

# Faint features in the isolated galaxy CIG96

P. Ramírez-Moreta<sup>1</sup>, L. Verdes-Montenegro, S. Leon,  
J. Blasco-Herrera, M. Fernández-Lorenzo and M. Yun, AMIGA Team

<sup>1</sup>Instituto de Astrofísica de Andalucía IAA-CSIC,  
Glorieta de la Astronomía s/n, 18008 Granada, Spain  
email: prm@iaa.es

**Keywords.** Galaxies: evolution, formation, interactions, structure

## 1. Project description and motivation

The AMIGA project carries out a multiwavelength study of the largest catalogue of isolated galaxies from the Local Universe (CIG, Karachentseva 1973). Compared to any other sample—field galaxies included—and using highly strict isolation criteria (unperturbed for at least  $\sim 3$  Gyr, Verdes-Montenegro *et al.* 2005), all the results show that these galaxies have the lowest values of the physical magnitudes expected to be enhanced by interactions. This strongly supports isolated galaxies as ideal laboratories for the study of galaxy formation and evolution. Despite CIG galaxies show the lowest HI integrated profile asymmetry level when compared to any other sample, some cases present up to 50% HI asymmetry (Espada *et al.* 2011b). We aim to shed light over the causes and sources of such asymmetries with our deep radiointerferometric and optical observations of CIG targets. Since major mergers are ruled out by the isolation criteria, in this work we are addressing whether minor mergers, internal processes or primordial gas accretion are responsible for such asymmetries.

## 2. Asymmetries in CIG96: optical and radiointerferometric results

Optical observations of CIG96 (16% HI asymmetry level) have revealed a faint pseudo-ring ( $\mu_R = 26.9$  mag/arcsec<sup>2</sup>, R filter) that lies in the outskirts ( $\sim 3.5 \times R_{25}$ ) of the galaxy (Espada *et al.* 2005, 2011a). Deep radiointerferometric HI data of CIG96, obtained from VLA and EVLA (total of 19h on source, configurations C and D) and processed with wavelet filtering (Ricker function) have let us reach a very faint HI column density of  $8.9 \times 10^{18}$  cm<sup>-2</sup> ( $5\sigma$ , 10 km s<sup>-1</sup> channelwidth). We have detected a number of dim structures in the external regions of the galaxy. The most outstanding feature consists on a series of HI masses located from  $\sim 5'$  to  $\sim 7'$  to the East of the galaxy. Their receding velocities decrease with the distance to the center of CIG96: the closest feature shows a similar velocity to the systemic velocity of CIG96 ( $V_{hel-CIG96} = 1562$  km s<sup>-1</sup>) while the farthest feature has  $V_{hel} \sim 1480$  km s<sup>-1</sup>.

However, neither the optical nor the HI data show any clear signs of companions that could explain this feature. A new analysis of the optical data is being carried out to focus in the outermost Eastern region where the HI feature lies. This study was presented in a contributed poster in the IAU Symposium 321, available upon request to the first author. The conclusions of this work will be presented in a paper later this year (Ramírez-Moreta *et al.* in prep.).

## References

- Espada, D., Bosma, A., Verdes-Montenegro, L., *et al.* 2005, *A&A*, 442, 455  
Espada, D., Muñoz-Mateos, J. C., Gil de Paz, A., *et al.* 2011a, *ApJ*, 736, 20  
Espada, D., Verdes-Montenegro, L., Huchtmeier, W. K., *et al.* 2011b, *A&A*, 532, A117  
Karachentseva, V. E. 1973, *Astrofizicheskie Issledovaniia Izvestiya Spetsial'noj Astrofizicheskoi Observatorii*, 8,3  
Verdes-Montenegro, L., Sulentic, J., Lisenfeld, U., *et al.* 2005, *A&A*, 436, 443