measurement of G″. At a distance of 100 pc the expected annual parallax would be 0.02″, a value within the capability of the WFPC2 on the Hubble Space Telescope.

This is the aim of a set of observations approved for Cycle 4. The need to pursue this programme with HST is obvious. Only the PC on board HST has the resolution (0.043″/pixel, i.e. about one third that of SUSI) required to compute the position of G″ with the necessary precision. Even if the PC field of view (35×35 arcsecs.) is smaller than that of SUSI (~ 2×2 arcmin.) it should have a number of reference stars to do accurate astrometry on the target. Exposures at the vernal and autumn equinoxes in 1994 and 1995 are foreseen.

The interest of an absolute distance measurement of Geminga would be outstanding. The optical, X and γ-ray observed fluxes could be converted accurately in luminosities, to be compared with the object's rotational energy loss, also precisely measured. This would then become the first case of a pulsar for which the energy output in each electromagnetic channel could be measured precisely as a test vs. pulsar theory.

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# Jet/Cloud Interactions in Southern Radio Galaxies?

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The role of jet/cloud interactions in high redshift radio galaxies is controversial, although there can be little doubt that radio jets have a profound influence on the interstellar medium which surrounds them. Cospatial radio and optical emission-line regions, extreme emission-line gas kinematics and extended blue continuum structures may all be manifestations of this phenomenon.

The importance of jet-induced phenomena has been stressed largely from the theoretical perspective, observational support for jet-induced star formation being, at best, suggestive (e.g. van Breugel & Dey 1993). This article corrects this imbalance. We present the preliminary results of our study of the southern radio galaxy PKS2250-41, an object displaying particularly clear evidence for such an interaction.

## 1. Observations of PKS2250-41

We are conducting a study at ESO of low and intermediate redshift radio galaxies, such objects being sufficiently distant to show characteristics typical of high redshift galaxies, but sufficiently nearby to allow detailed study (Tadhunter et al. 1993, Morganti et al. 1993). As part of this survey, PKS2250-41 (z=0.31) was observed with the ESO 3.6-m in July 1993 using EFOSC in broad/narrow-band imaging, spectroscopic and polarimetric modes.

The narrow-band [O III] image is shown in Figure 1. The striking morphology of this object, in particular the emission-line arcs, are clearly indicative of a strong jet/cloud interaction; the west-

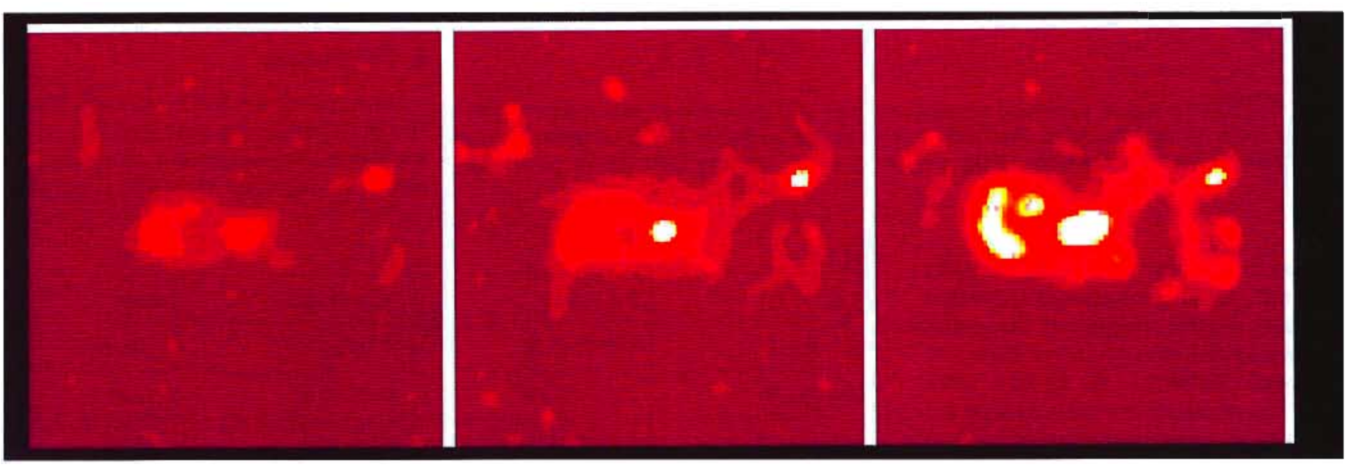

Figure 1: *A montage of 5-min B (left), 5-min V (centre) and 30-min [OIII] (λ5007 Å – right) images of a 58 arcsec square area centred on the nucleus of PKS2250-41. The images have been derived after undertaking Richardson-Lucy restoration using PSF's derived from stars on the original EFOSC frames, although all of the structure evident in these frames are also clearly seen in the original images. North is up, east to the right.*

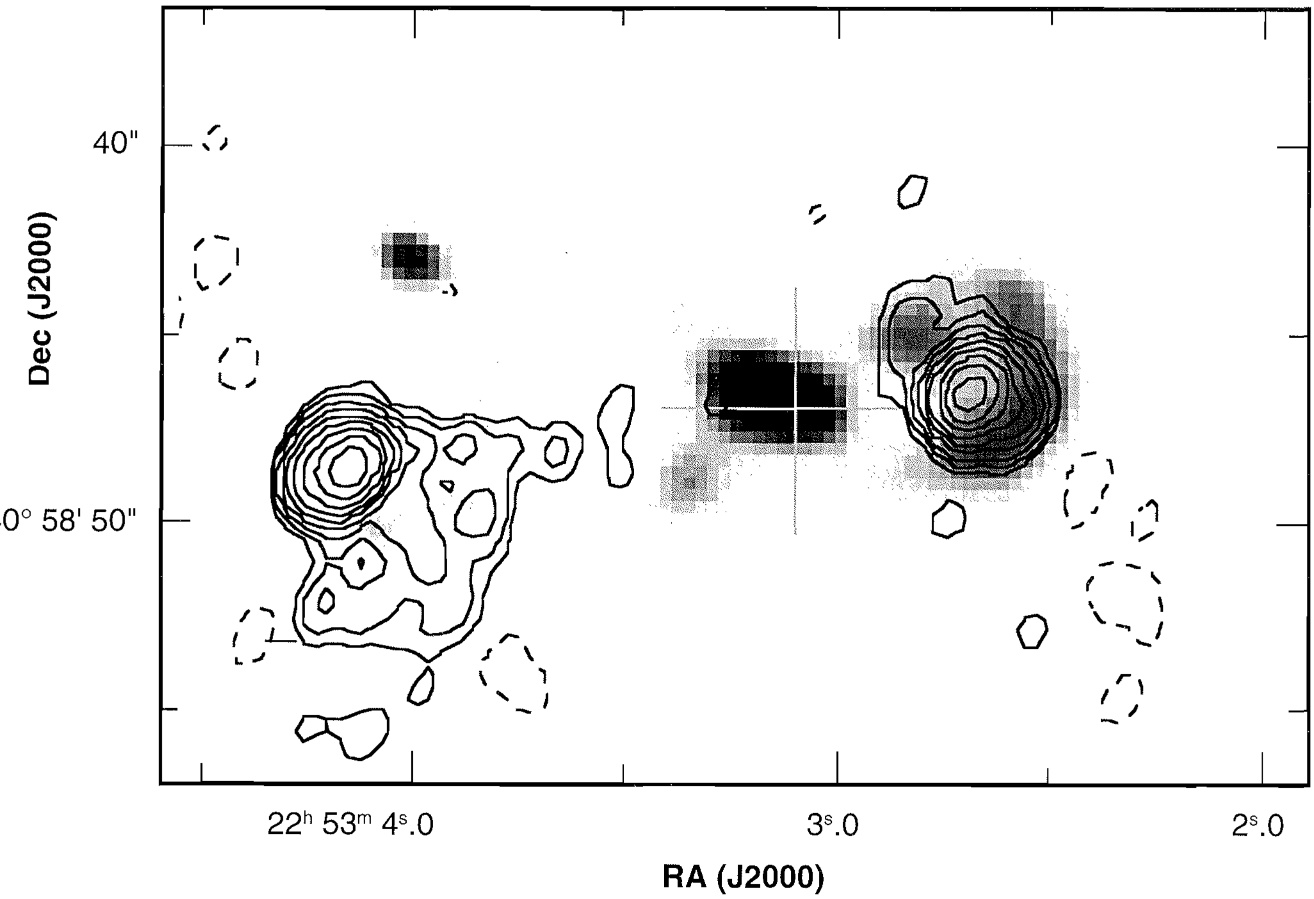


Figure 2: *Greyscale of the original (unrestored) [OIII] image with superposed 8 GHz radio contours derived from ATNF observations in February 1994. The large cross marks the location of the optical nucleus, and the radio beam size is 1.2×0.9 arcsecs along a P.A. of –30°.*

ernmost arc has the appearance of a bow shock, whilst east of the nucleus two (fainter) concentric arcs are evident. There also exist holes through each eastern arc, these being aligned with the nucleus/jet axis and possibly implying subsequent excavation of a cavity in the emission-line gas by the radio jet. A similar instance has recently been inferred by Jackson et al. (1993) from HST observations of Cygnus A. The dimensions of the structures evident in this figure are also impressive: the western and (innermost) eastern arcs are 35 kpc and 60 kpc from the nucleus ($H_0$=50 km $s^{-1}$ $Mpc^{-1}$ and $q_0$=0.0).

The spatial correspondence between the emission-line arcs and radio lobes is excellent (Fig. 2), and suggests a causal link between the structures. Interestingly, the western and eastern arcs are also sites of continuum emission, both components being seen in broad-band B and V images (Fig. 1).

Further support for the jet/cloud hypothesis comes from our spectroscopic and polarimetric observations. The 60-min blue spectra show the nucleus to possess line ratios typical of a photoionized narrow line region in an AGN, whilst the western arc is more consistent with photoionization or shock excitation. Moreover, our 3-hour B-band polarimetry results place a 3$\sigma$ upper limit of $\lesssim$ 3.5 % on the degree of polarization in the western arc within 2.5–6.2 arcsec diameter apertures. By contrast, the nucleus is polarized at 5.0 ($\pm$0.7) % over equivalent apertures, at a position angle misaligned from the innermost optical isophotes by 77$\pm$6°.

## 2. Implications

Our polarization measurements suggest that the rest wavelength UV continuum of the nucleus in PKS2250-41 is dominated by scattering from an AGN. Conversely, the western arc appears to posses continuum flux generated locally, possibly from the light of hot stars and/or by recombination continuum flux from warm ionized gas.

To our knowledge, this is the most striking evidence to date for jet-induced phenomena in powerful radio galaxies. The question arises as to why the emission-line arcs are so clear in this object. Also, why do they show such excellent spatial coincidence with the radio lobes, even though shock models imply that the primary emission lines arise in regions considerably downstream from the shock? We believe the most likely reason is that the radio jets have encountered a particularly dense region of the ISM in the host galaxy, or in a merging companion, in a manner similar to that inferred by van Breugel et al. (1985) in the case of 3C277.3.

If PKS2250-41 is indeed typical of its high redshift radio galaxy counterparts, the importance of jet/cloud interactions implied by our observations is significant. For example, although scattered light is undoubtedly a contributory factor in the alignment effect (e.g. Tadhunter et al. 1992, Cimatti et al. 1993), objects like PKS2250-41 suggest that scattering is not the whole story. A more detailed account of this work is being submitted to *Astronomy and Astrophysics* Letters.

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