

A SYMMETRIC JET-LIKE STRUCTURE IN THE PLANETARY NEBULA FG 1

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Fg 1 (He 2-66) is a southern planetary nebula that presents an elliptical shape. Deep CCD imaging and long-slit spectroscopy have been obtained at Las Campanas Observatory of this object. The images were obtained in the light of $H\alpha + [NII]$, $[SII] \lambda\lambda 6716, 6731$, $HeII \lambda 4686$ and in the broad-band R_{gunn} filter. The spectra were obtained oriented N-S, P.A. 90° , and P.A. 85° . The instrumental combination yields a spectral resolution of $\sim 2 \text{ \AA}$ FWHM, covering a spectral range $\simeq \lambda\lambda 6290 - 6805 \text{ \AA}$.

The discovery of a symmetric jet-like structure, consisting of two strings of ionized nebular knots, highly reminiscent of Herbig-Haro objects is reported. The strings are bent in opposite directions and span 2 arcmin to either side of the PN. The main body of Fg 1 consists of an orthogonal system of elliptical structures. The major axis size for the brighter of these structures is $\simeq 38$ arcsec. The common axes of the strings pass right through the central star and coincides with the minor axis of the bright elliptical structure. The spectra from the opposite innermost knots, intersected by the slit, show opposite sign velocities, indicating an expansion radial velocity $V_{\text{exp}} 43 \text{ km s}^{-1}$ and line ratios typical of collisionally excited gas.

The pairs of opposite knots that make up the strings are symmetric and nearly equidistant with respect to the planetary nebula nucleus (PNN). These knots are interpreted as multiple ansae that have been formed and blown away in episodic events by symmetric, collimated flows probably produced by a pressing source. It is estimated that the outermost ansae system was produced between $3.42 \cdot 10^4$ and $1.34 \cdot 10^4$ years ago, when Fg 1 was in proto-planetary stage.

The details of this work will be published in *Astronomy and Astrophysics*.