

## On the nature of radiation from the nucleus of a CD galaxy A0779

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**Abstract.** An attempt is made to detect synchrotron radiation from the nucleus of a CD galaxy A-0779 through polarization studies. We have detected a high degree of polarization (up to 9 percent in ultraviolet) with a bimodal distribution in the position angle; this can be thought due to two distinct components, one from the nucleus and the other from the galaxy. The position angle in ultraviolet coincides with the direction of radio jet direction as seen by VLBI observations, indicating relativistic beaming from the nucleus of the galaxy.

*Key words* : CD galaxy—polarization

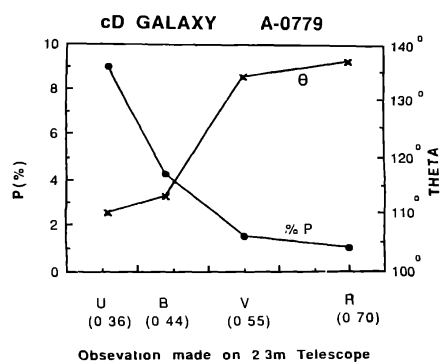
### 1. Introduction

A distinct feature of large clusters of galaxies is the presence of one or two highly luminous supergiant elliptical galaxies near the centres of the clusters. These galaxies, known as cD galaxies are most luminous galaxies in the universe and also largest, also have extended amorphous stellar envelope (Matthews, Morgan & Schmidt 1964; Morgan & Lesh 1965; Tonry 1987; Tremaine 1990). Since cD galaxies give out large amount of energy it is worthwhile to establish the radiation mechanism and physical processes leading to the excess energy generation.

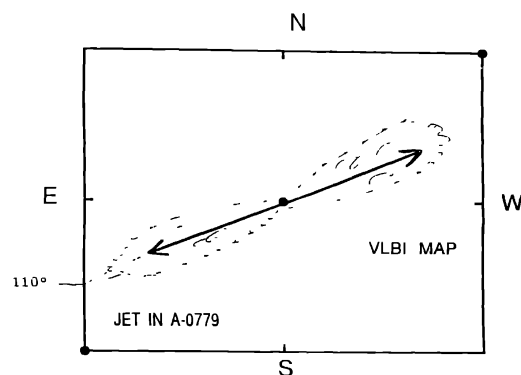
### 2. Observations and discussions

With above goal in mind, observations were made of a cD galaxy A-0779 in the Abell cluster. These observations were made on VBT using PRL polarimeter, using UBV and R filters (Deshpande *et al.* 1985). The results are shown in figure 1. Surprisingly large amount of polarization (about  $9 \pm 0.1$  percent) was observed in the ultraviolet which decreased to 1 percent in the red. The position angle in ultraviolet and blue was about  $110^\circ \pm 1^\circ$ , which suddenly increased to about  $135^\circ \pm 1^\circ$  in visual and red. The position angle in ultraviolet exactly coincides with the jet direction (figure 1b) as observed by VLBI studies (Zhao & Burns 1989).

The high degree polarization in ultraviolet and bimodal distribution position angle can be explained in terms of two component model, one the contribution from the nucleus and the other from the galaxy itself. The high degree polarization and the coincidence of position angle in ultraviolet with the radio jet suggests the presence of relativistic beaming and



**Figure 1a.** Percent polarization ( $P$ ) and position angle ( $\theta$ ) observations with wavelength for a cD galaxy A-0779. Note the high degree of ( $P$ ) in U band and a bimodal distribution in  $\theta$ .



**Figure 1b.** VLBI map for A-0779 indirectly jet activity oriented at angle of  $110^\circ$  which exactly coincides with the  $\theta$  in U band.

synchrotron radiation from the nucleus. These are the first observations of polarization from a cD galaxy and we hope to observe many more galaxies in the next year. Also polarizations are planned with various apertures to assess the contribution of galaxy vis-a-vis nucleus.

In conclusion we report the detection of nonthermal radiation from the nucleus of a cD galaxy A-0779.

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