# The signatures of long-lived spirals in disk galaxies.

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Based both on observations and simulations, recent works propose that spiral patterns are actually short-lived, and that the azimuthal color/age gradients across spiral arms predicted by density wave theory could not be produced. We, however, have consistently found such gradients, and measured spiral pattern speeds by comparing the observations with stellar population synthesis models (González & Graham 1996; Martínez-García et al. 2009a,b; Martínez-García & González-Lópezlira 2011, 2013). Here, we summarize our results in non-barred and weakly barred spirals. We adopted various techniques, as the traditional $Q$-index method of González & Graham 1996, together with Fourier methods (e.g., Puerari & Dottori, 1992). Our method includes the use of resolved mass maps (Zibetti, Charlot & Rix, 2009) to disentangle between potential candidates of long-lived modes and more flocculent structures.

On the other hand, we have indeed found a trend whereby pattern speeds at smaller radii are larger than expected from a model that assumes purely circular orbits, likely due to the effect of spiral shocks on the orbits of newborn stars. Other works suggest that the speed of the spiral pattern in disk galaxies may decrease with increasing radius. Our results suggest that spirals may behave as steady long-lived patterns.