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The Circumnuclear Spiral Pattern of NGC 5427

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We have studied *Hubble Space Telescope* archive imagery of the central region of the Seyfert 2 galaxy NGC 5427. The images were taken with F606W (V-band) and F160W (H-band) filters with the Wide Field and Planetary Camera 2 and the Near Infrared Camera and Multi-Object Spectrometer, respectively.

A Fast Fourier Transform (FFT) of the images shows that the mode $m = 2$ is dominant in both filters. The $\log r$ vs. θ plot allows us to state that the south-southwest arm with strong dust lane is that which better defines a continuous logarithmic spiral with pitch angle of about 26° between 0.5 and 1.6 kpc. Star-forming knots are profusely detected in both filters along the outer edge of the dust lane. These knots are themselves embraced by the ridge of the $m = 2$ FFT mode in V-band and H-band. The ridge in the H-band might represent the over-density of stars corresponding to the old-star disk perturbation. The ridges in V-band, H-band, and the dust arm intersect at radius of 1.2 ± 0.1 kpc, which would indicates the presence of a corotation resonance. Adopting the rotation curve from Fuentes-Carrera *et al.* (2004), we derive a pattern angular speed $\Omega_p \sim 67\,\mathrm{km\,s^{-1}\,kpc^{-1}}$ for the circumnuclear spiral pattern. In a linear density wave approximation (Grosbøl & Dottori 2009), we derive an age of approximately 25 ± 10 Myr for the triggering of star formation. Furthermore, differences in velocities between the perturbing pattern and the perturbed disk are higher than $10\,\mathrm{km\,sec^{-1}}$ at 300 pc from the corotation resonance inwards, pointing to supersonic velocities and consequently to the presence of shocks. Two recent works have detected streaming motions of ionized gas towards the nucleus along nuclear spirals (Fathi *et al.* 2006; Storchi-Bergmann *et al.* 2007). The high Ω_p inside 1 kpc points to a vigorous perturbation, capable of fueling such type of processes.

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