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# UNVEILING THE MORPHOLOGY AND KINEMATICS OF LOTR 5, THE HIGHEST GALACTIC LATITUDE PN

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**A deep [O III] $\lambda$ 5007 mosaic image of the highest Galactic latitude planetary nebula, LoTr 5, has been obtained with the Manchester Echelle Spectrometer (MES) on the San Pedro Mártir telescope. This image is accompanied by high-resolution, spatially-resolved [O III] $\lambda$ 5007 long-slit profiles of the nebula.**

LoTr 5 (PN G339.9+88.4) was discovered by Longmore & Tritton (1980) at Galactic latitude 88°. The nebula predominantly radiates at [O III] $\lambda$ 5007 due to the central G5 star's $> 10^5$ K subdwarf companion. Knowledge of the distance to LoTr 5 is particularly crucial because of its high Galactic latitude. If greater than a few hundred parsecs, it would be expanding in the tenuous Galactic halo. However, there is as yet no consensus as to the distance to LoTr 5 and estimates vary from 80 to 6300 pc.

A new narrow-band [O III] $\lambda$ 5007 image of LoTr 5 taken at the San Pedro Mártir telescope with the MES is shown in Figure 1. The structure of the nebula can be seen in unprecedented detail and the emission clearly varies considerably over its diameter. The central star is apparently offset from the nebular center and a 'hole' in the emission is apparent to the east of the star. North-South-oriented position-velocity arrays, obtained with the MES through an [O III] $\lambda$ 5007 filter, are shown in Figure 2.

Our conclusions are as follows:

1. An expansion velocity of 34 km s$^{-1}$ is found. The expansion is not centered on the ionizing star.

2. The *HIPPARCOS* proper motion of the central star is 24 mas yr$^{-1}$ away from the 'hole' in the nebular emission.

3. Under the hypothesis that the central star has moved from this hole to its current location in the dynamical age of the nebula, a distance of approximately 150 pc is established.

## REFERENCES

Longmore, A. J., & Tritton, S. B. 1980, MNRAS, 193, 521

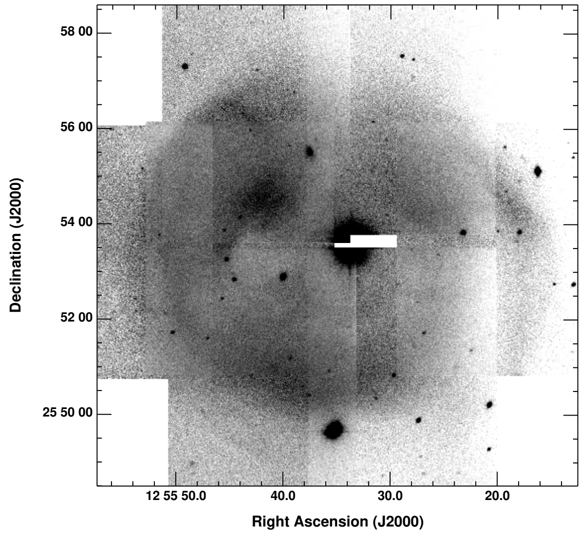


Fig. 1. Mosaic of seven [O III] $\lambda$ 5007 images of LoTr 5.

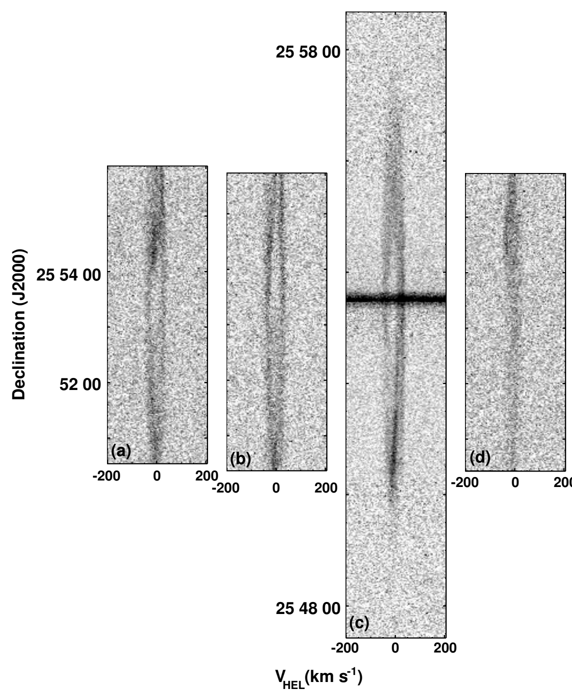


Fig. 2. [O III] $\lambda$ 5007 position-velocity arrays of the North-South MES slit positions at right ascensions of (*a*) $12^h 55^m 42\overset{s}{.}9$, (*b*) $12^h 55^m 38\overset{s}{.}7$, (*c*) $12^h 55^m 53\overset{s}{.}8$ (across the central star), and (*d*) $12^h 55^m 20\overset{s}{.}9$.

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