

LARGE SCALE COHERENT STAR-FORMATION IN NGC 4321

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ABSTRACT. We apply a newly devised quantitative technique to infer the relative arm/interarm star formation efficiency ratio in NGC 4321, revealing a complex but clearly defined density wave structure pattern.



Fig. 1 $H\alpha$ isophotes of NGC 4321 using the TAURUS camera on the the 4.2m William Herschel Telescope, La Palma. Subarcsec resolution was obtained over the whole image. Contour interval is 0.47 instrumental magnitudes. Lowest contour at 5 times r.m.s. sky level (see Cepa & Beckman 1990a).

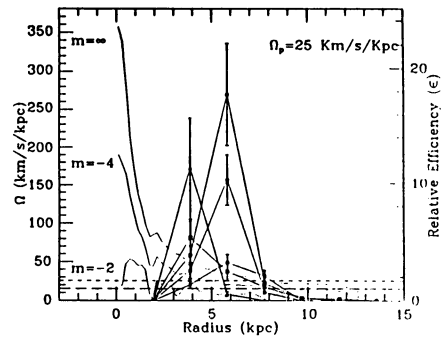


Fig. 2 Relative arm/interarm star formation efficiency ϵ as a function of radius for each arm of NGC 4321 (bold lines). Superposed, the rotation curves and inferred differential resonance curves for density wave patterns with $m = -2$ and -4 (fine lines). Long dashes: value of ϵ for a non-triggered system. Short dashes: pattern speed of $25 \text{ km s}^{-1} \text{ kpc}^{-1}$.

This work represents one application of a technique first described in detail in Cepa & Beckman (1990b). The two striking features of Fig. 2 are (i) The sharp peaks in ϵ , rising to over 10 in three of the arms, and implying triggering of star formation. (ii) Congruencies of two distinct patterns in ϵ in pairs of arms, with one peak at 4 kpc and the other at 6 kpc. These are antinodes of the resonance patterns corresponding to $m = -4$ and $m = -2$ in the density wave system.

References

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