We present Galaxy Evolution Explorer (GALEX) far and near ultraviolet imaging of the nearby early-type galaxy NGC2974, along with complementary optical imaging. In the ultraviolet, the galaxy reveals a central spheroid-like component and a newly discovered complete outer ring of radius 6.2 kpc, with suggestions of another partial ring at an even larger radius. Blue FUV-NUV and UV-optical colours are observed in the center of the galaxy and from the outer ring outward, suggesting young stellar populations (>1 Gyr) and recent star formation. This is supported by a simple stellar population model which assumes two bursts of star formation, allowing us to constrain the age, mass fraction of the young component pixel by pixel. Overall, the mass fraction of the young component appears to be just under 1 per cent. The additional presence of a nuclear and an inner ring (radii 1.4 and 2.9 kpc, respectively), as traced by [OIII] emission, suggests ring formation through resonances. All three rings are consistent with a single pattern speed of 78±6 km s\(^{-1}\) kpc\(^{-1}\), typical of 50 galaxies and only marginally slower than expected for a fast bar if traced by a small area observed surface brightness plateau. This thus suggests that star formation and morphological evolution in NGC2974 are primarily driven by a rotating asymmetry (probably a large-scale bar), despite the standard classification of NGC2974 as an E4 elliptical. (astro-ph/0608212)

**References**


**ABSTACT**

**1. Introduction**

Dynamically simple stellar systems with homogeneous stellar populations ??

Red colours and old stellar populations ??

**2. Observations & Data Reduction**

**UV observations: using the GALEX (Galaxy Evolution Explorer)**

1. We observed NGC2974 with GALEX on 2005 February 19, part of a larger survey of the galaxy sample from SAURON project (see de Zeeuw et al. 2002).
2. Exposure times: 1477 s (both the far-UV and near-UV)
3. We have performed surface photometry by measuring the surface brightness along elliptical annuli, using the ELLIPSE task within the STSDAS ISOPHOTE package in IRAF.
4. The ellipses were fitted to the NUV image only.

**Optical observations: using the MDM Observatory 1.3-m McGraw-Hill Telescope**

1. Optical imaging observations in the HST filters (F555W and F814W) were obtained with the MDM Observatory 1.3-m McGraw-Hill Telescope on 2003 March 26.
2. Exposure times: 400 s
3. Surface photometry along ellipses were carried out for the MDM data in the same manner as for the GALEX data.

**3. Results**

Small peak in the NUV profile between 20 and 30 arcsec which may be associated with a bar.

Broad secondary peak at 60 arcsec which can be identified with the outer ring.

Blue UV – Optical colours at central region within and beyond the newly identified outer ring.

**4. Stellar Populations**

**Stellar Population and Star Formation: Two Component Fit Maps**

1. The age map shows very young stars (<500 Myr) in both the central regions and in and around the UV rings.
2. There are comparatively more young stars to the North-East edge of the outer ring than to the South-West.
3. The mass fraction map show that the fractional contribution of the young component is rather low in the centre but increases outward.

**5. Figure Rotation**

**Figure Rotation: Pattern Speed**

Using the UV ring detected in the GALEX data, we argue that NGC2974 has a large scale m=2 pattern, most likely a large scale bar, with a pattern speed of 78±6 km s\(^{-1}\) kpc\(^{-1}\).

**6. Conclusions**

1. The outer ring of radius 6.2 kpc is newly discovered.
2. Blue FUV – NUV, NUV – V and V – FUV colours are observed in the centre of the galaxy and around the outer ring suggesting young stellar populations.
3. The mass fraction of the young component appears to be just under 1 per cent.
4. The SAURON [OIII] nuclear and inner rings and the GALEX UV outer ring are all consistent with a single pattern speed of 78±6 km s\(^{-1}\) kpc\(^{-1}\), suggesting that NGC2974 harbours a large-scale m=2 asymmetry such as a bar.
5. Here, we have witnessed evidence for recent star formation in a particular early type galaxy, in the form of a ring.
6. Star formation may not be all that unusual in early-type galaxies, or perhaps elliptical galaxies are simply far rarer than usual assumed.