
Unveiling Faint Features in Extremely Isolated Galaxies
Pablo Ramírez Moreta
PhD student at IAA-CSIC, Spain.
Advisors:
Lourdes Verdes-Montenegro (IAA) & Stéphane Leon (ESO/JAO)
Collaborators:
Javier Blasco-Herrera, Mirian Fernández-Lorenzo & rest of AMIGA Team at IAA
+ Min Yun (UMass) + Roberto Rampazzo (INAF) + Reynier Peletier (Kapteyn Inst.)
+ Gijs Verdoes-Kleijn (Kapteyn Inst.) + Aku Venhola (Kapteyn Inst.)
CSIC
AMIGA
Analysis of the Interstellar Medium of Isolated GAlaxies

AMIGA

Analysis of the interstellar Medium of Isolated GAlaxies

amiga.iaa.es

- multiwavelength study
- CIG - Karachentseva 1973
- isolation criteria - Verley et al. 2007ab, PhD

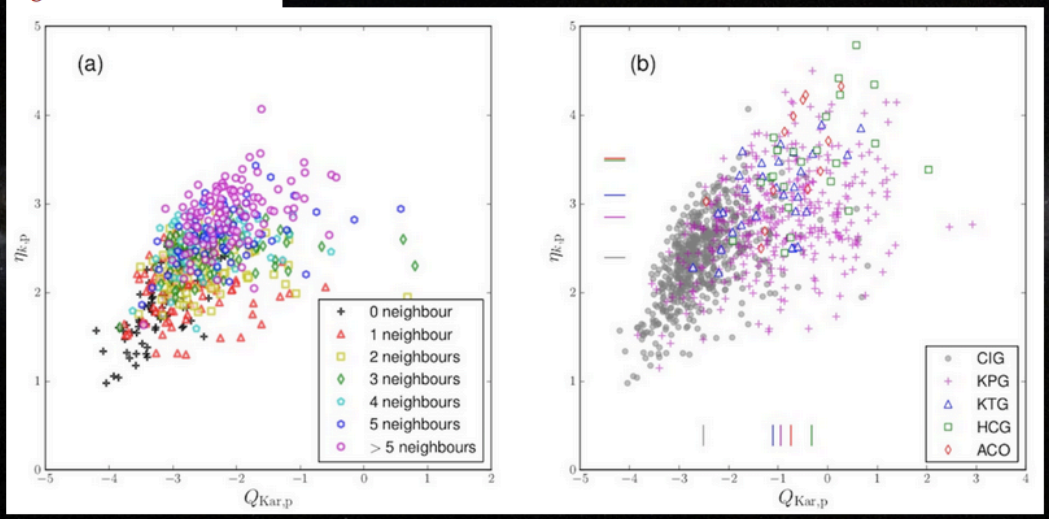
⚡ local number density η_k

⚡ tidal force estimation Q_k

↓

no major tidal interaction within the last ~3Gyr

Argudo-Fernández et al. 2013



Some results from AMIGA

↓ X = lowest values of X (VS. any other sample)

- ↓ L_B
- ↓ L_{FIR} - Lisenfeld et al. 2007
- ↓ radiocontinuum - Leon et al. 2008
- ↓ molecular gas - Lisenfeld et al. 2011
- ↓ atomic gas asymmetry - Espada et al. 2006 + 2011
- ↓ lower dispersion of redder colors - Fernández-Lorenzo et al. 2012
- not preferentially barred or unbarred - Verley et al. 2007
- larger bars - Durbala et al. 2008
- morphologies - Sulentic et al. 2006 + Fernández-Lorenzo 2012
- pseudobulges
  - in most Sb - Sc - Durbala 2008+2009
  - redder than discs - Fernández-Lorenzo 2014
  - bulges of gals. with bars are denser, but still red - Fernández-Lorenzo in prep.

↘

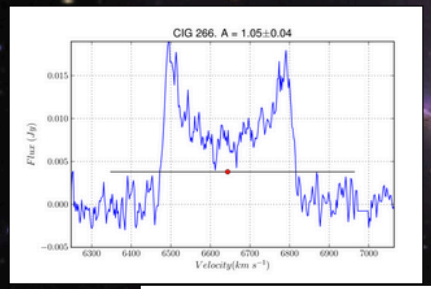
E - E/S0 = 6%
S0 - S0a = 9%
Sa - Sab = 4%
Sb - Sc = 65%
Scd - Im = 16%

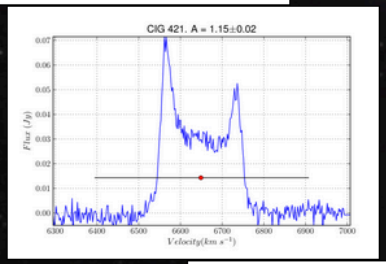
AMIGA

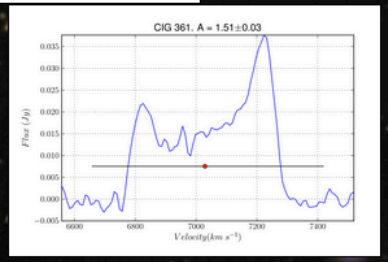
Analysis of the interstellar Medium of Isolated GAlaxies

amiga.iaa.es

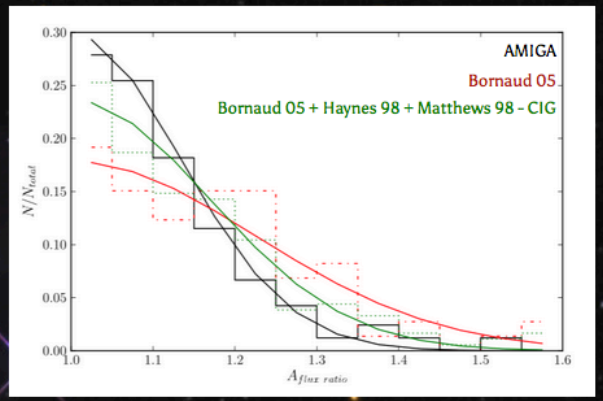
Asymmetries in isolated galaxies

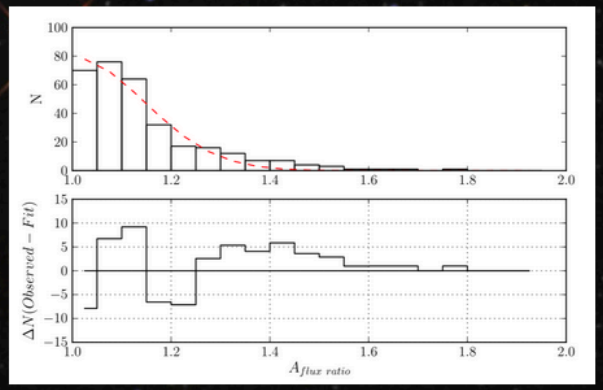






Espada et al. 2011





Resources

Sample

CIG

HI

$\eta_k < 2.7$

Vel > 1500 km/s

$A_G < 0.5$ mag

$D_{25} > 1'$

184 isolated galaxies

Method

radiointerferometric observations

VLA + WSRT + GMRT

deep optical observations

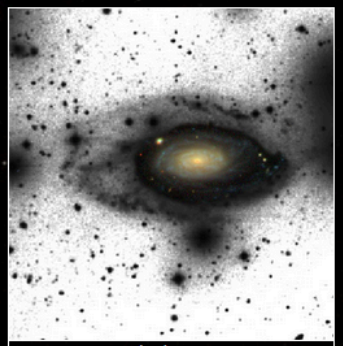
CAHA + INT + NOT + VST

over 22 galaxies

> 4h on target

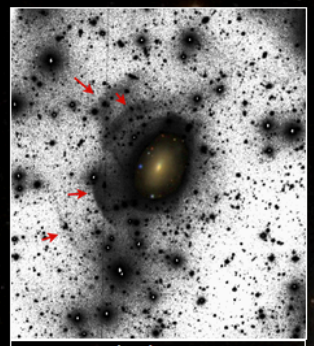
First images

A = 1.22



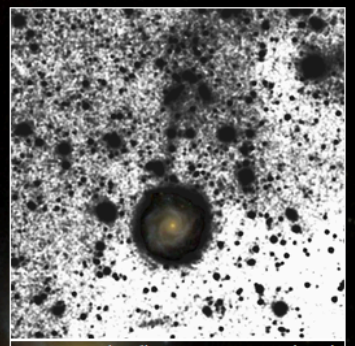
CIG1019 (Sc) - CAHA2.2m
~26.5 mag/"² (R band)
~2.5h on target - 6'x6', R_{25} = 0.76'

A = 1.08



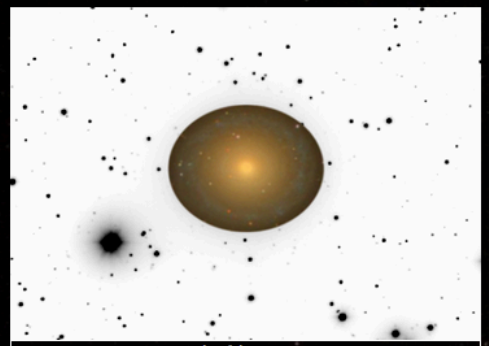
CIG841 (S0) - CAHA2.2m
~5h on target (r SDSS)
image: 7'x9' - R_{25} = 0.81'

A = 1.08

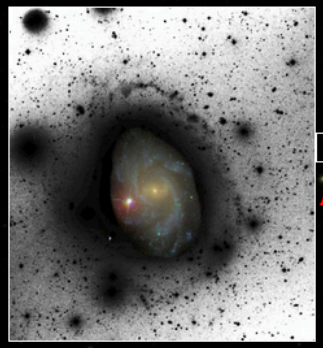


CIG568 (Scd) - OmegaCAM (VST)
~27.6 mag/"² (r SDSS)
~2h on target - 4'x5' - R_{25} = 0.51'

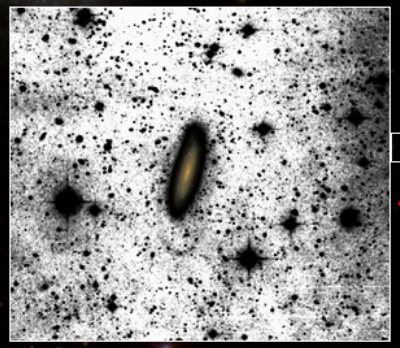
A = 1.17



CIG947 (Sab) - CAHA2.2m
~4.3h on target (r SDSS)
image: 12'x10' - R_{25} = 2.26'

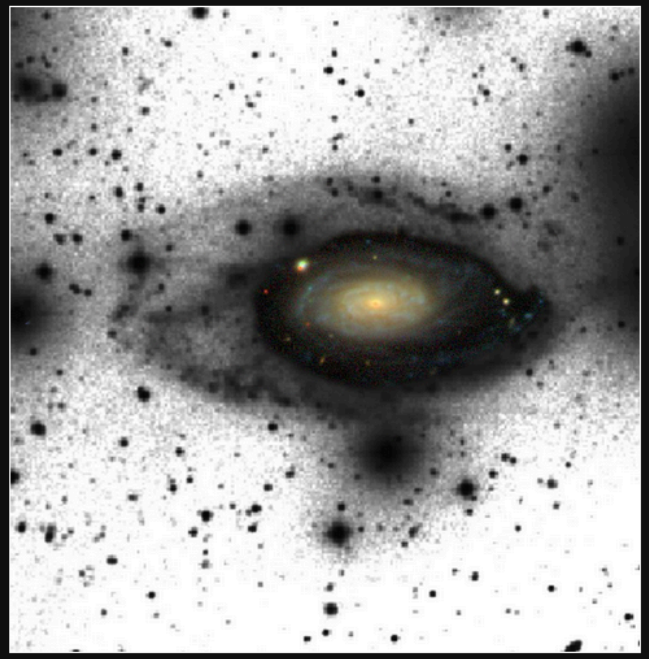


CIG96
A = 1.16



CIG340
A = 1.03

CIG1019 - CIG841

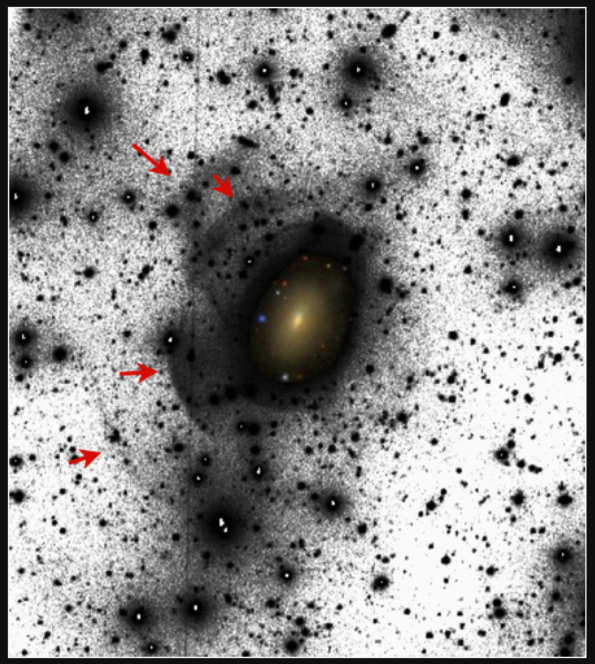


current work

inner 6' x 6' of CIG1019

SB = 26.5 mag/arcsec² (R band)

A = 1.22

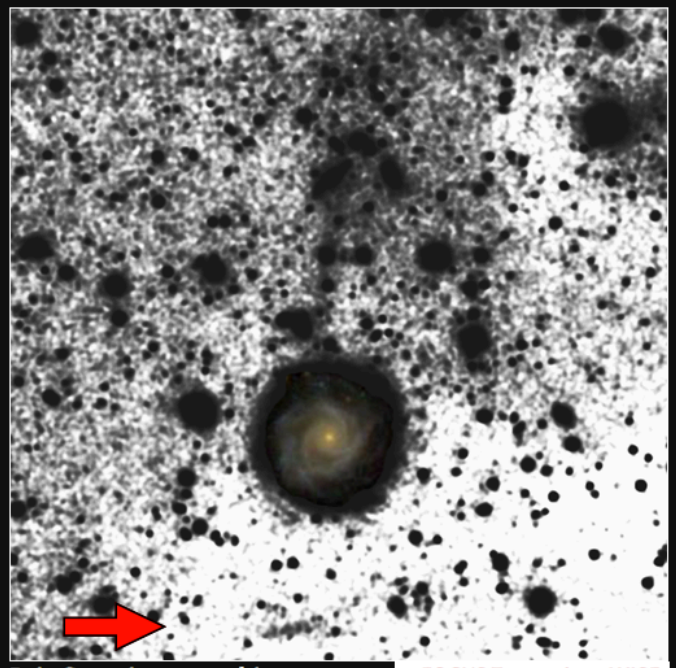


current work

inner 7' x 9' of CIG841

Athanassoula & Bosma 1985

CIG568 - CIG947



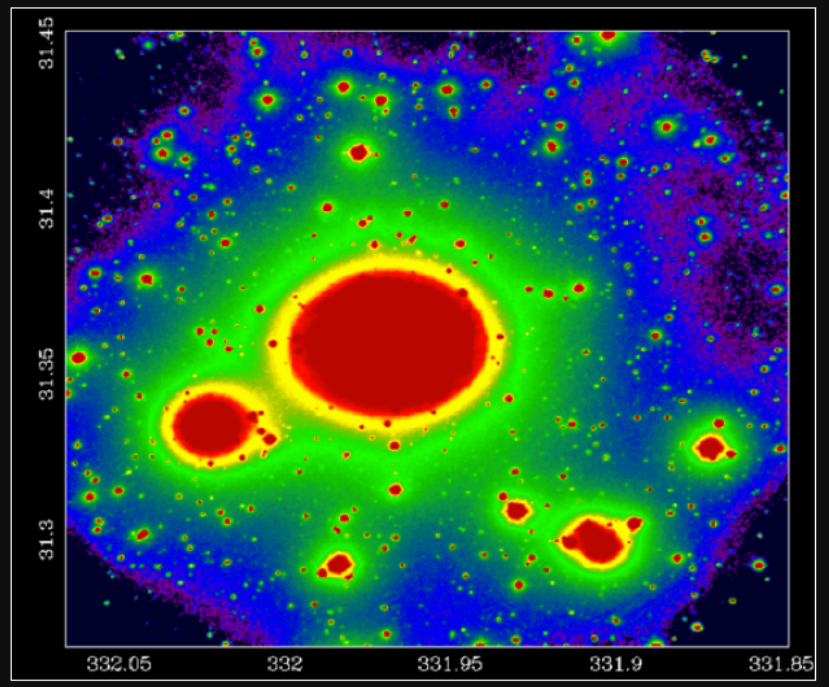
5pix Gaussian smoothing
current work

+ FOCUS Team + AstroWISE

A = 1.08

inner 4' x 5' of CIG568

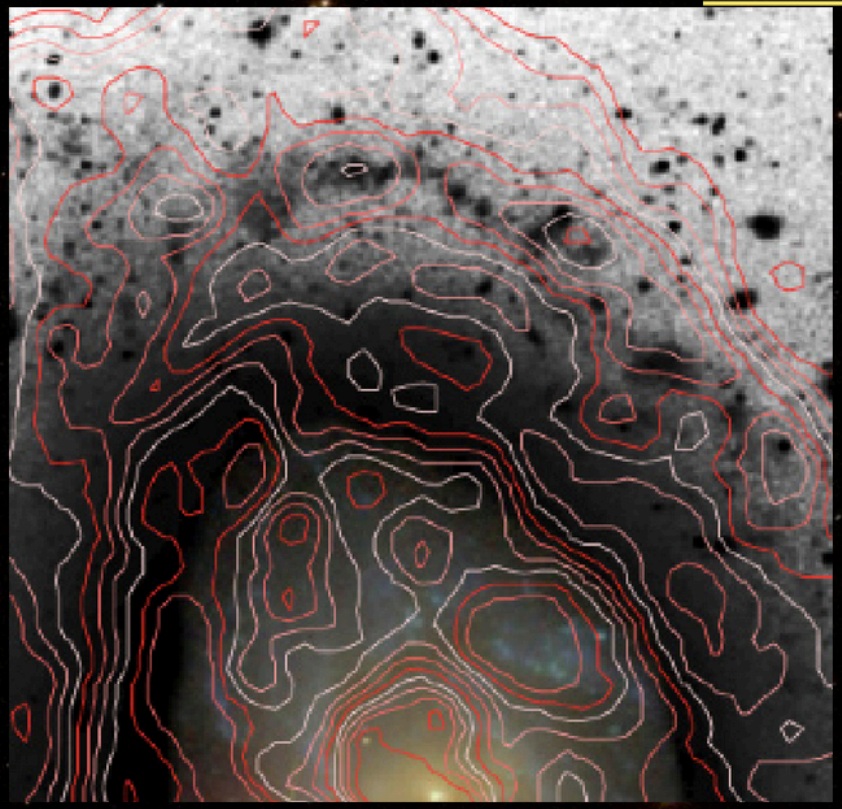
SB = 27.6 +/- 0.5 mag/arcsec²



inner 12' x 10' of CIG947

A = 1.17

CIG 96



Optical: ~3.8h on target with CAFOS at CAHA2.2m
HI: ~8h on target with VLA (C+D conf.)

A = 1.16

Optical

R_{25} = 0.86'; FoV = inner 4.5' x 4.5'

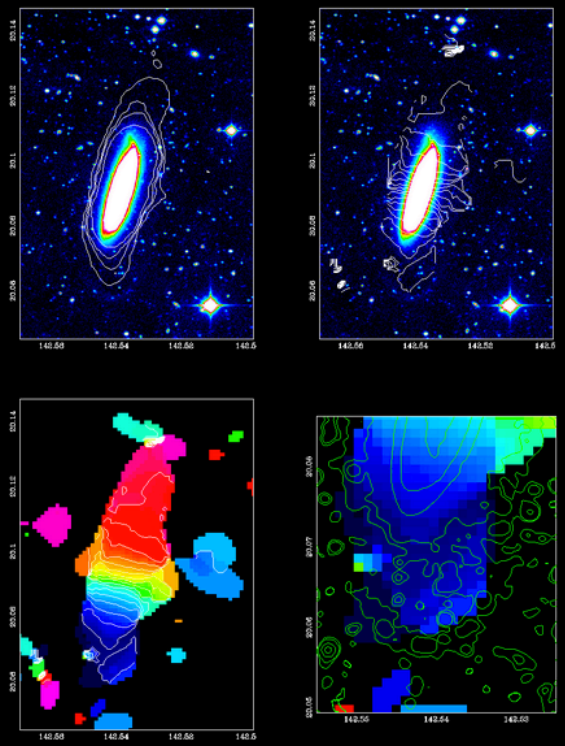
SB = 26.9 mag/arcsec² (R band)

HI

~8h in C+D conf.

N(HI) ~ 5 e19 at/cm²

Future work



CIG340

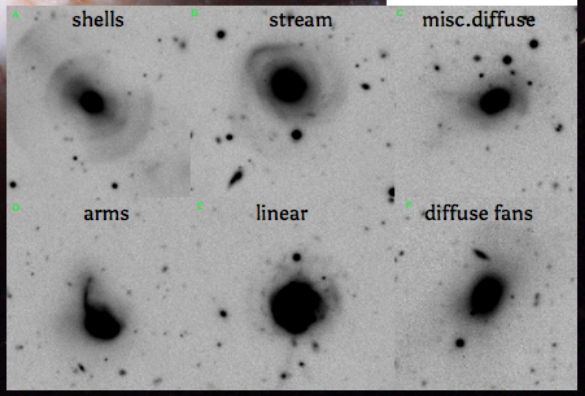
analyse 20+ optical observations galaxies

colors of the features

HI study of striking features

fitting our features in other classification systems

Atkinson et al. 2013



Summing-up

Extremely isolated galaxies present asymmetries whose origin remains unexplained.

By analysing *deep optical* and *HI* data, we expect to find clues of what are the most probable causes for such asymmetries.

Thank you

Graphical references

Cover: Tadpole galaxy - http://billsnyderastrophotography.com
Stephan's Quintet - http://www.kentbiggs.com
Milky Way - ESO / S. Brunier, F. Tapissier, The World At Night
threefold Hubble's diagram - CANDELS-HST
NGC3628 - APOD
NGC2623 - HST
back cover background - kvnyang from hdw.eweb4.com

Acknowledgements

The AMIGA Team and all the collaborators.

Special thanks to Víctor Terrón, Ana Karla Díaz and Laura Sampedro for all their in/voluntary help for this presentation.

All the folks whose images I borrowed.