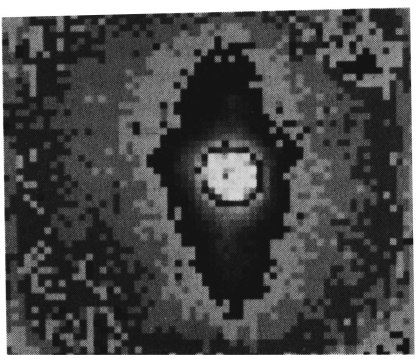
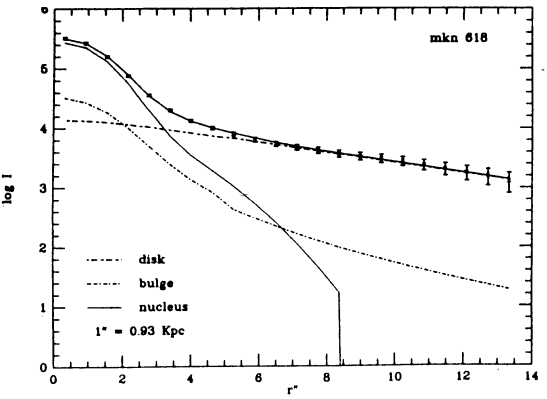
Our IR data are from the 3.8m United Kingdom Infrared Telescope (UKIRT) on Mauna Kea, Hawaii, and both photoelectric photometry and imaging are available for the infrared sample.

The photoelectric photometry, obtained in four nights in April and in August 1987 and using the remote control telescope from Edinburgh, was done in the broad bands J H K L' M and using the apertures 5" and 7.8". The choice of this two diaphrams has been done to minimize the contamination of the nuclear radiation by bulge. We have also obtained IR images for the whole sample using the IRCAM system (McLean et al., 1986), producing an image of 62x58 pixels. We have chosen an image scale of 0.62"/pix to have more detail on the brightness profile of the galaxies. The observations date back to January and July of this 1988 year. At the date of this Symposium we have reduced the first observing run.

Applying the same procedure used on the optical data (Bonoli et al. present Symposium) we have obtained an IR brightness profile for each galaxy, calibrated with our photometry. Our procedure decomposes the Seyfert profile in three components, disk, bulge, and nucleus following a conventional model. We believe that this observations will permit to study the properties of each component. We should therefore be able to isolate the IR contribution of the nucleus and underlying galaxies and to compare the colours, luminosities and structure of the host galaxies of our sample with those of normal galaxies. Correlations between IR nuclear properties and host galaxies properties will be studied. Moreover the spectral energy distribution of the AGN of this optically selected homogeneous sample will be studied in detail and compared with previuos similar studies of differently selected sample (e.g. Ward et al, 1987; Edelson and Malkan,1986).

An example of infared image and related infrared profile in K band obtained using our fitting procedure is shown.





References

Cheng Fu-zhen, Danese,L., De Zotti, G., and Franceschini, A., 1985, Mon.Not.R.astr.Soc., **212**, 857.

Edelson, R.A., Malkan, M.A., 1986, Ap.J., **308**, 59

McLean, I.S, Chuter, T.C., McCaughrean, M.J., Rayner, J.T., 1986, Proceedings of SPIE, **627**, 430.

Miley, G., and Rien de Grijp, 1986, Light on Dark Matter,471,486

Rodriguez Espinosa, J.M., Rudy, R.J., and Jones, B., 1987, Ap.J., **312**, 555

Ward, M., Elvis, M., Fabbiano, G., Carleton, N.P., Willner, S.P., and Lawrence, A., 1987, Ap.J., **315**, 74

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