

# VELOCITIES WITHIN 1 ARCSEC OF THE NUCLEUS OF NGC 4151 AS REVEALED BY THE HST FAINT OBJECT CAMERA

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We have obtained a longslit spectrum at a position angle (PA) of  $84.6^\circ$  and passing within 0.38 arcsec of the nucleus of NGC 4151, using the FOC f/48 camera on the Hubble Space Telescope. The spectrum shows strong emission lines including [OII]  $\lambda$  3727 and [OIII]  $\lambda\lambda$  4959, 5007. By fitting with Gaussian velocity profiles, we resolve the emission lines, within 1 arcsec of the nucleus, into a high and low velocity component. The low velocity component has a total range in radial velocity of  $200 \text{ km s}^{-1}$  and appears to be associated with material comprising the knots seen in the FOC, F501N [O III] image of NGC 4151, illustrated in Boksenberg (1993). The much weaker high velocity system has a range of  $1000 \text{ km s}^{-1}$ , is more smoothly distributed in brightness and shows a peak brightness close to the nucleus. Because the slit did not intersect the nucleus it is possible to determine the PA at which the two velocity systems cross the zero velocity axis. This is at PA  $-26^\circ$  for the low velocity system and PA  $+32^\circ$  for the high velocity system. These PA values may be subject to a systematic error as the zero velocity is defined by the mean position of the line, in the absence of any external calibration.

The low radial velocity system can be interpreted either as outflow within oppositely directed cones or as Keplerian motion. For radial outflow the PA of zero velocity indicates that the axis of symmetry of outflow (PA  $-116^\circ$ ) lies close to the axis of the biconical structures (PA  $-115^\circ$ ) seen in the FOC F501N image, while for Keplerian motion the velocity amplitude implies, for an inclination of  $21^\circ$  for the plane of NGC 4151, a mass within 30pc ( $H_0 = 75 \text{ km s}^{-1} \text{ Mpc}^{-1}$ ) of  $10^9 M_\odot$  and a line of nodes  $\Omega = 64^\circ$ . This is greater than the value of  $\Omega = 29^\circ$  found by Pedlar *et al.* (1992) 10 arcsec from the nucleus.

The high velocity system can not be interpreted as Keplerian motion as it would imply too large an enclosed mass; and if interpreted as radial outflow, the PA of the axis of symmetry ( $-58^\circ$ ) lies in the direction of the rotation axis of NGC 4151, 10 arcsec from the nucleus (PA  $-61^\circ$ ). These results will be discussed in more detail in a forthcoming paper.

## References

- Boksenberg, A., 1993. ESO Conference and Workshop Proceedings 44, 61.  
Pedlar, A., Howley, P., Axon, D.J., & Unger, S.W., 1992. MNRAS, 259, 369.