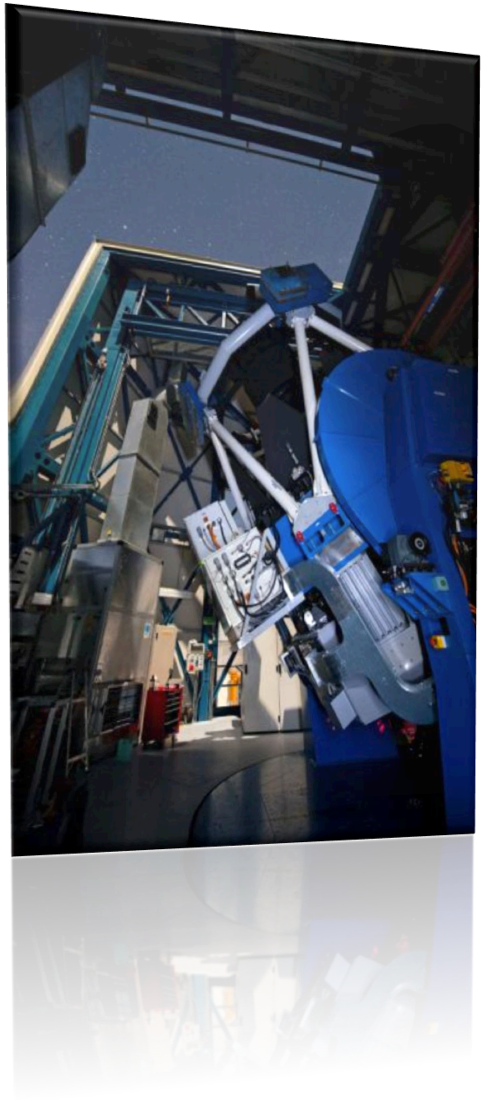
VST
the VLT Survey Telescope



Massimo Capaccioli
Department of Physics, University of Naples Federico II
INAF-Capodimonte Astronomical Observatory, Naples

on behalf of

Pietro Schipani, OAC
Giacinto de Paris, INAF
Aniello Grado, OAC
Nicola Napolitano, OAC
Enrica Iodice, OAC
Marcella Marconi, OAC
Paola Merluzzi, OAC
Vincenzo Ripepi, OAC

and many others ….

ESO Garching, 15 October 2012

1997: OAC proposal to ESO

for a wide-field optical & IR facility

then VISTA came

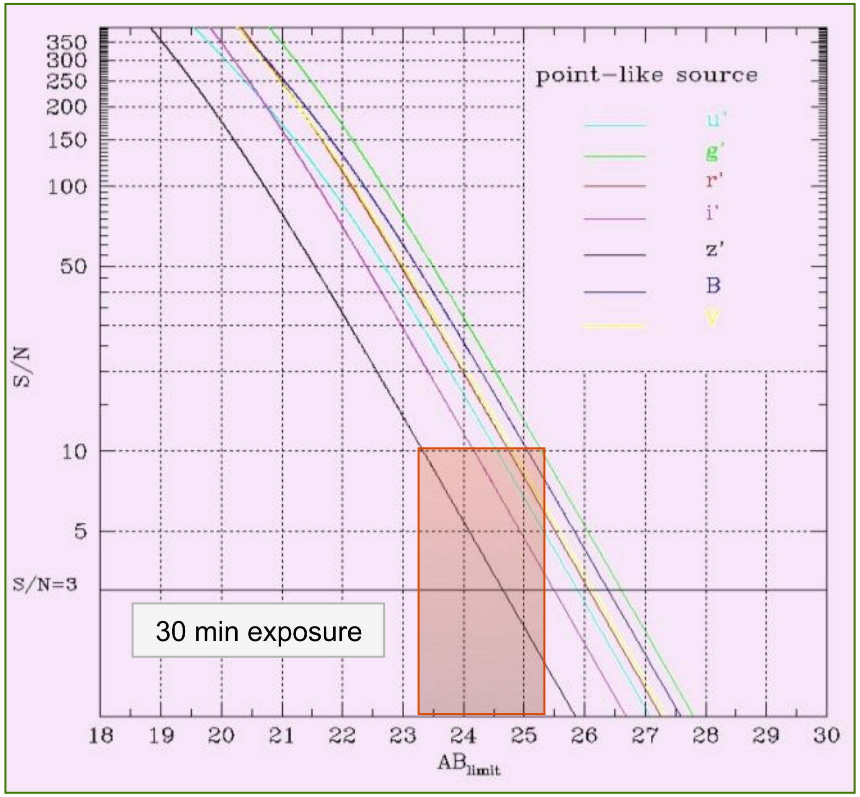
...

1997: OAC proposal to ESO

for a wide-field optical facility
performing 10 times better than WFI @ ESO/MPI2.2m

- class 2.5 m
- NTT type mount
- active optics
- 1.46 deg corrected FoV (∅)
- 80% EE in 0.4″
- scale ~ 0.2″
- spectral range from *U* to *I*

Expected performances

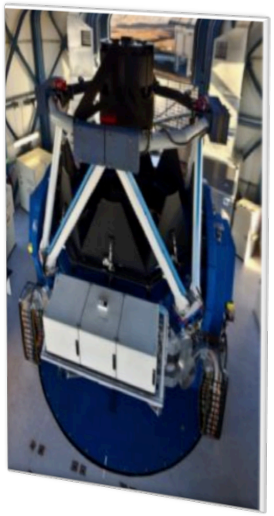


Why sky surveys?

Monitor what is known, discover what is rare/unknown

1998: ESO accepted

and the VST project started with the following commitments and returns

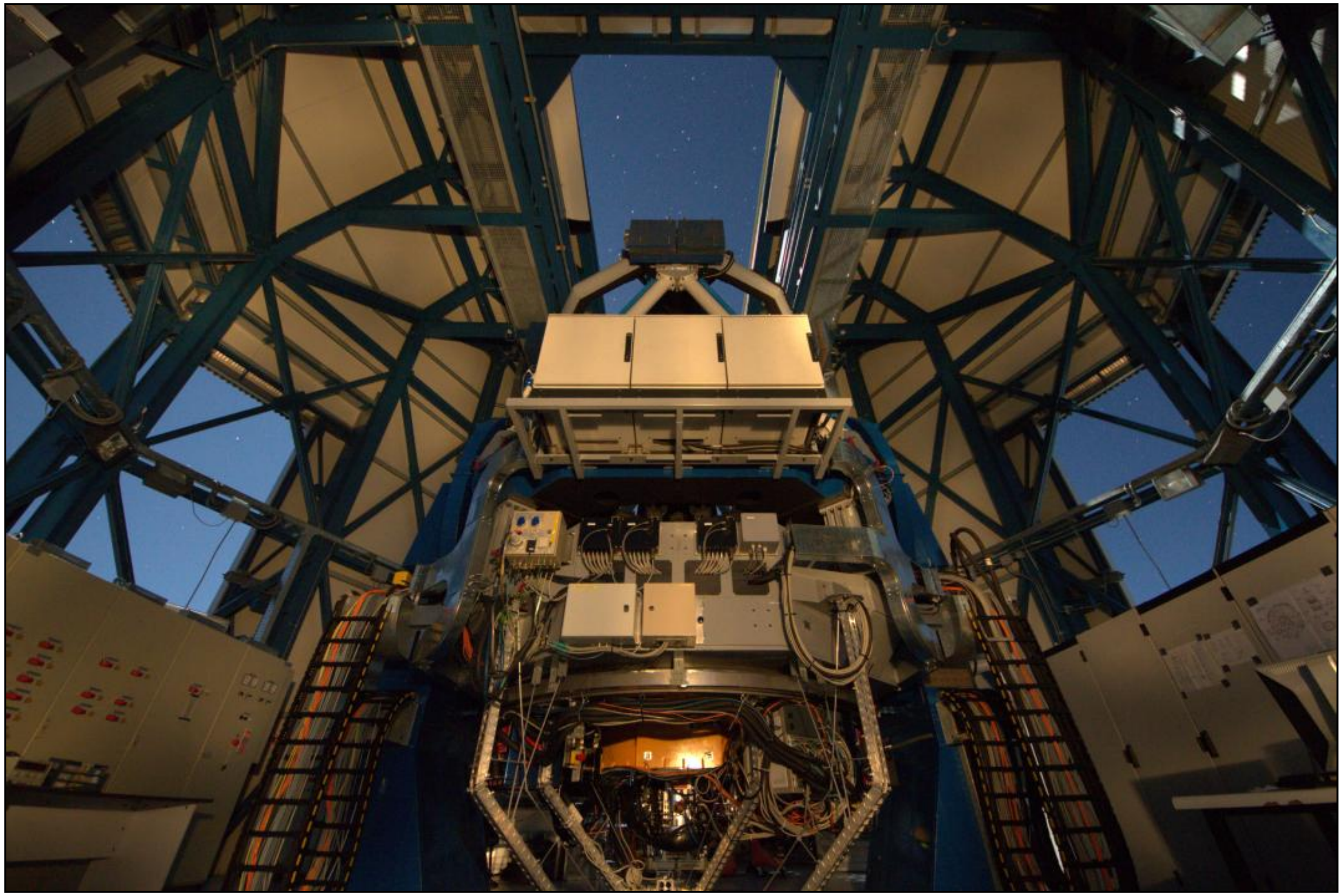


OAC: **procurement of the telescope at Paranal**
in exchange of some GTO @ VST & VLT

ESO: **civil work and operation of the facility for at least 10 years;**

OmegaCam: **procurement of the 16k×16k camera**
in exchange of some GTO @ VST.

October 15, 2011: VST facility in service

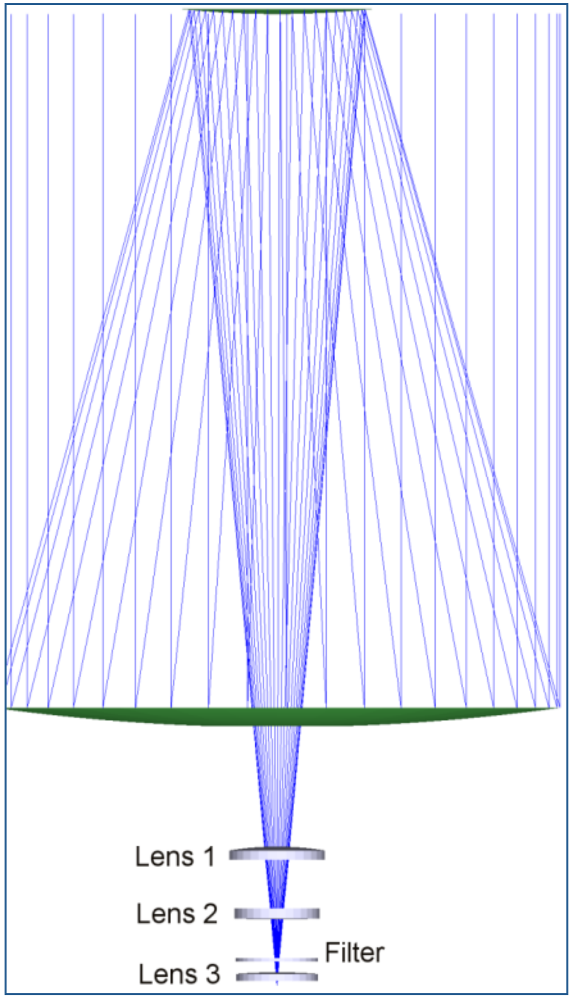


A success at the end of a dark tunnel made possible, among the others, by the perseverance of Jason Spyromilio and Roberto Tamai.

VST as it is, in a nutshell

Optical System

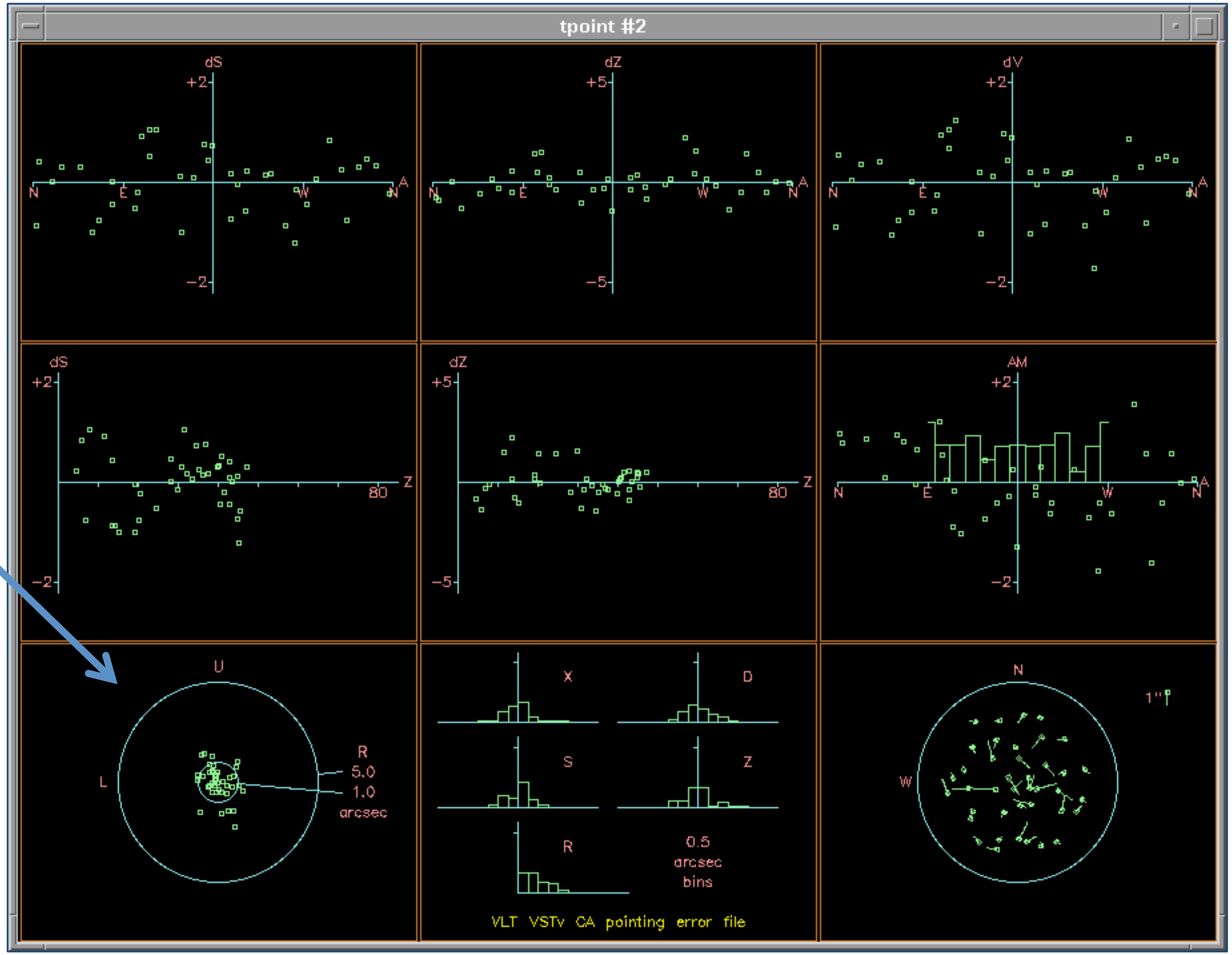
- Primary mirror: 2.6m
- Secondary mirror: 0.9m
- F# 5.5
- Field corrector with 3 lenses (2 in the telescope + 1 in the camera)
- ADC with counter-rotating doublet of prisms, exchangeable with 2 lens corrector
- Field of view: 1°×1°
- Shack-Hartmann wavefront sensor
- Active M1 shape control (81 active axial support + 3 axial fixed points)
- Active M2 positioning in 5 dof (hexapod)
- Autoguiding with probe in R,θ coordinates



VST Pointing Model

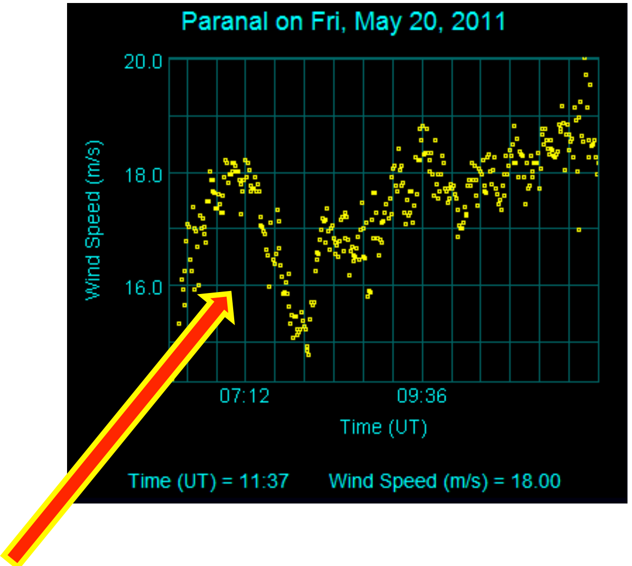
Performance

- Pointing error ~1 arcsec RMS
- Fit results typically between 0.8 and 1.1 arcsec
- A model with 40 stars is built in less than 1 hour

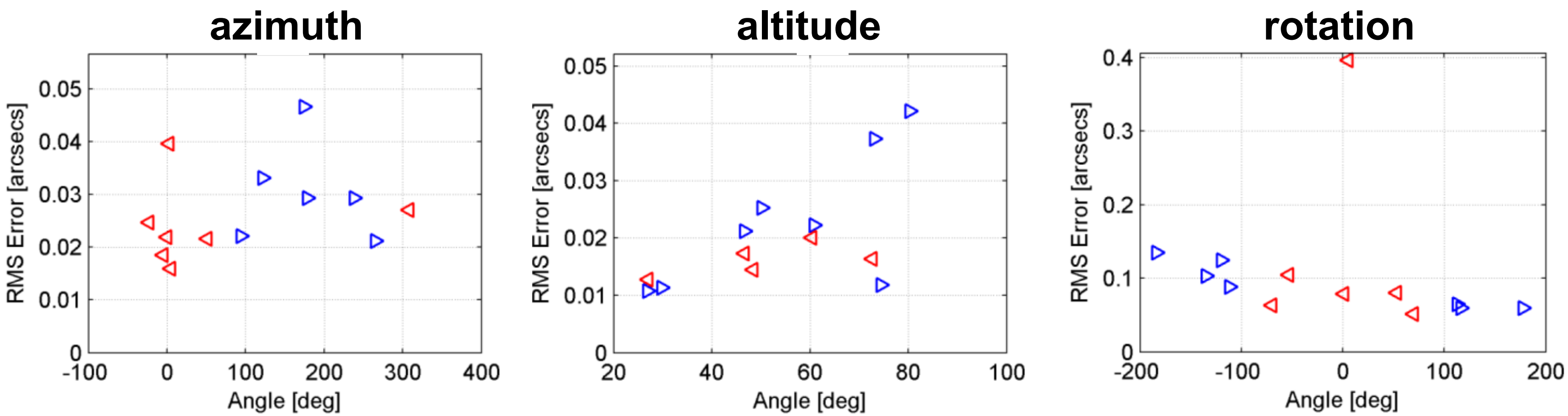


VST Servo Control

- Speed loop (soft-tacho)
- Position loop – Variable Structure Control
- Commercial amplifiers
- 4 motors with torque bias
- Tracking Map - representative of all tracking conditions
- Frequent Offsets
- Wind rejection



Performance (3 min lap in a windy night: 15 < v < 20 m/s)

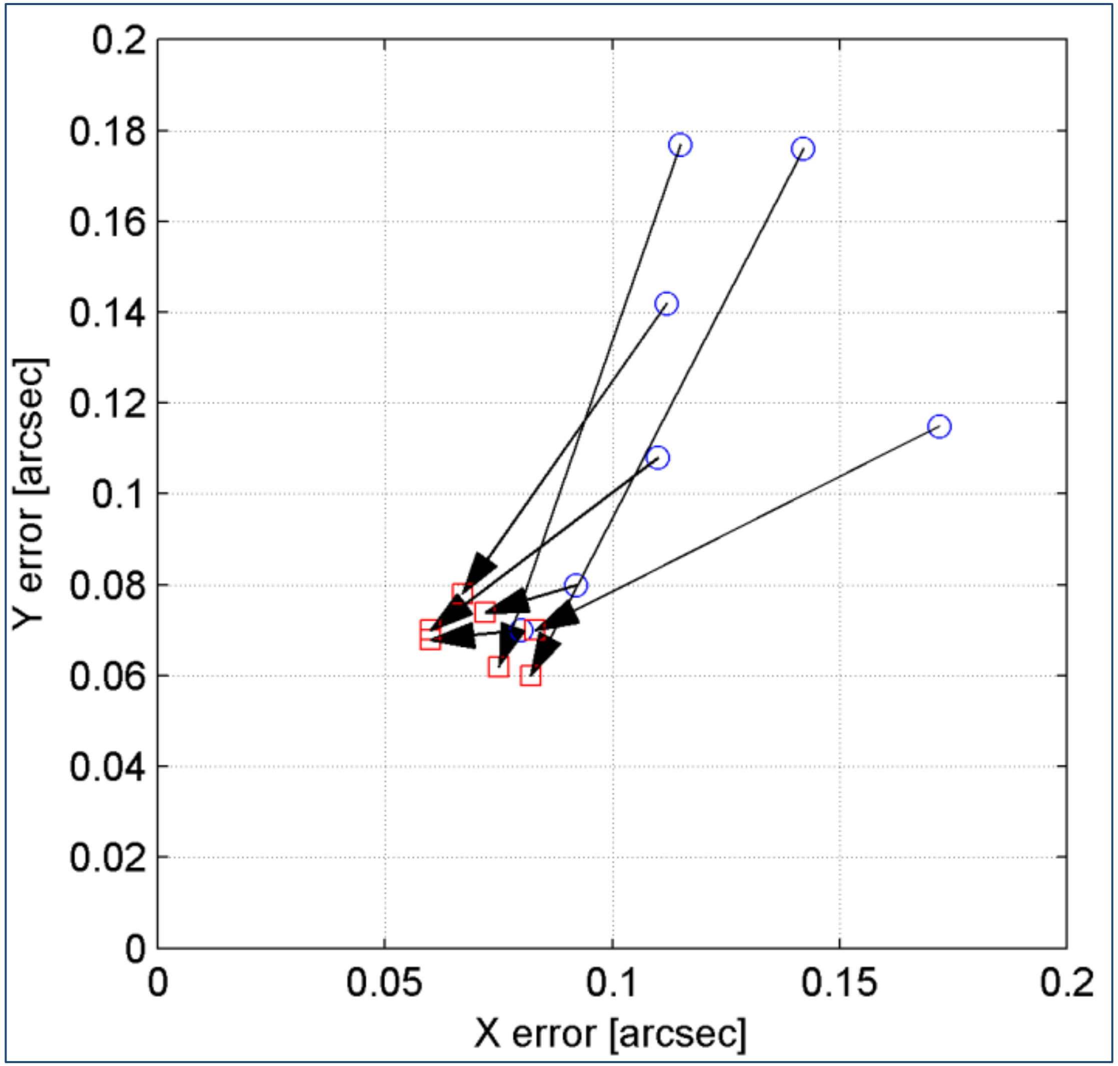


VST Autoguiding System

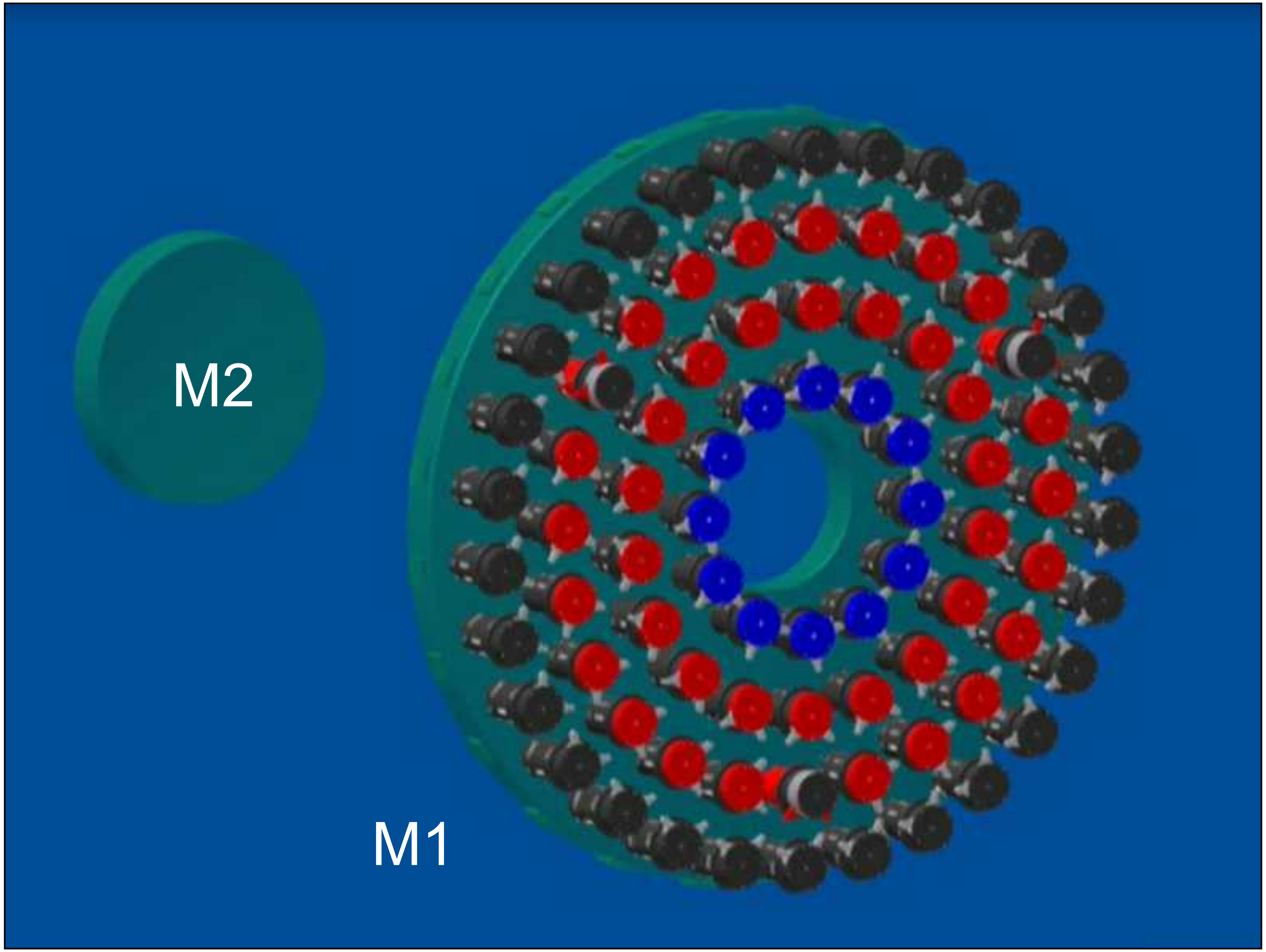
Performance

With autoguiding active
the error measured
on the guide probe is
≤ 0.1 arcsec RMS

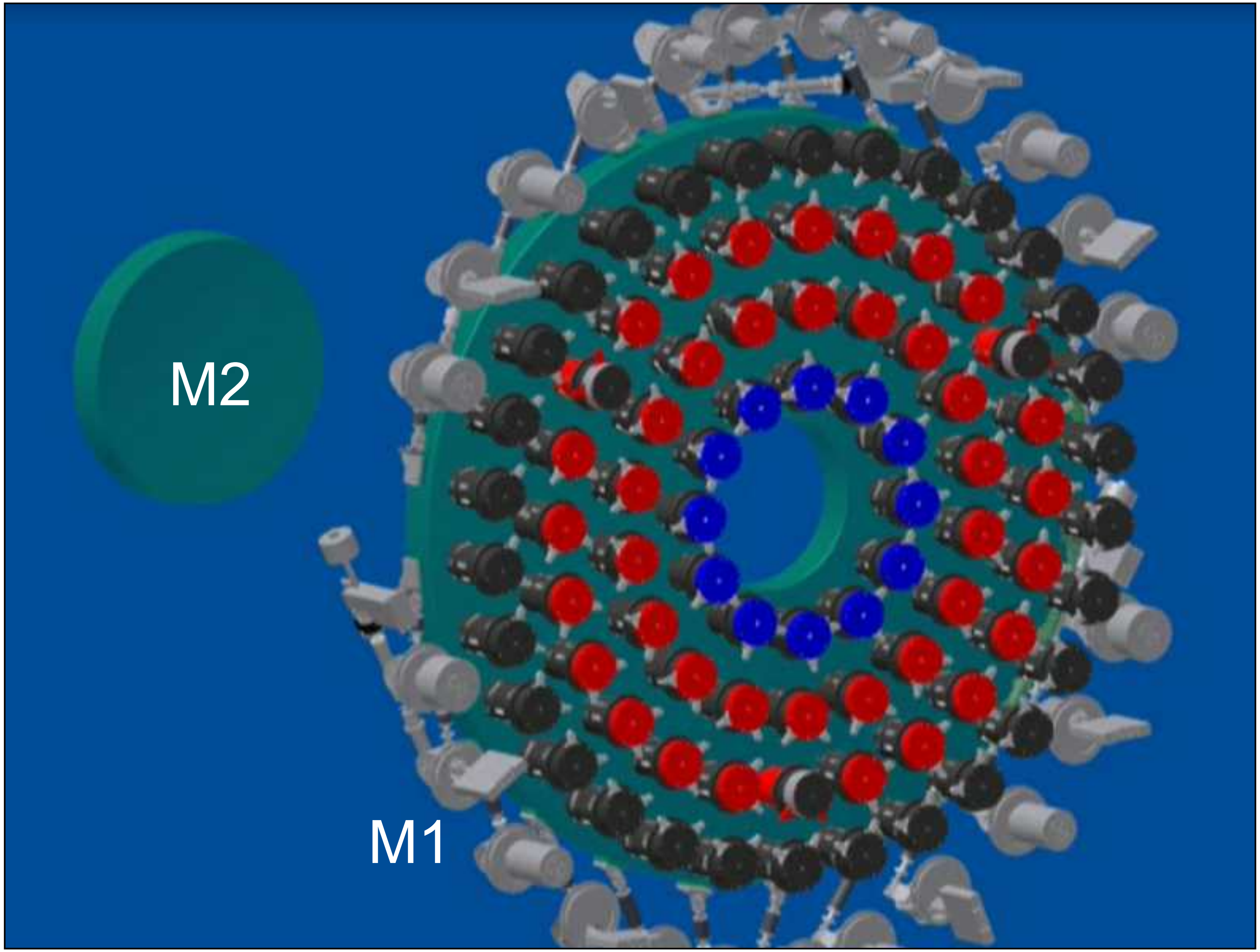
(telescope AG not used)



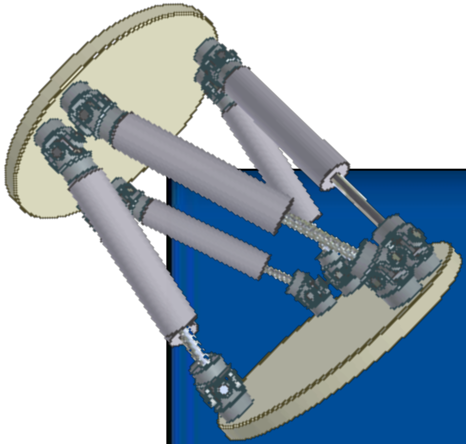
VST active optics:
M1 axial actuators & fixed points

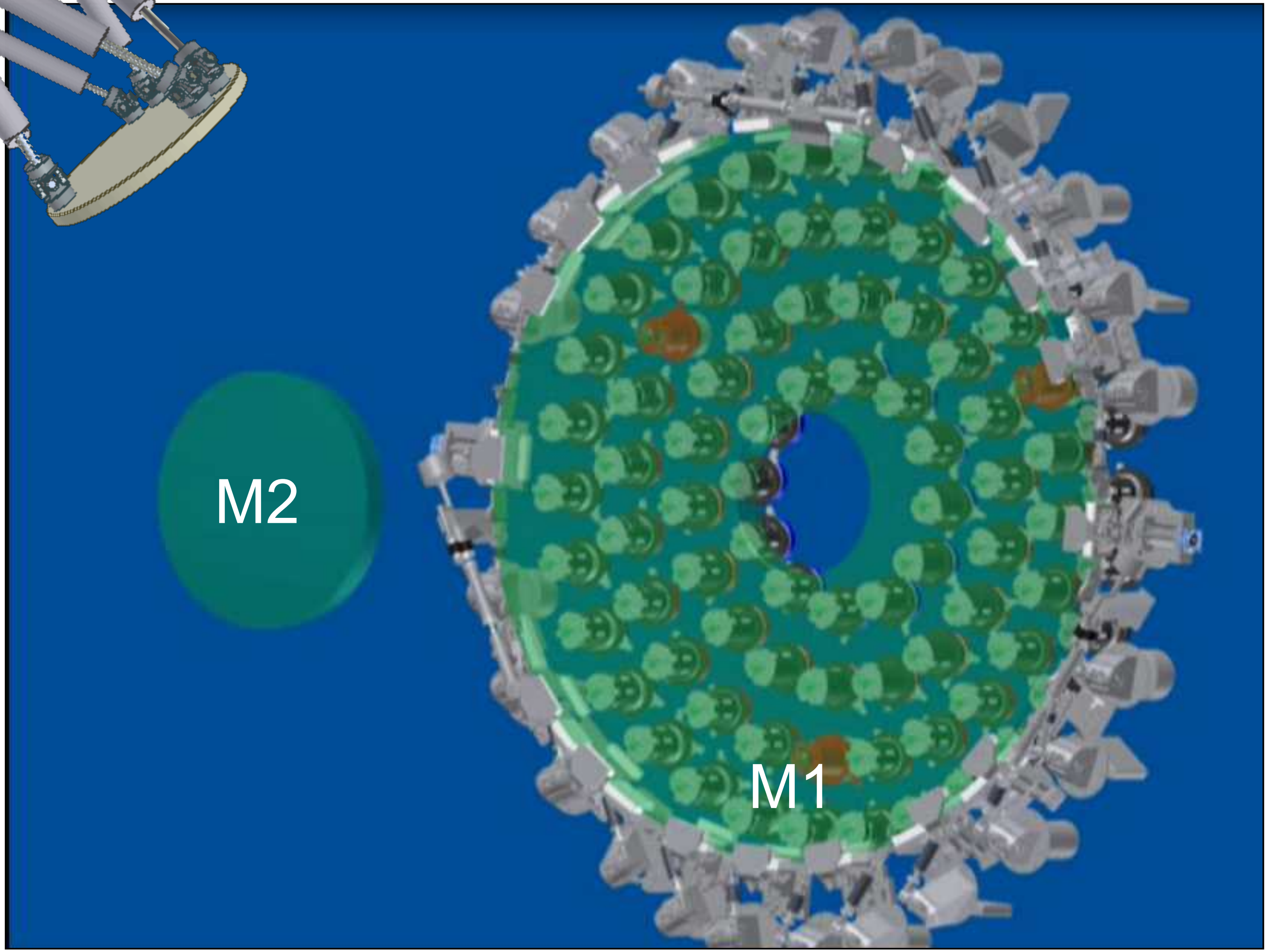


VST active optics:
M1 axial & radial actuators



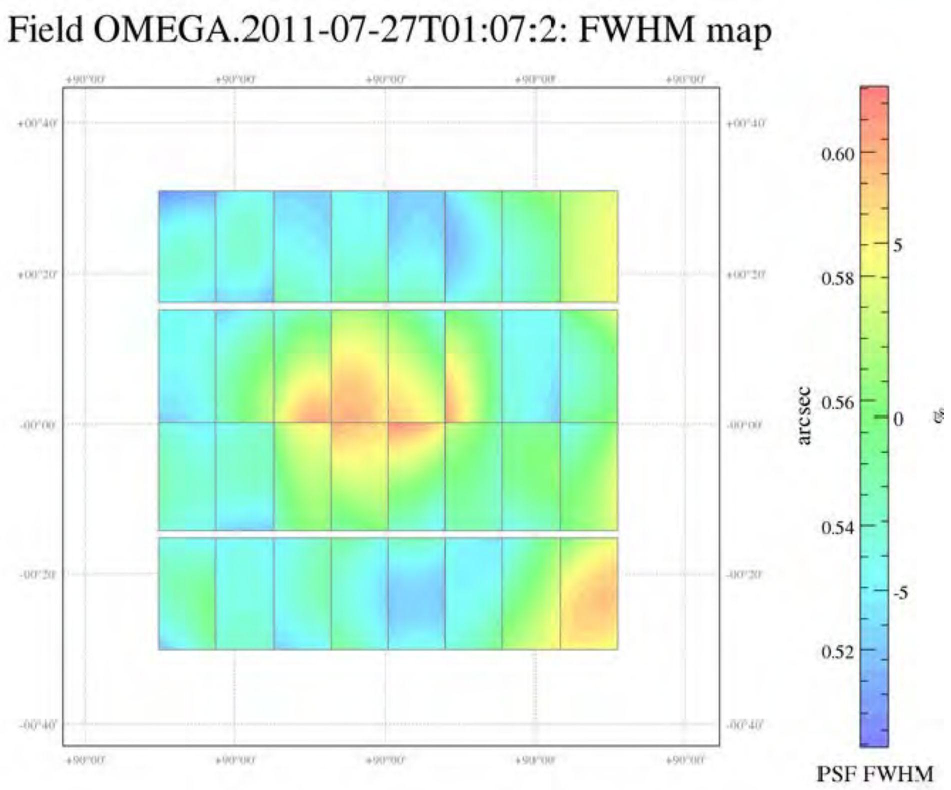
VST active optics:
hexapod at M2

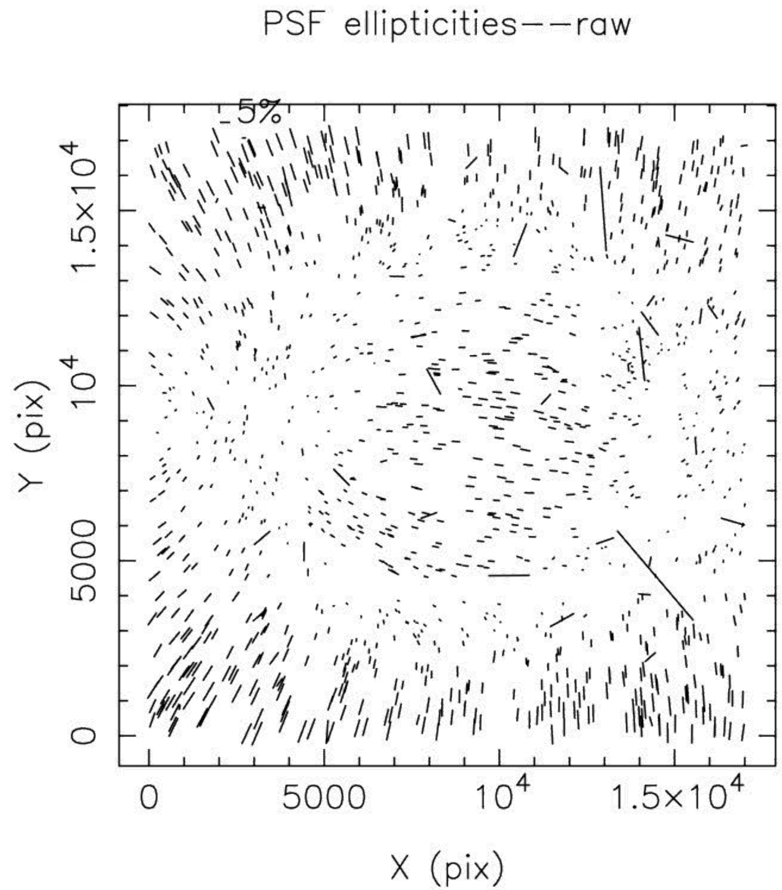




VST: the active M1 cell as it is

VST Image Quality performance





PSF FWHM = 0.5 arcsec, constant within <10% over the whole field
ellipticity ~ 10%

VST camera OmegaCam

P.I. Konrad Kuijken

OmegaCAM Consortium: the Netherlands, Germany, Italy, ESO

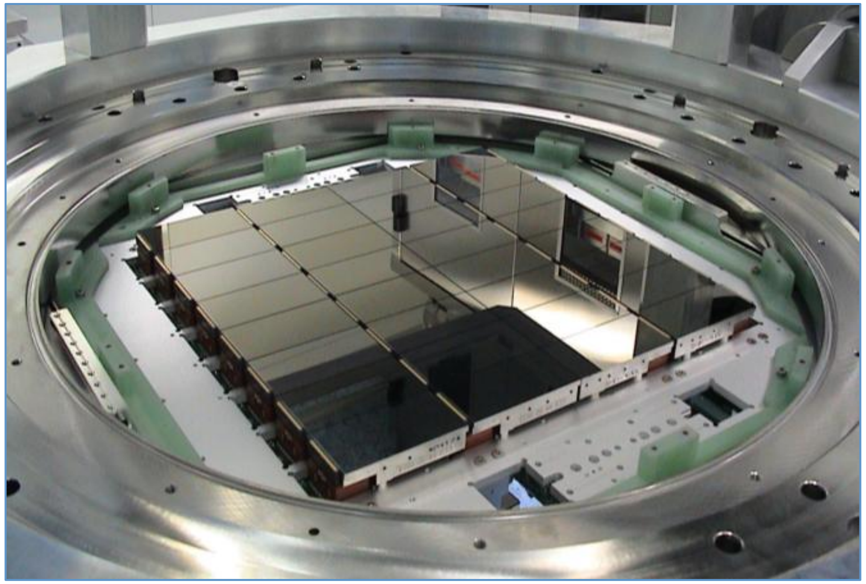
Format: 268 Mpixel mapping a 1°×1° field

Scale 0.21 arcsec/pixel

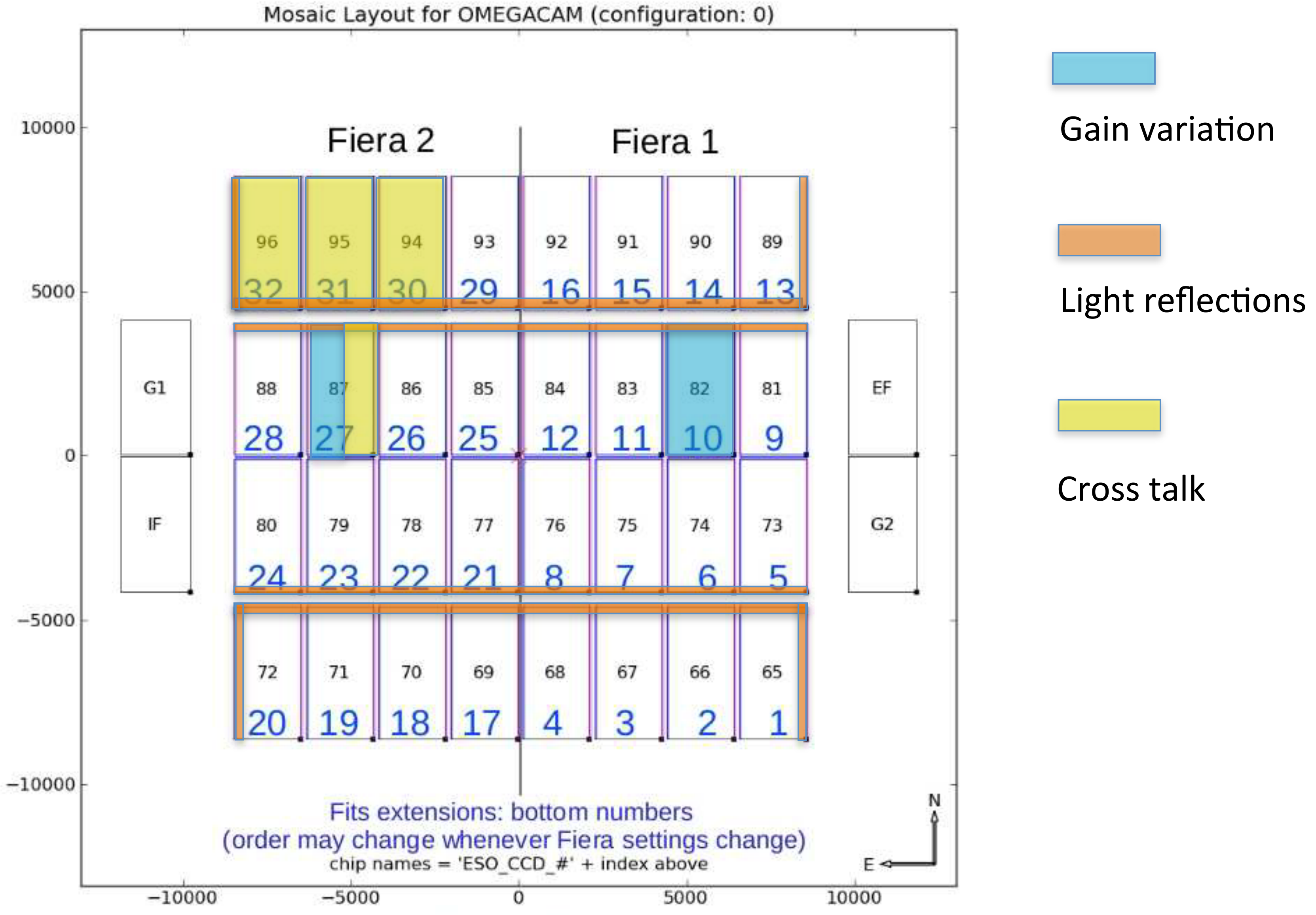
32 scientific CCDs + 4 outer CCDs

Autoguiding

Image analysis curvature sensor

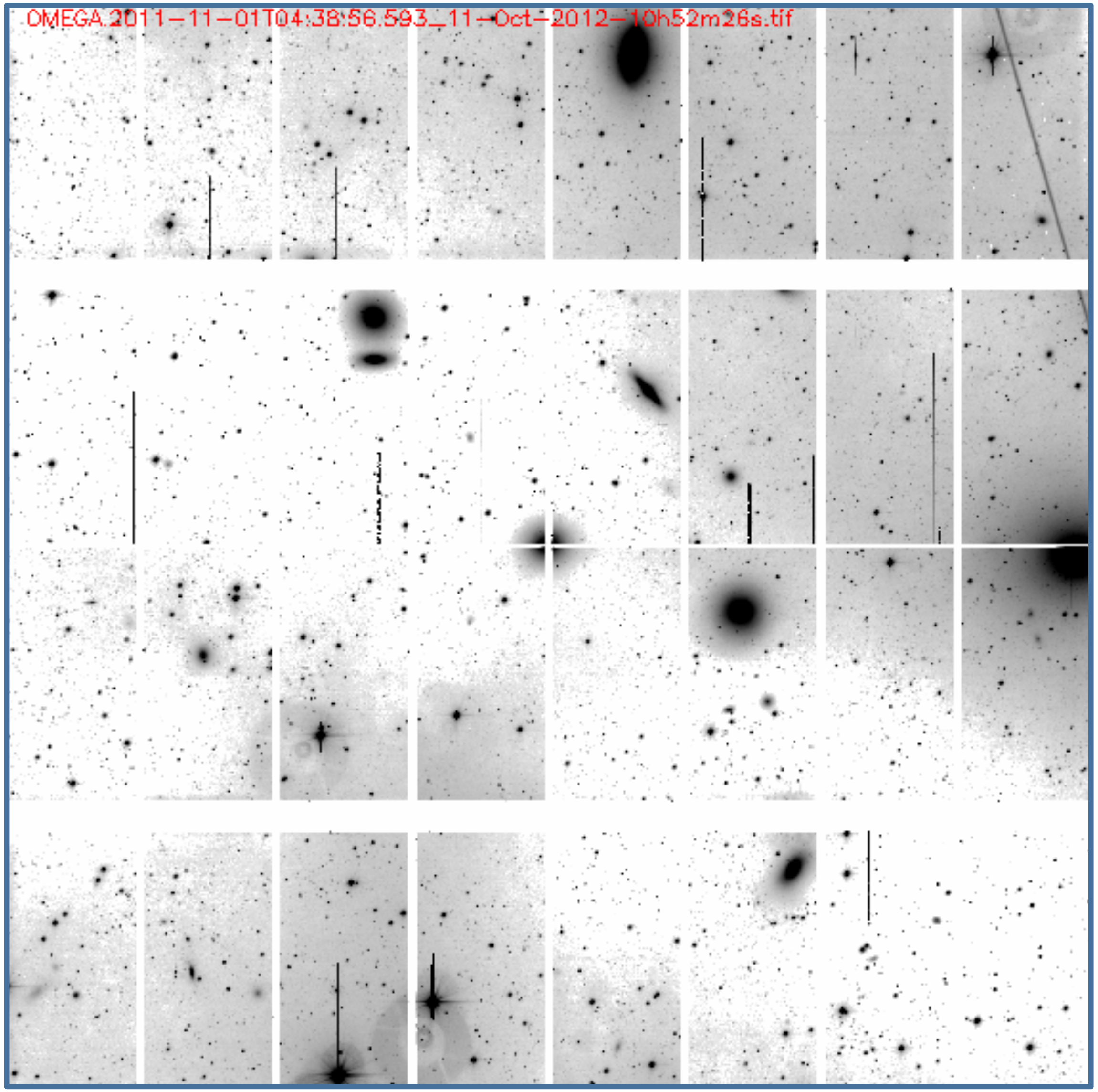


VST camera mosaic issues



VST camera OmegaCam:

some residual problems



VST regular operations

Official start of regular operations:

15th October, 2011

exactly one year ago (P88 + P89)

Regular operations

In 1 year:

- ➢moderate technical downtime caused by the telescope (ESO data: 4.1% in P89 which includes telescope, camera and enclosure downtimes – no official breakdown available)
- ➢reliability of the system: in 1 year only one positioning problem of M2 which caused a realignment activity by Paranal (earthquake ?).

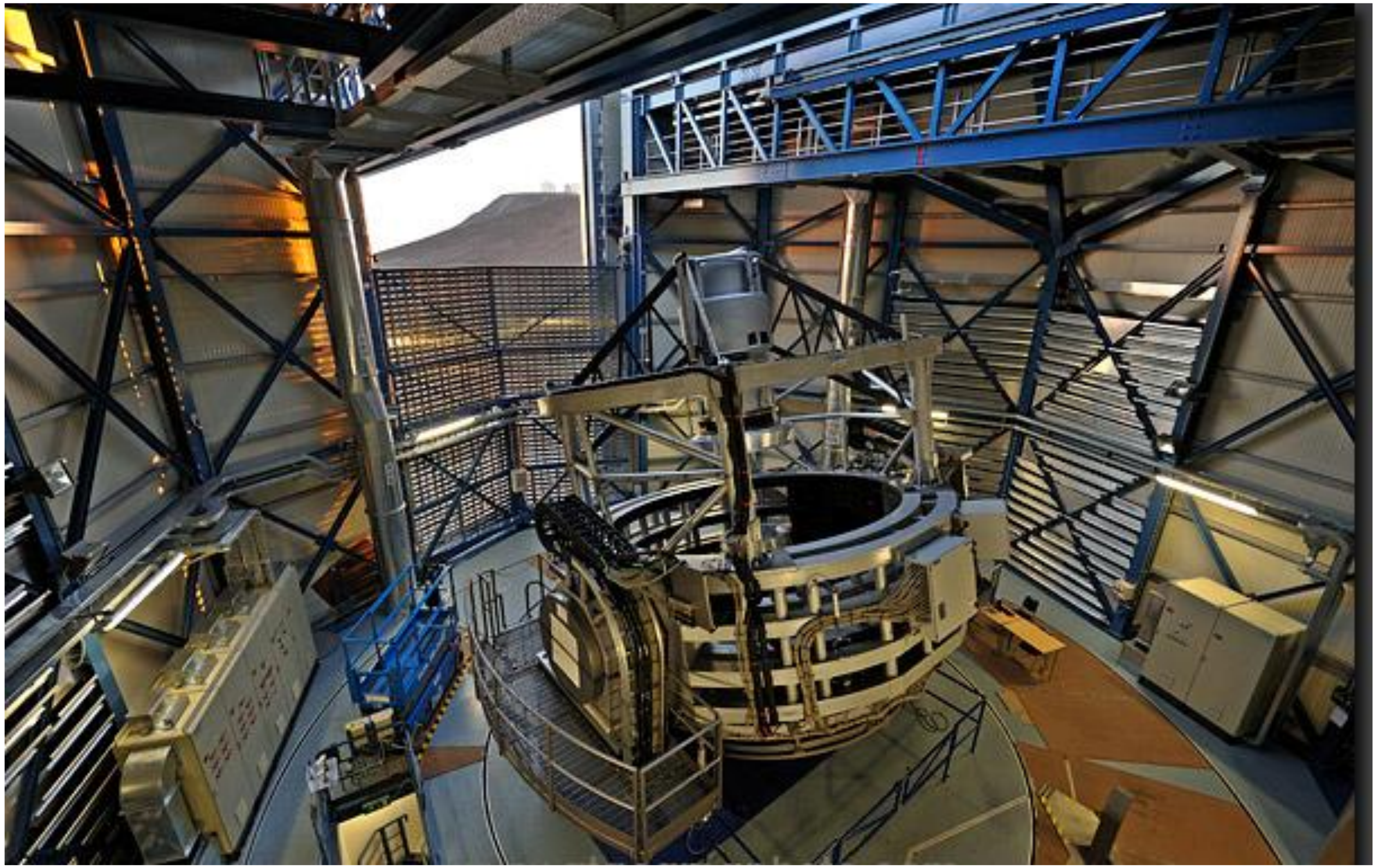
  No other relevant HW/SW problems
- ➢3 interventions from INAF team for pending action items (no impact on the surveys – daily or full moon time activities)

Future:

- ➢Possible improvements only from a common effort on the overall system: telescope + camera + operations
- ➢Acquisition time to be reduced, several ideas from multiple sides to be implemented

An extrabonus: synergy of VST with VISTA

VST+VISTA: u to K wavelength coverage
(accurate photometric redshifts, star formation etc.)



VST-OmegaCAM competitors

Telescope/Instrument	D/f-ratio	FoV /DIQ	$\frac{D^2 \times FoV}{DIQ^2}$	Availability
VST - OmegaCam	**2.6m / 5.5**	**1 / 0.43**	**37**	**operating**
CFHT - MegaCam	3.6m / 4	1 / 0.7	26	operating
SkyMapper	1.3m/ 4.8	5.7 / 0.7?	20?	operating
PanSTARRS 1	1.8m / 4	8.3 / 0.8	42	operating
WIYN - ODI	3.5m / 6.3	1 / 0.55	40	operating
CTIO - DEC	4.0m / 2.7	3 / 0.9	59	first light!
DCT Prime Focus (?)	4.2m / 2.3	2 / >0.73	<66	?
PanSTARRS 2	2×1.8m / 4	8.3 / 0.8	84	2013
ACTUEL-JPCam	2.5m / 3.6	3/0.45	92	?
PanSTARRS 4	4×1.8m / 4	8.3 / 0.7	220	?
Subaru - Hyper Suprime	8.2m / 1.8	4 / 0.6	693	2012 (planned)
LSST	6.7m / 1.25	9.6 / 0.7	879	>2020

DIQ= delivered image quality ~ FWHM in arcsec of a point source

VST dedicated software
Astro-Wise

Started from a FP5 RTD program funded by the EC

Partners:

OmegaCEN-NOVA/Kapteyn Institute, The Netherlands
INAF-Capodimonte Astronomical Observatory, Naples, Italy
Terapix, IAP, Paris, France
Universitäts-Sternwarte München / MPE, München, Germany
Argelander-Institut für Astronomie, Bonn, Germany
ESO, Garching bei München, Germany

A distributed system for processing, analyzing and disseminating wide field astronomical images

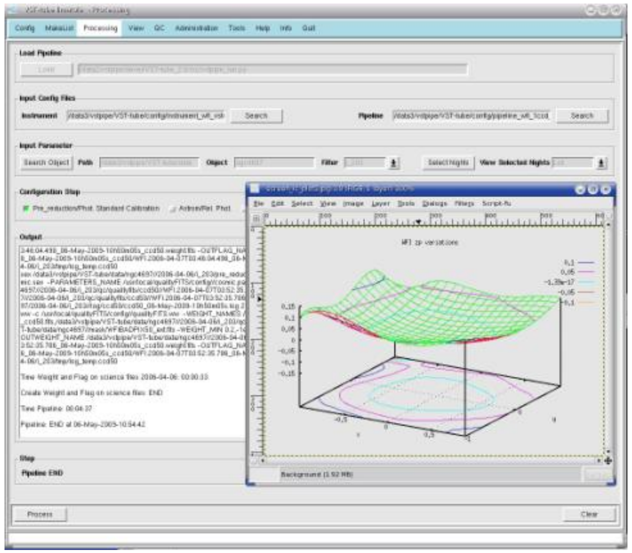
Official pipeline for KIDS public survey

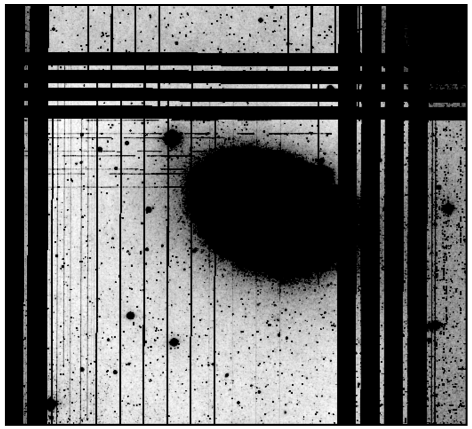
For progress on KIDS data reduction see Konrad's & Gijs' talks

VST dedicated software
VstTube

Pipeline developed at Naples by A. Grado & L. Limatola

- from raw to fully calibrated images
- tailored on surveys needs
- GUI to facilitate processing and administration
- includes a growing set of analysis tools
- supported surveys: VEGAS, ACCESS, SUDARE, VOICE, STEP, STREGA, COSMOS (Chilean GTO)
- not only VST …… (*e.g.* Subaru, VLT FORS …)



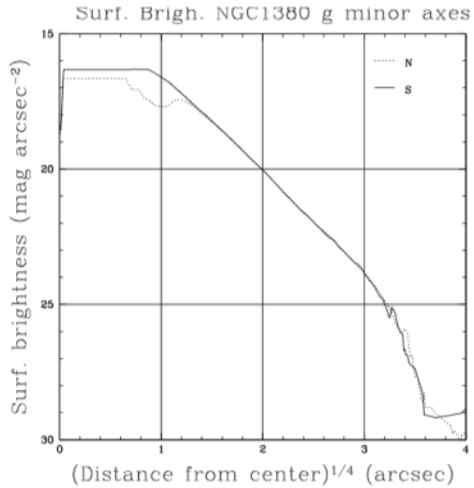


True noise map propagation

NGC4697 weight map section

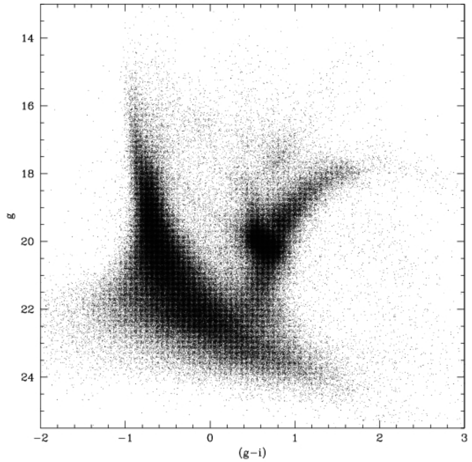
First VST image fully processed (OmegaCen)

Capable of processing science verification data (NGC253)

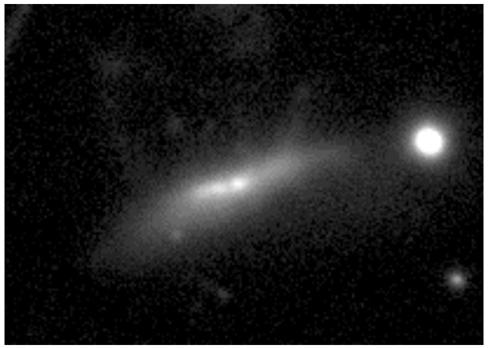


VEGAS: faint surf. bright. profiles

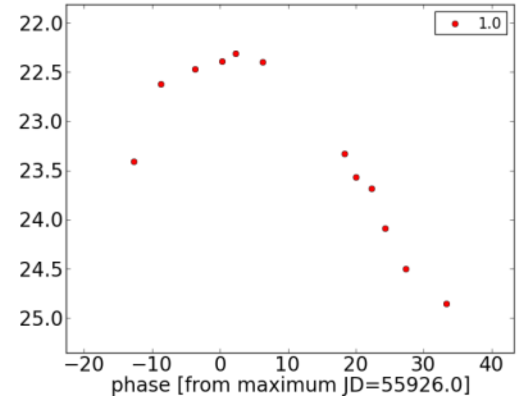
Vst Tube



STEP: SMC SFH



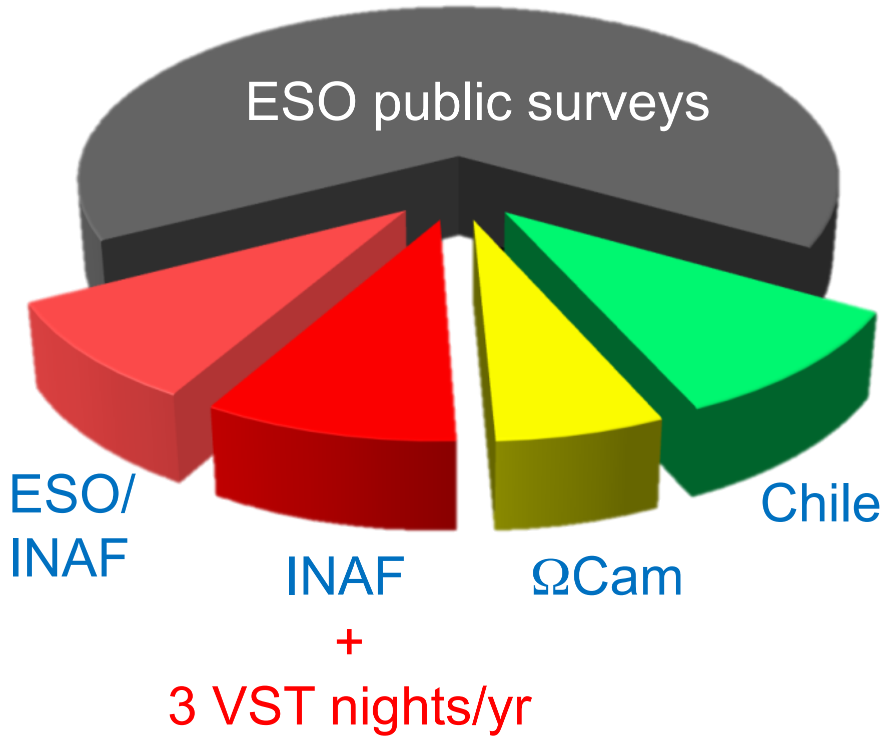
ACCESS: identification of transforming galaxies by morphology

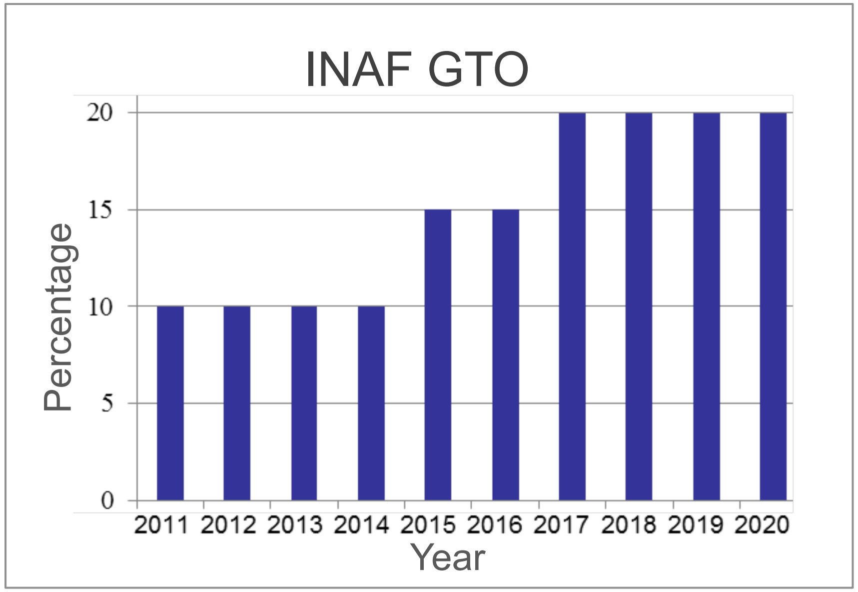


SUDARE: first VST SN detected. 12 hours between VST obs. and VLT spectr. confirmation

Share of VST observing time and scientific policy

for the first 10 years of operation





Observations:
service mode

VST ESO Public Surveys

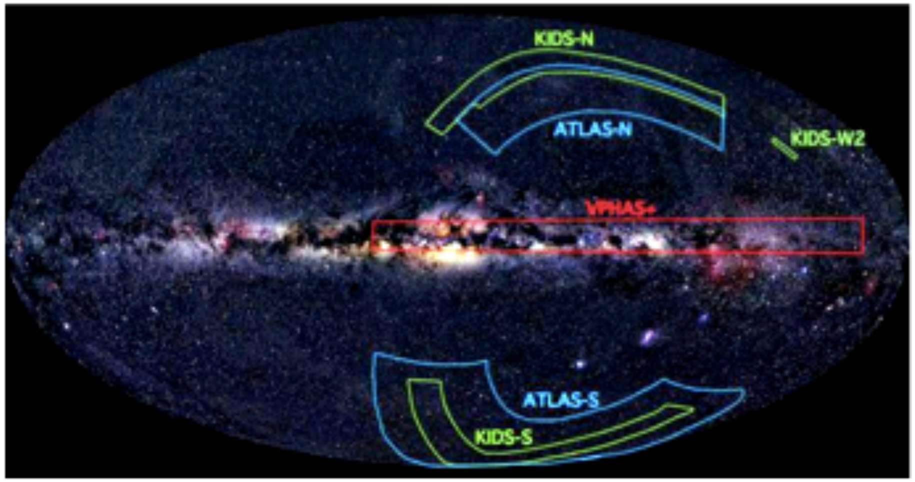
see presentation

1) KIDS = Kilo-Degree Survey; P.I. Konrad Kuijken (Leiden)

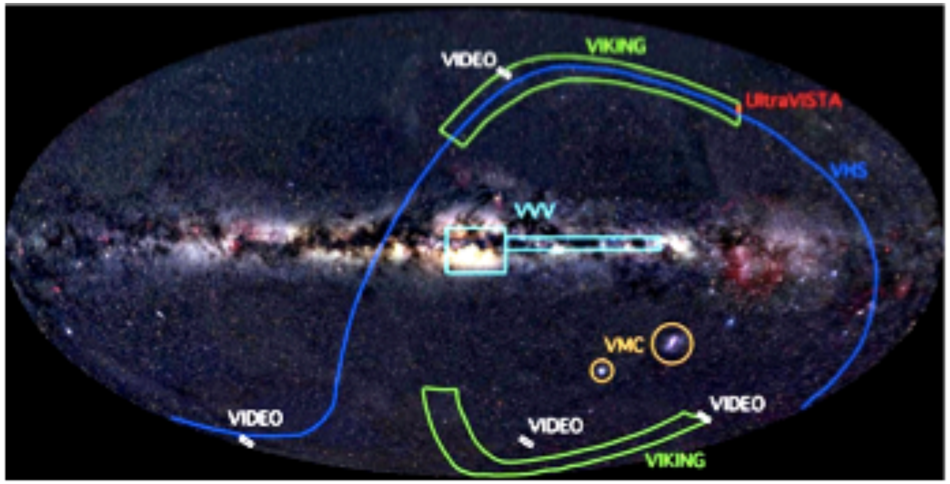
1500 square degrees in 4 bands (+ NIR VISTA/VIKING survey)
2.5 mag deeper than the Sloan Digital Sky Survey

- weak gravitational lensing: studying DM halos and DE with weak lensing,
- investigating galaxy and cluster evolution, large-scale angular power spectrum, and the equation of state of the dark energy;
- high redshift quasars.

Optical imaging: u g r i



NIR imaging: Z, Y, J, H, Ks



VST ESO Public Surveys

2) The VST ATLAS;
P.I. Tom Shanks (Durham)

see presentation

4500 square degrees survey of the Southern Sky in 5 filters to depths comparable to the SDSS + NIR from the VHS VISTA survey.

- dark energy equation of state by examining the 'baryon wiggles' in the matter power spectrum;
- high redshift galaxies and quasars;
- imaging base for many other future spectroscopic survey (VLT AAOmega).

3) VPHAS+ - The VST Photometric Hα Survey of the Southern Galactic Plane;
P.I. Janet Drew (Imperial College, London)

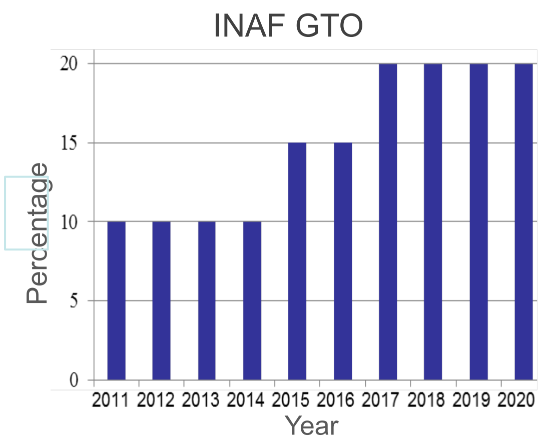
1800 square degrees survey in H-α and broadband u'g'r'i' covering the whole of the Southern Galactic Plane within the latitude range |b| < 5 degrees.

•VPHAS+ will facilitate detailed extinction mapping of the Galactic Plane

•and will be used to map the structure of the Galactic disk and to investigate its star formation history.

VST GTO + programs

+ INAF-OmegaCAM GTO



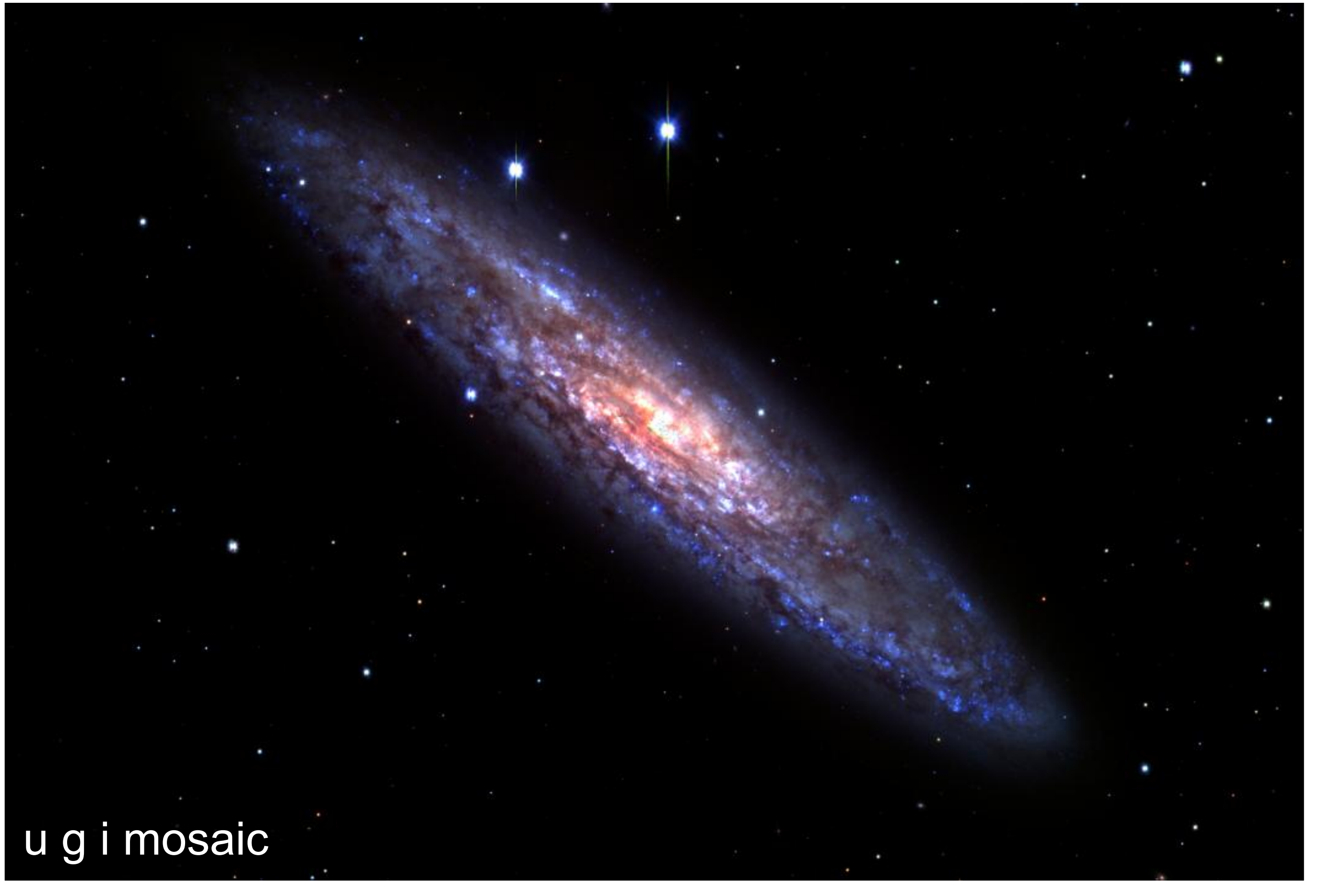
redshift

1) **STREGA**: STRucture and Evolution of the Galaxy (PI Marconi)
2) **STEP**: The Small Magellanic Cloud in time evolution of a prototype interacting dwarf galaxy (PI Ripepi)
3) VST-Omegacam Local Group Dwarf survey (PI Held)
4) **VEGAS**: VST survey of Elliptical Galaxies in the South hemisphere (PI Capaccioli)
5) **WINGS** Wide field Imaging of Nearby Galaxy clusters Survey (PI Poggianti D'Onofrio)
6**)** **VST-ACCESS**: Complete CEnsus of Star-formation in Shapley (PI Merluzzi)
7) VOICE: The VST optical imaging of the CDFS and ES1 fields (PIs: Covone, Vaccari)
8) SUDaRE: SUpernova Diversity and Rate Evolution (PI Cappellaro)

The structure of the barred galaxy NGC253:

target of the VISTA and VST Science Verification extragalactic mini-survey

material borrowed from Enrica Iodice



The VISTA & VST SV have been defined by teams of astronomers from ESO and community

ESO - Vitacura: A. Ahumada Andrea, E. Pompei, S. Mieske, T. Szeifert, V. Ivanov

ESO - Garching: M. Arnaboldi (P.I.), G. Battaglia, L. Bilbao, W. Freudling, E. Hatziminaoglou, M. Hilker, W. Hummel, J. Melnick, I. Misgeld, P. Moller, M. Neeser, N. Neumayer, K. Nilsson, M. Rejkuba, J. Retzlaff, M. Romaniello, R. Slijkhuis, B. Venemans, B. Ziegler, H. Kuntschner.

ESO user community : E. Iodice Enrica (INAF-OAC), L. Greggio (INAF-OAPd)

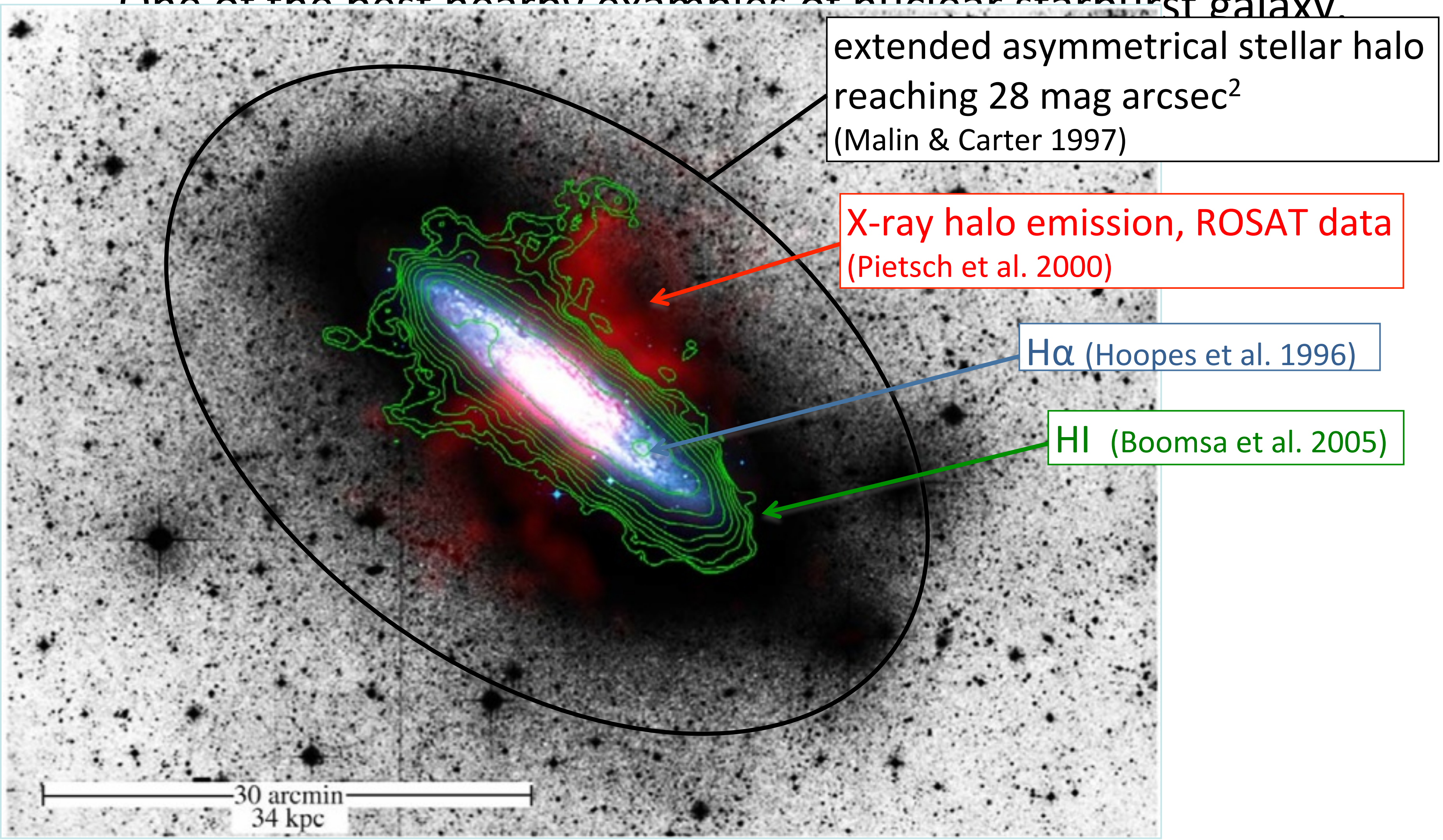
VISTA / CASU: J. Emerson, W. Sutherland, M. Irwin, J. Lewis, S. Hodgkin, E. Gonzalez-Solares

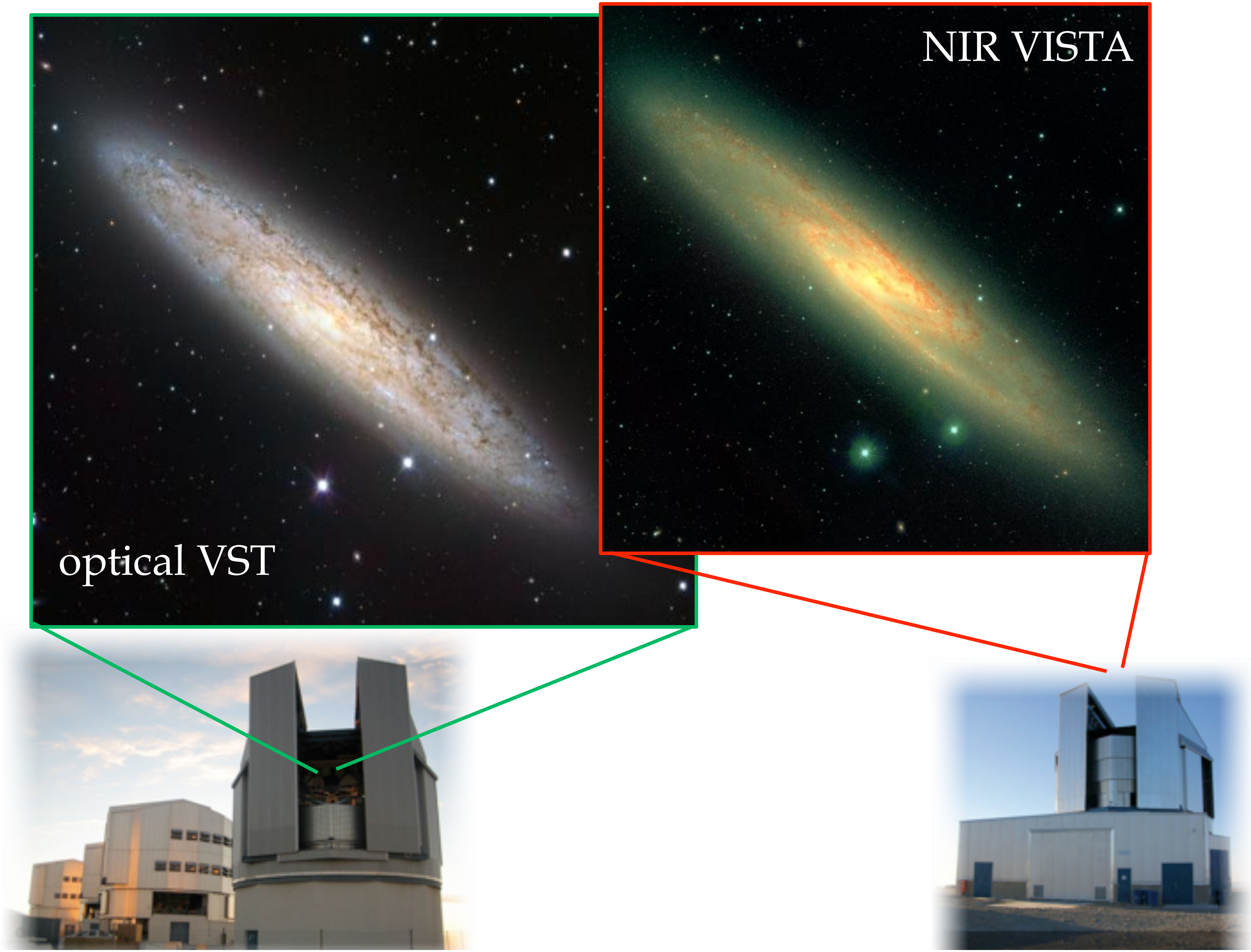
VST / VST-Tube: M. Capaccioli, A. Grado, L. Limatola

Pre-VISTA - VST anatomy of NGC253

Nearly edge-on barred Sc galaxy seen in Sculptor group (Δ ~ 3.2 Mpc).

One of the best nearby examples of nuclear starburst galaxy.

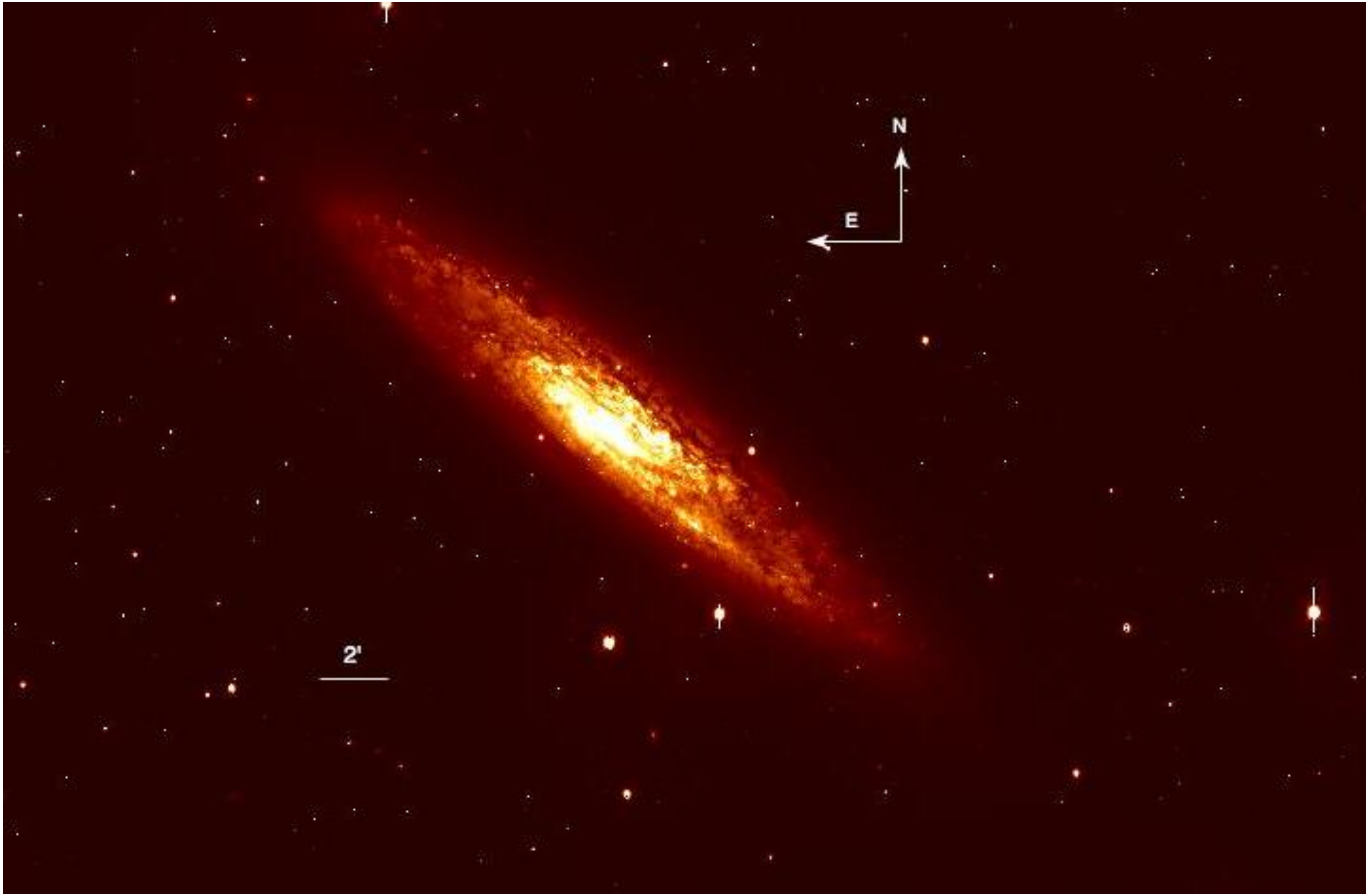




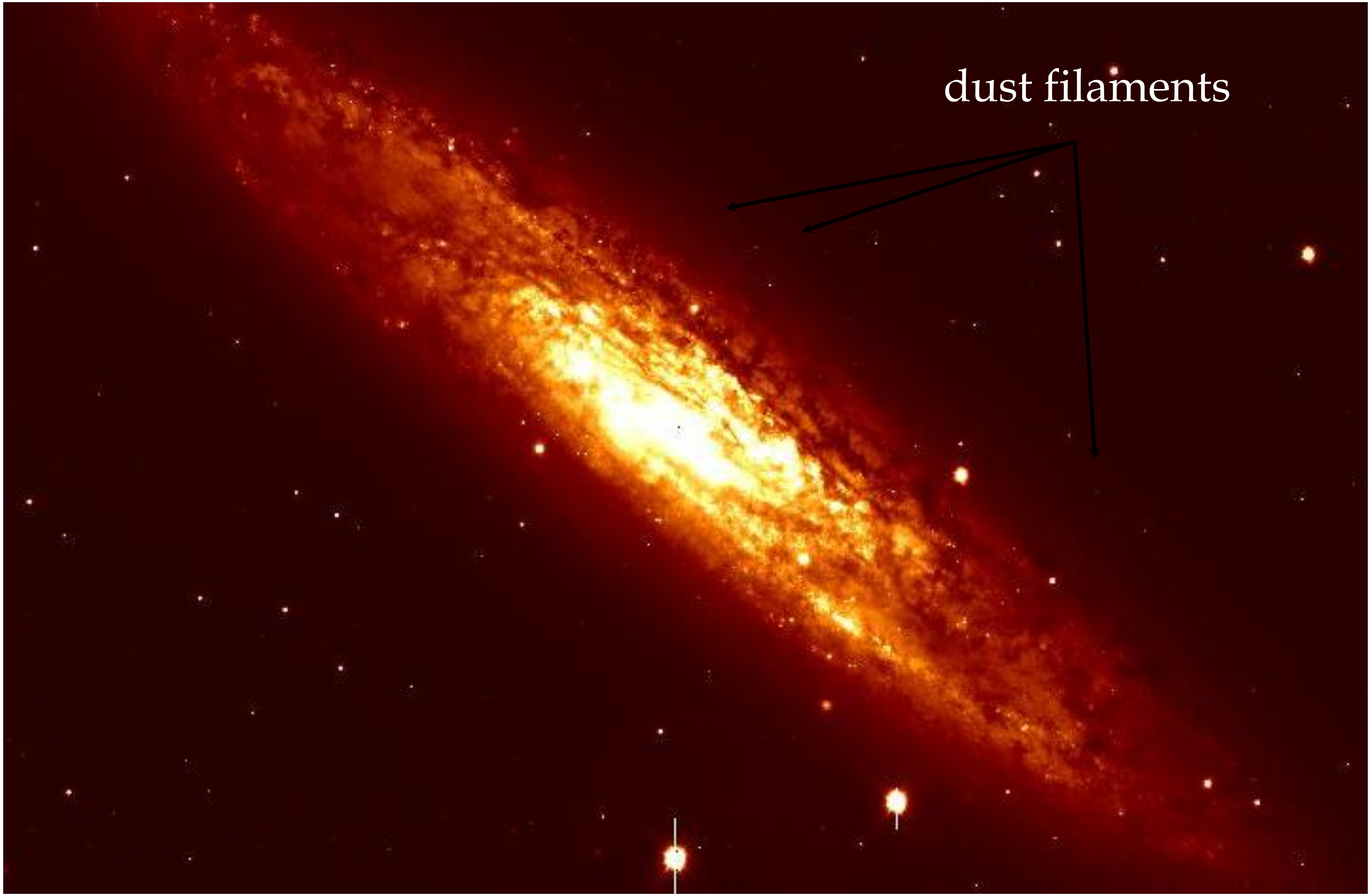
NIR VISTA
optical VST

NGC253: a very dust obscured disk

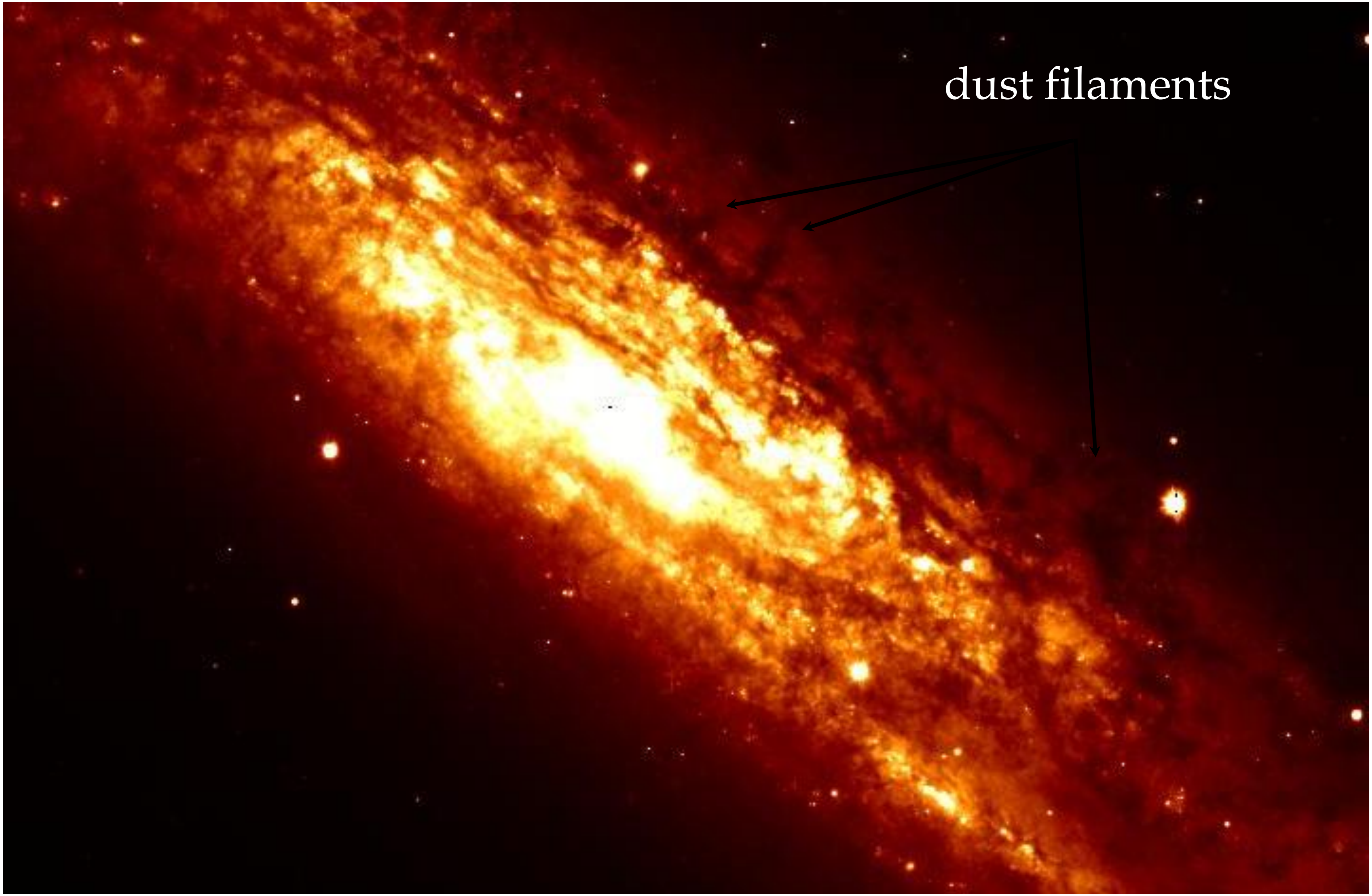
VST r band image of the disk of NGC 253



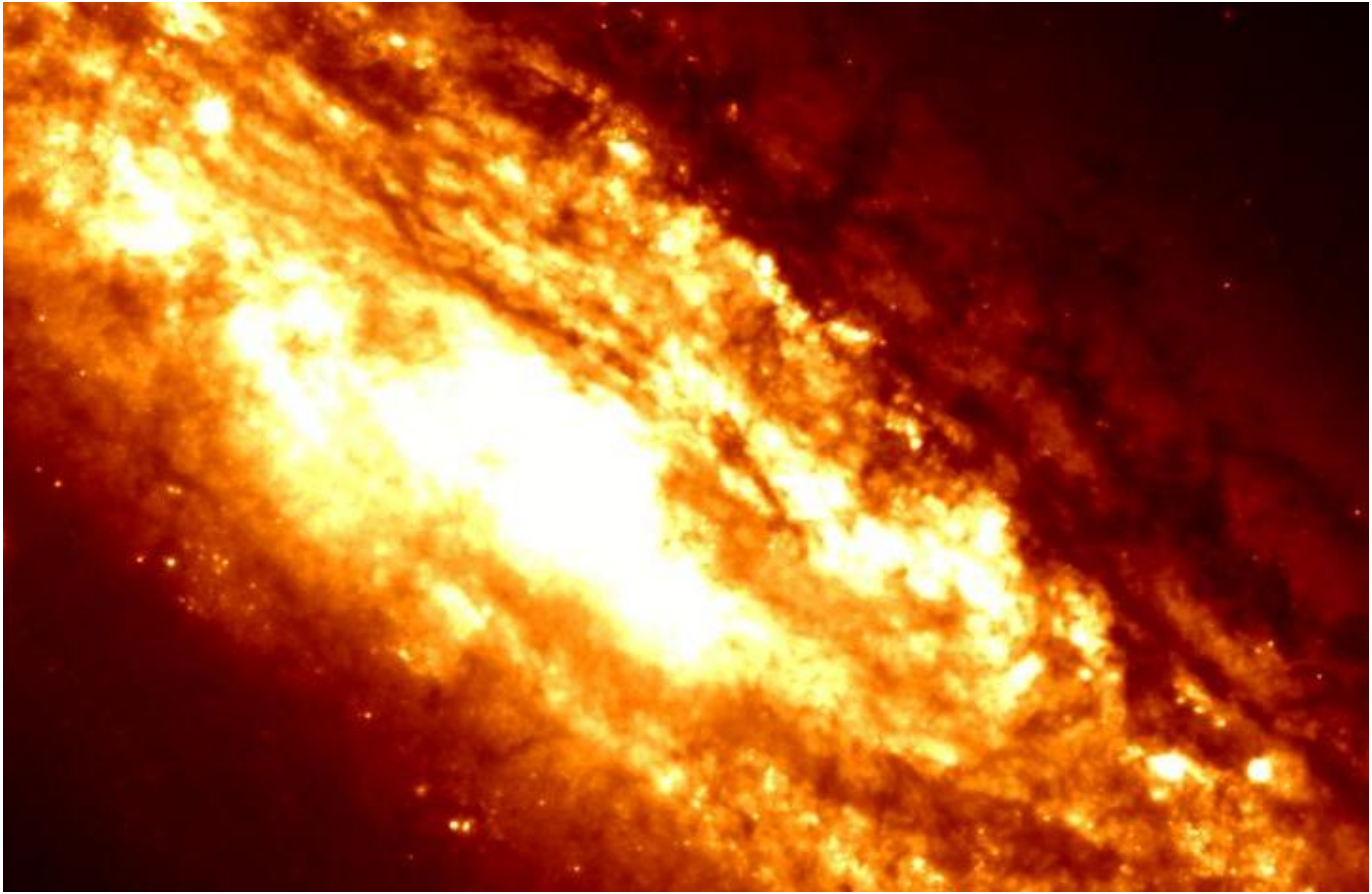
VST r band image of the disk of NGC 253



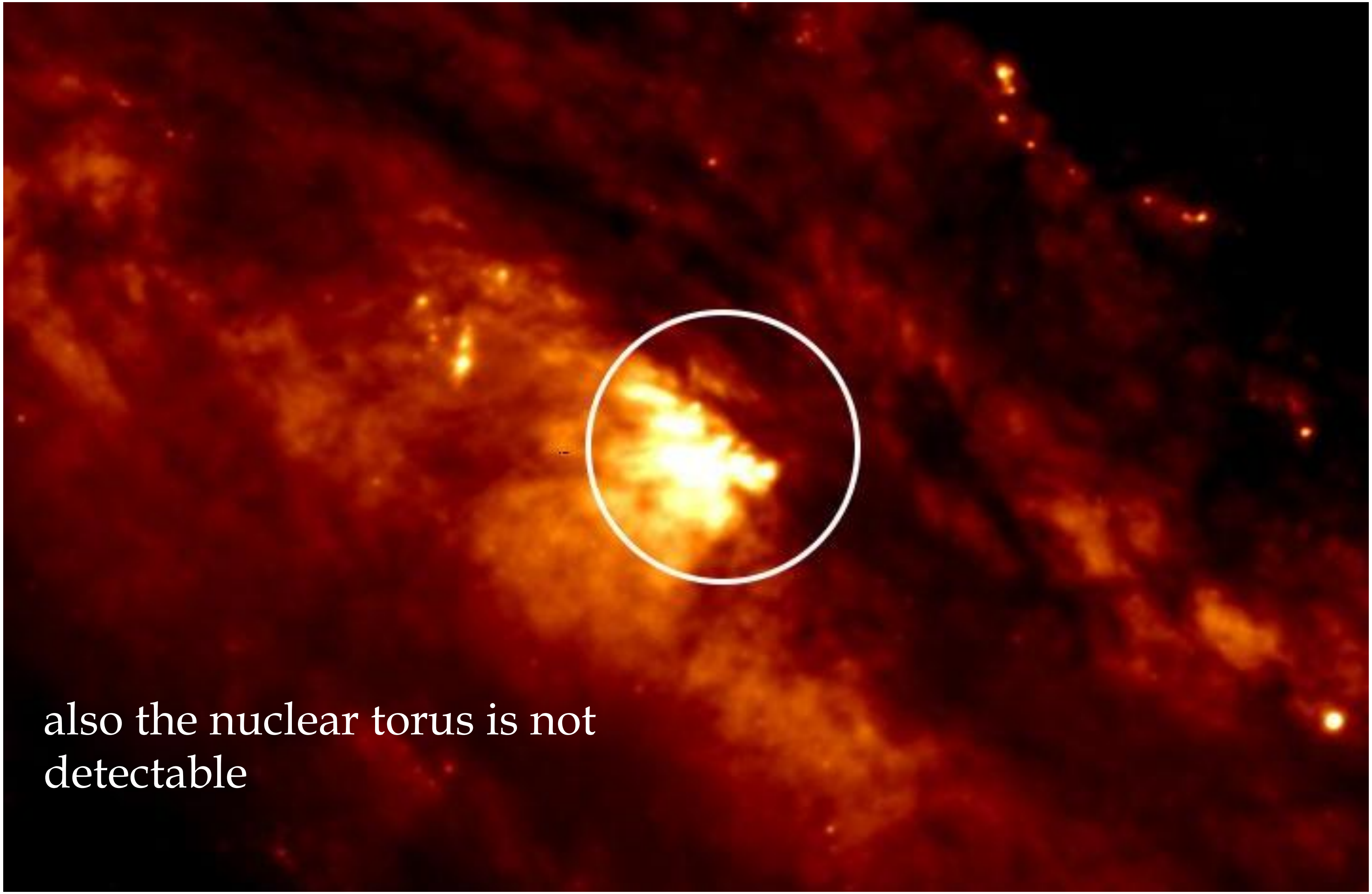
VST r band image of the disk of NGC 253



VST r band image of the disk of NGC 253

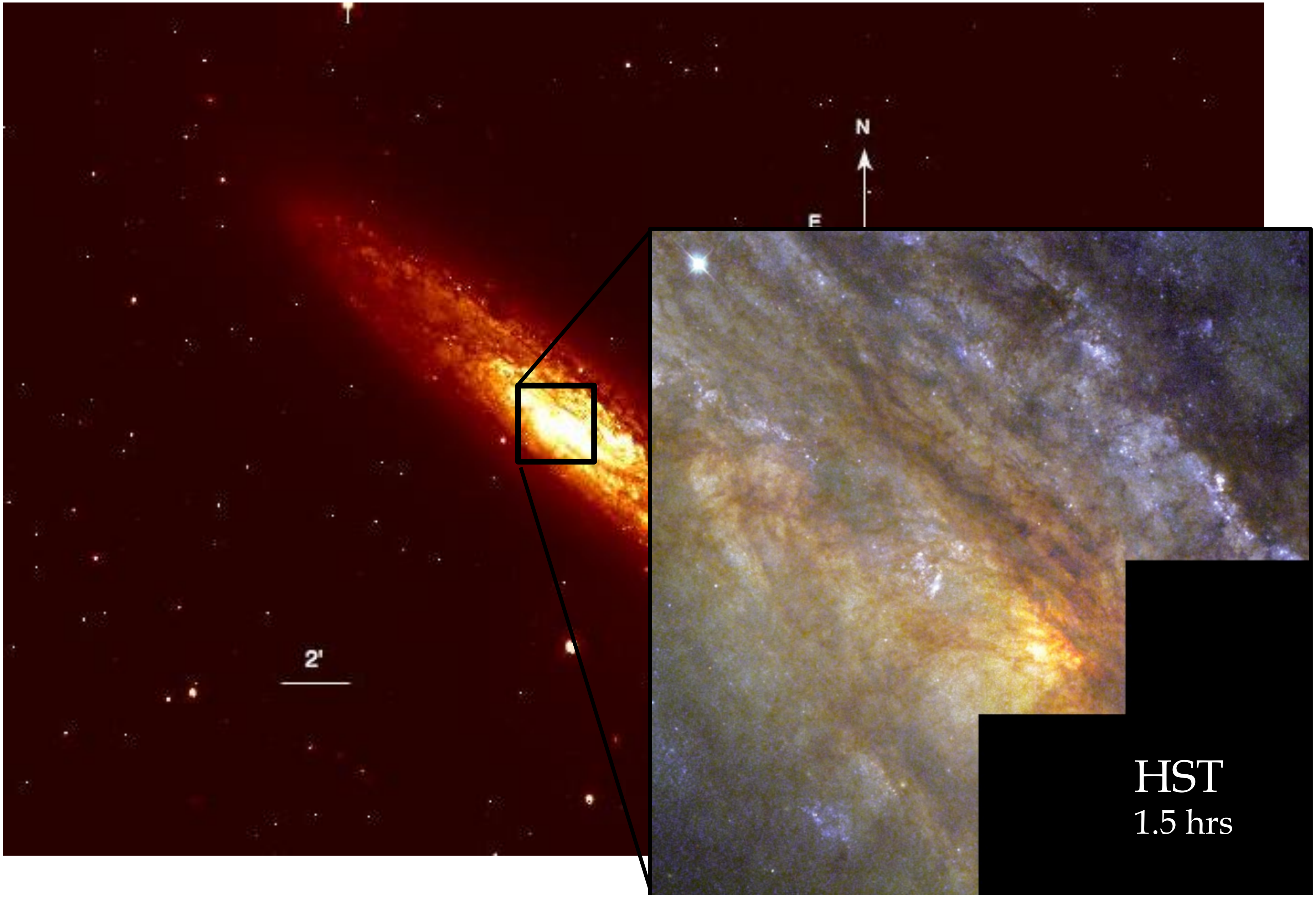


VST r band image of the disk of NGC 253

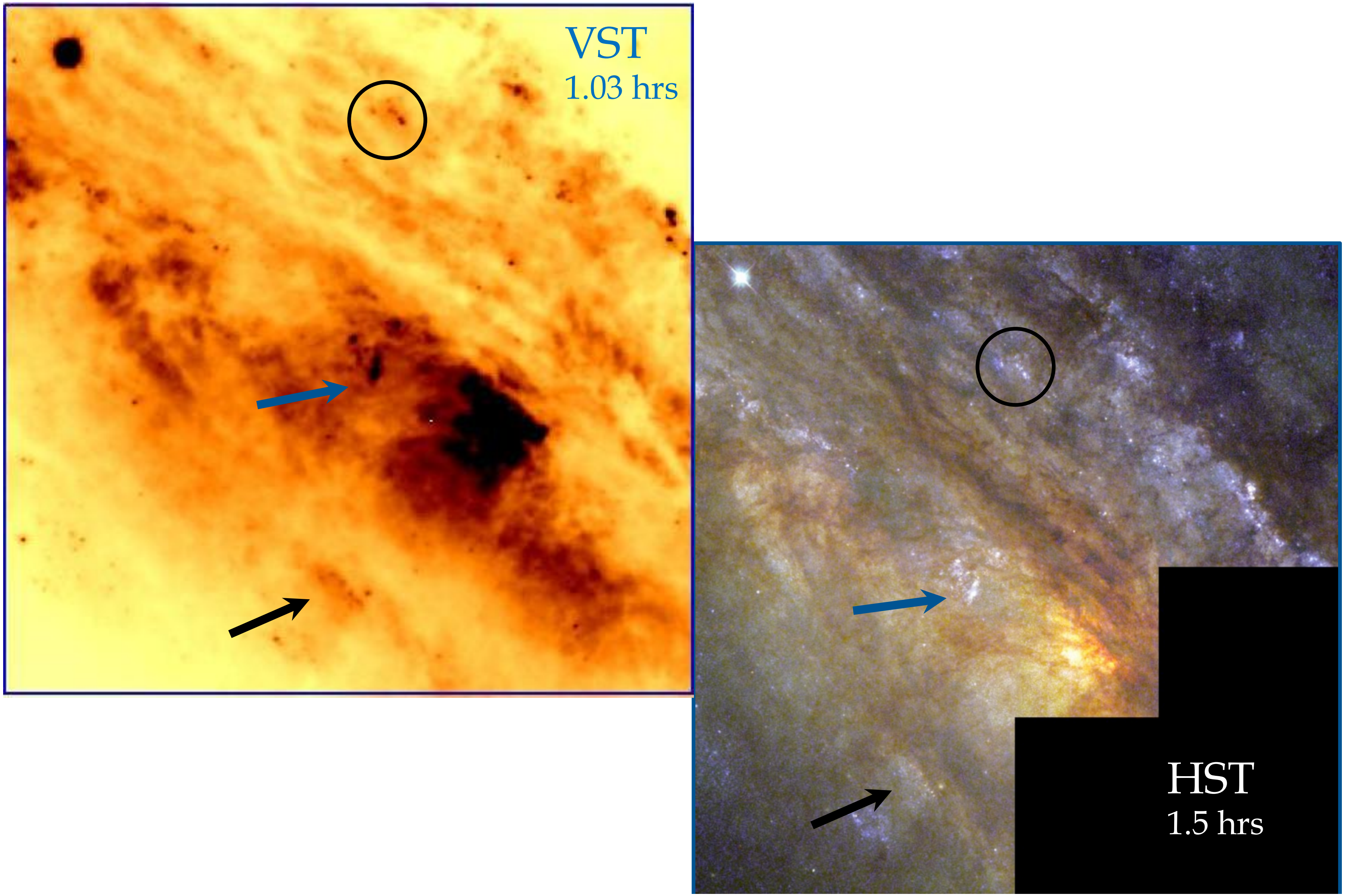


VST r band image of the disk of NGC 253

VST vs HST image of the NGC 253



VST vs HST image of the NGC 253



VEGAS:

VST survey of Elliptical GAlaxies in the South hemisphere

P.I. Massimo Capaccioli (University of Naples Federico II)

in collaboration with

N.R. Napolitano, E. Iodice, A. Grado, A. Rifatto, INAF-OA Naples, Italy,
M. Cantiello, G. Raimondo, INAF-OA Teramo, Italy,
V. Brocato INAF-OA Rome, Italy,
M. D'Onofrio, Uviv. Padua, Italy,
G. Covone, G. Longo, M. Paolillo, Univ. Naples, Italy,
A.J. Romanowsky, Univ. California @ Santa Cruz, USA,
D. Forbes, Swinburne Univ., AU,
T. Puzia, Pontificia Univ. Catolica de Chile, Chile
M. Pannella, Centre d'Etudes de Saclay, F
C. Tortora, Zurich Univ.

VEGAS: science aims

Use the large FoV, high efficiency and spatial resolution of the VST system to map with reasonable integration time the surface brightness of nearby galaxies from their cores to isophotes enclosing ~90% of the total light.

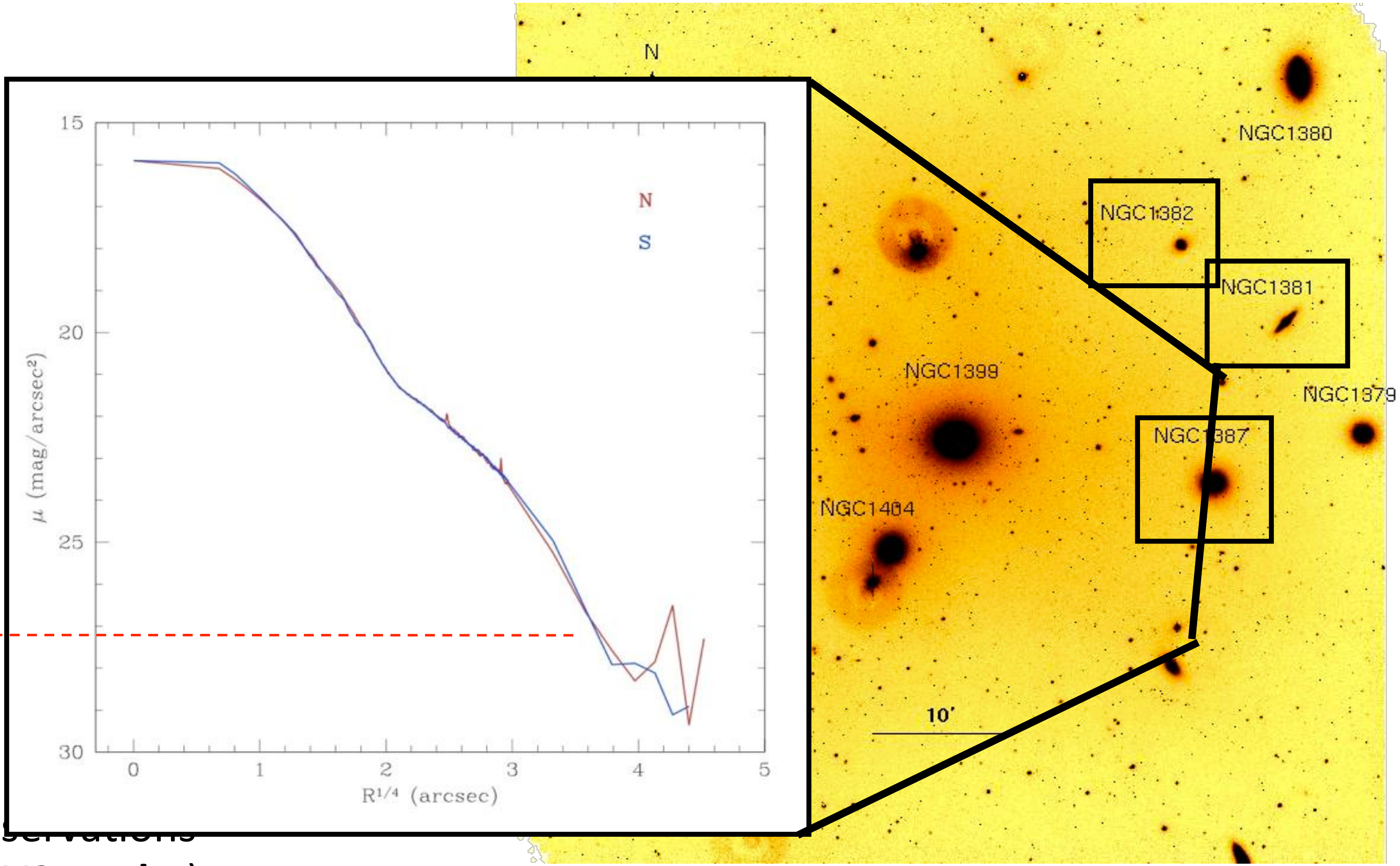
- **SB out to 8-10 Re:** physical correlations among structural parameters (total luminosity, Sersic index, R_e, ellipticity, boxiness/diskiness);
- ***g* - *r*, *g* - *i* colour gradients** and the connection with galaxy formation theories;
- **GC color and density distribution; GC luminosity function; comparison of GCs integrated colors to the theoretical models** (multiple episodes of formation of globular clusters);
- **SBF fluctuations**: for distance and chemical characterization of the stellar population out to 2-3 R_e;
- **Stellar M/L:** stellar masses, M/L gradients;
- **Study of the long-lived external structure and the diffuse component** of the galaxies and their connection with the environment.

VEGAS:
Goals and limits

Survey goals: multiband (*u, g, r, i*) optical survey of ~110 of galaxies with V_{rad}<4000 km/s in all environments (field to clusters).

Expected SB limits: 27.5 *g* , 27.0 *r* , and 26.2 *i* mag arcsec^{-2} (S/N=10 per arcsec^{-2}).

28 mag/arcsec^2

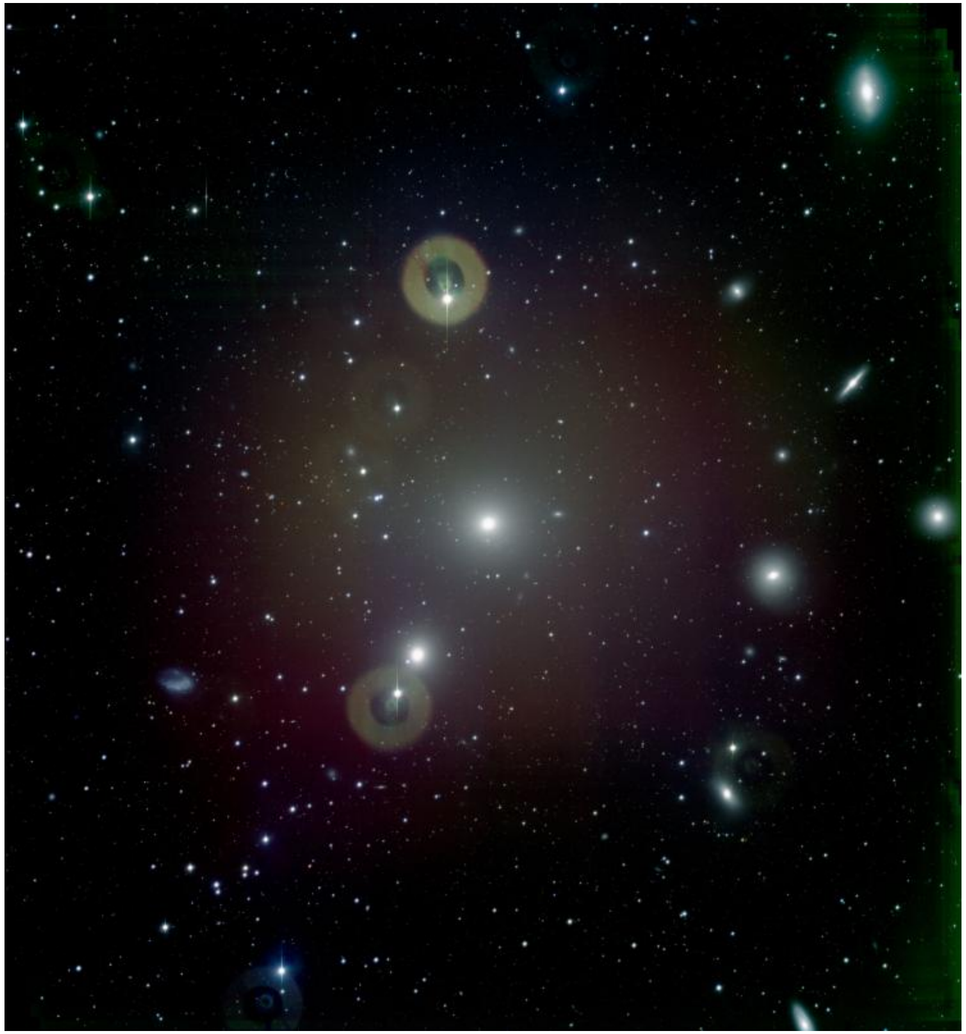


Based on P88 observations
(data reduction: **VST-Tube**)

VEGAS:

VST performances in galaxy photometry

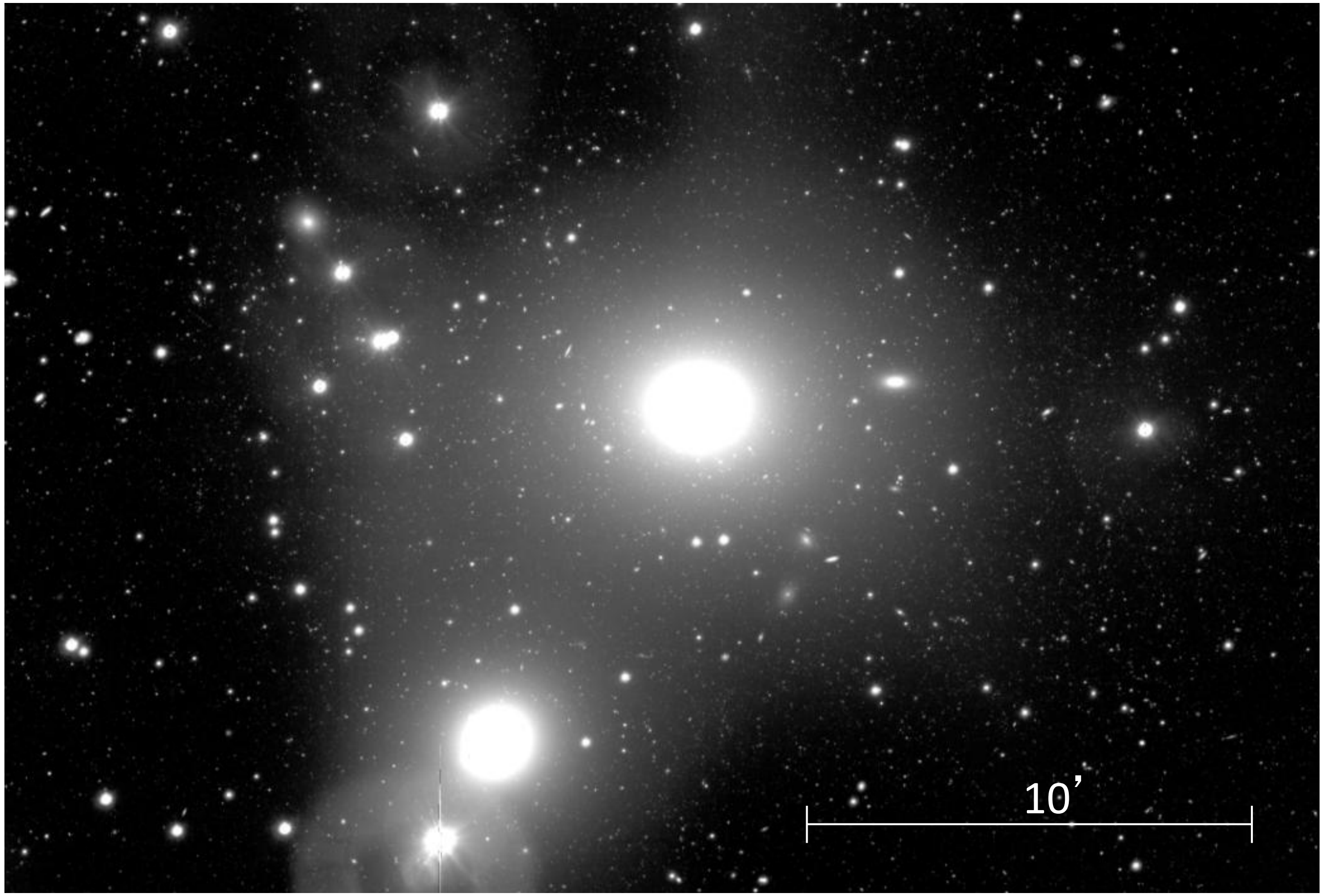
beautiful halo around NGC 1399 (ICL?)



VEGAS:

VST performances in galaxy photometry

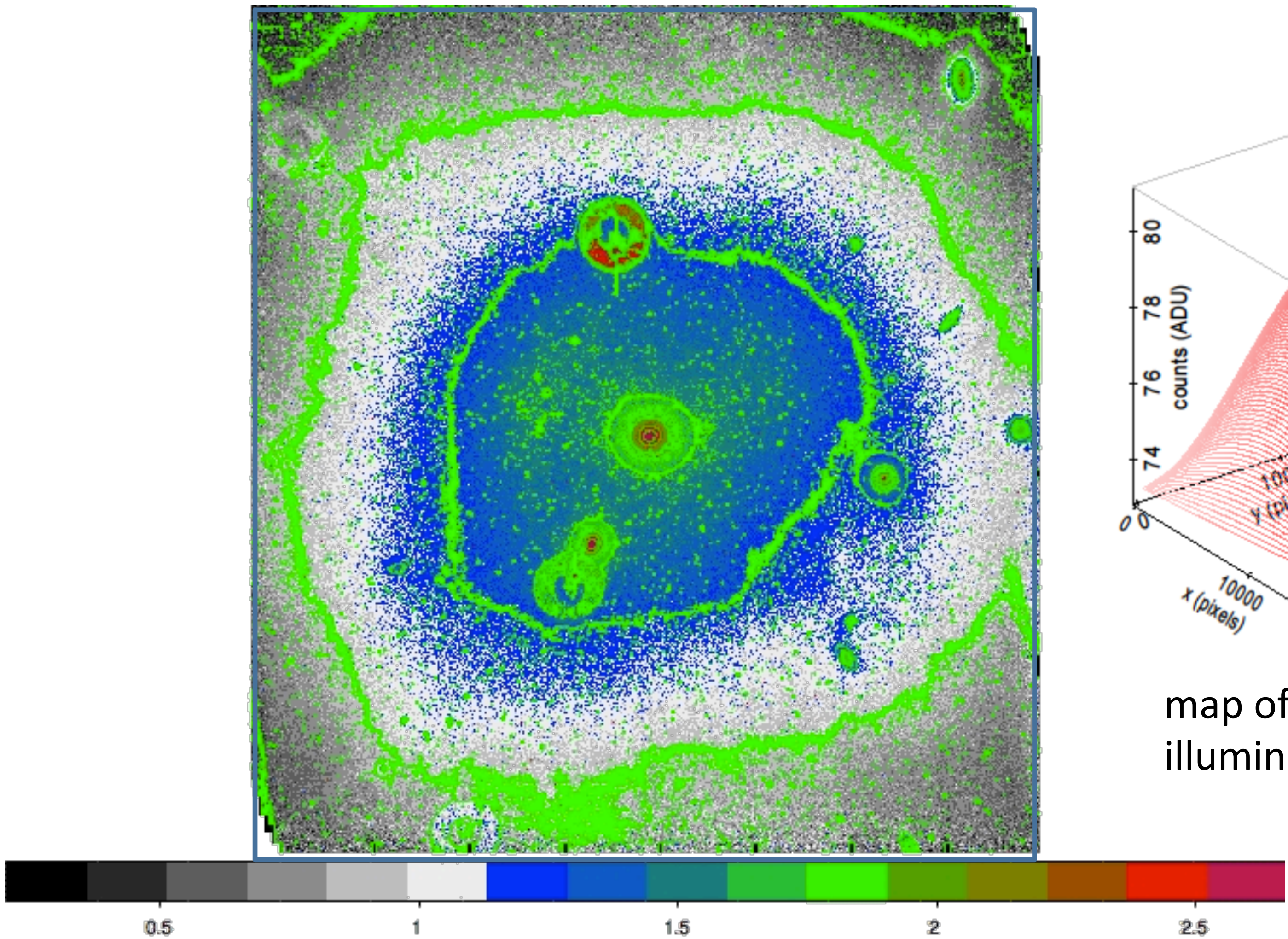
beautiful halo around NGC 1399 (ICL?)

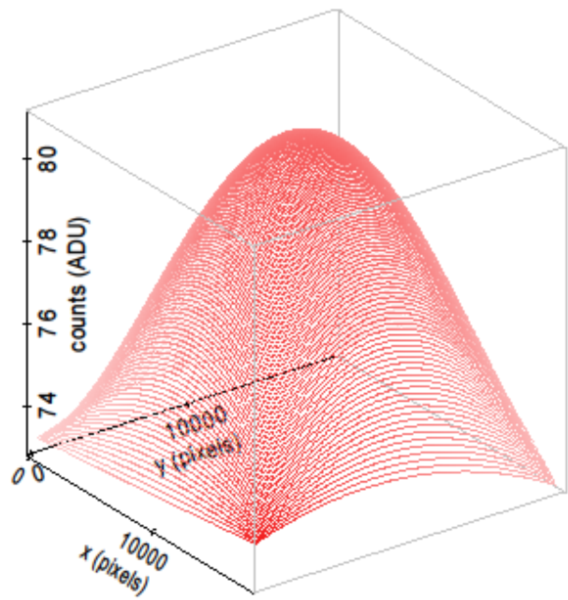


NGC 1399
VST+OmegaCam g-band image

VEGAS: how far does NGC 1399 extend?

true or fake?

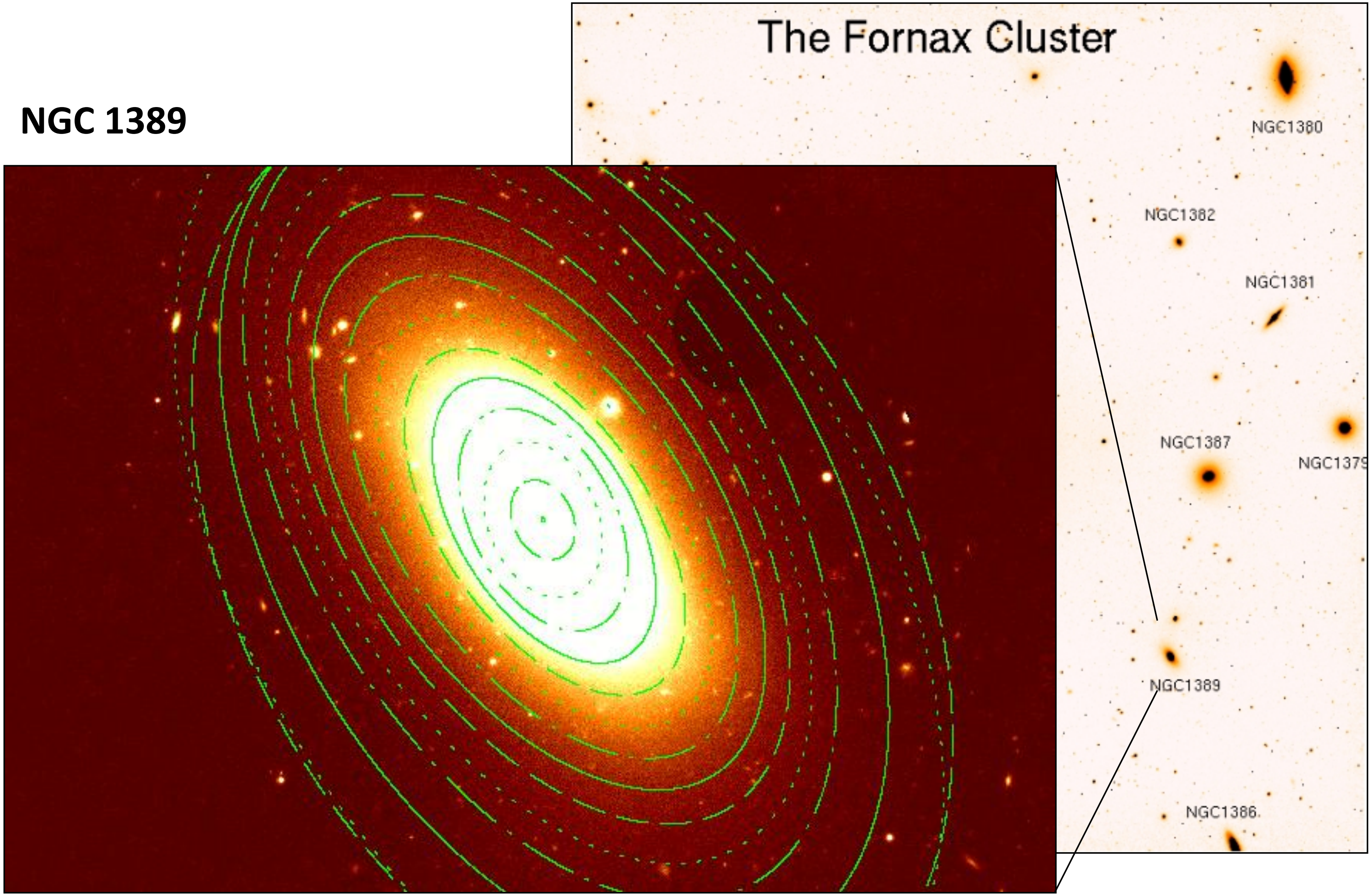




map of
illumination correction

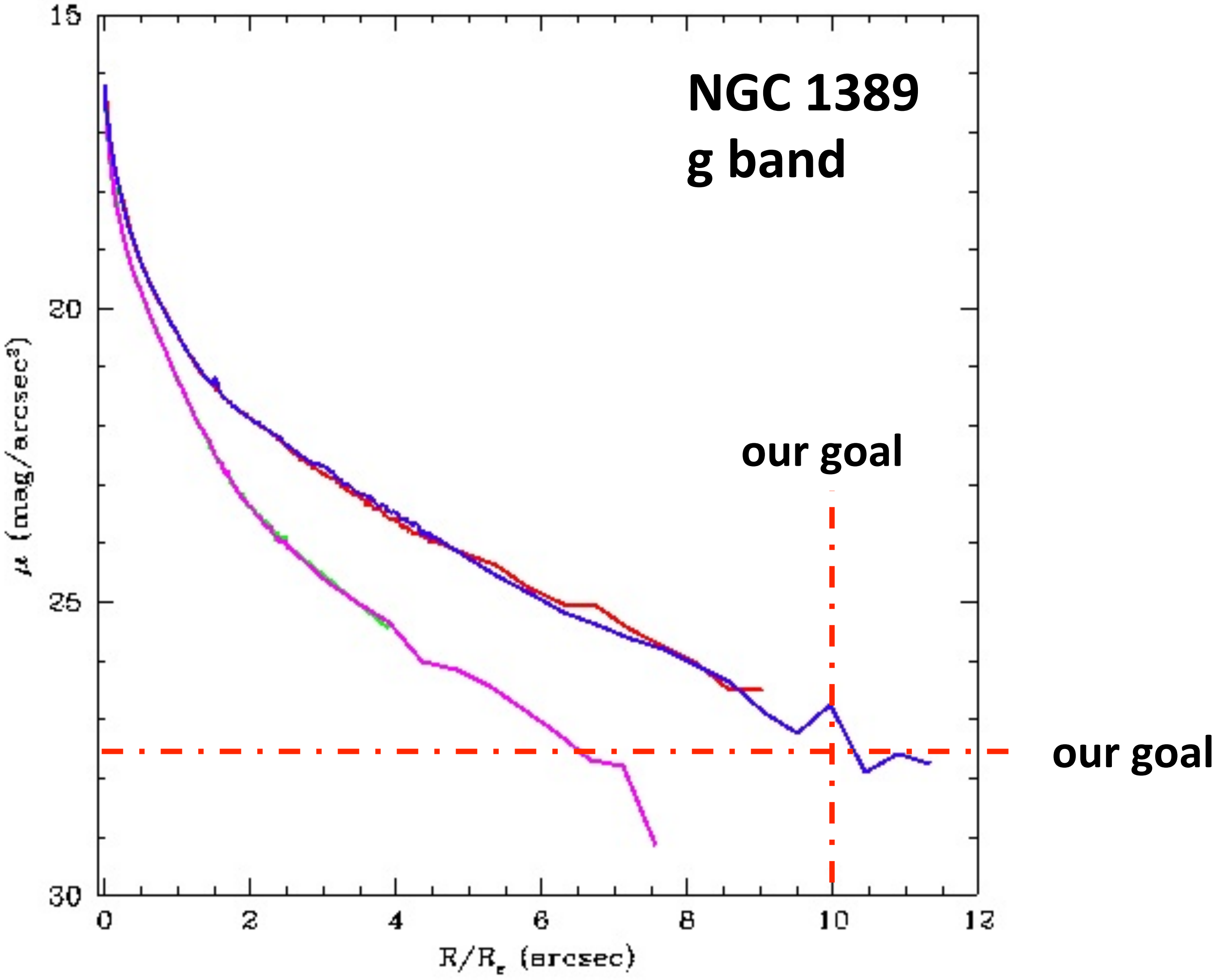
VEGAS: surface photometry does work

NGC 1389

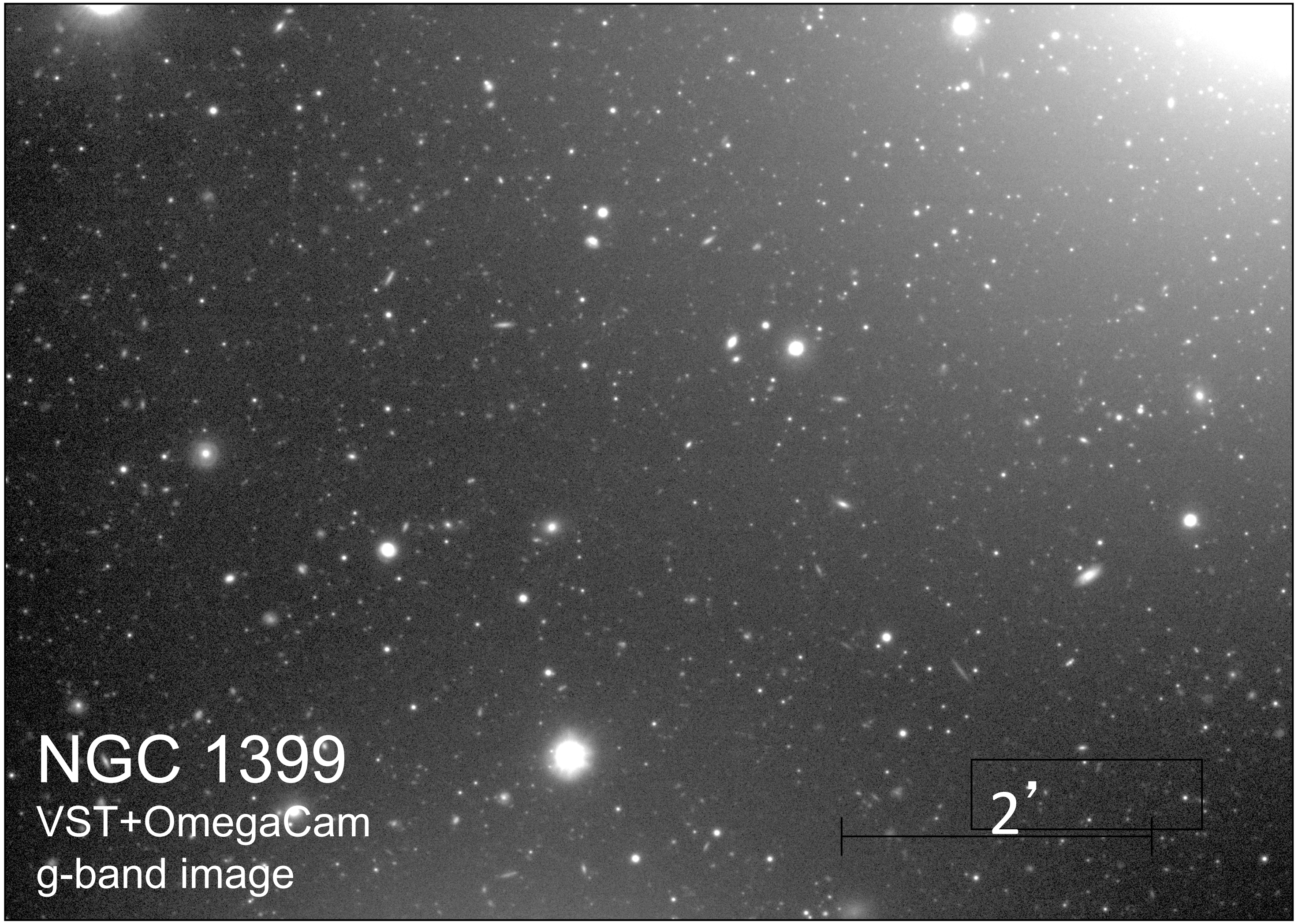


VEGAS: surface photometry does work

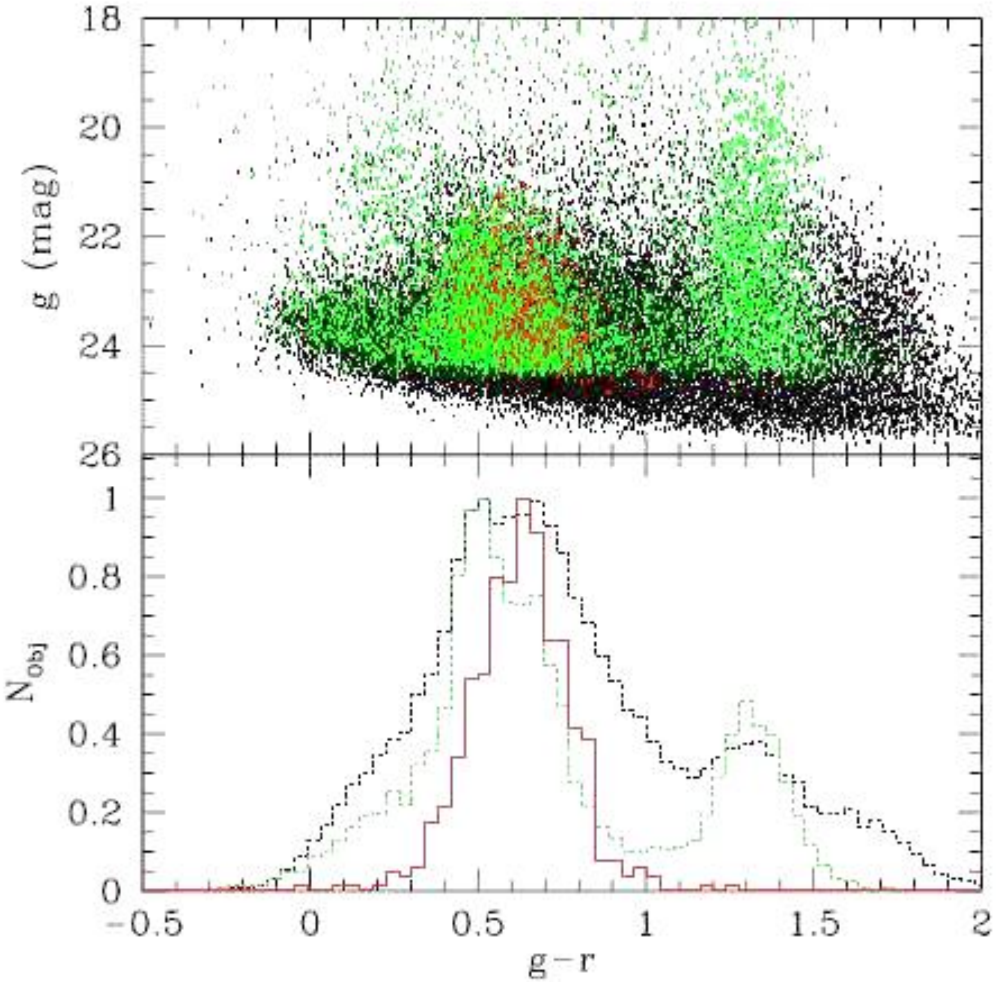
Wait for the talk by E. Iodice (wed. 17, 10.10)



VEGAS: Globular Clusters in NGC 1399/1404



VEGAS: Photometry of stellar images around NGC 1399/1404



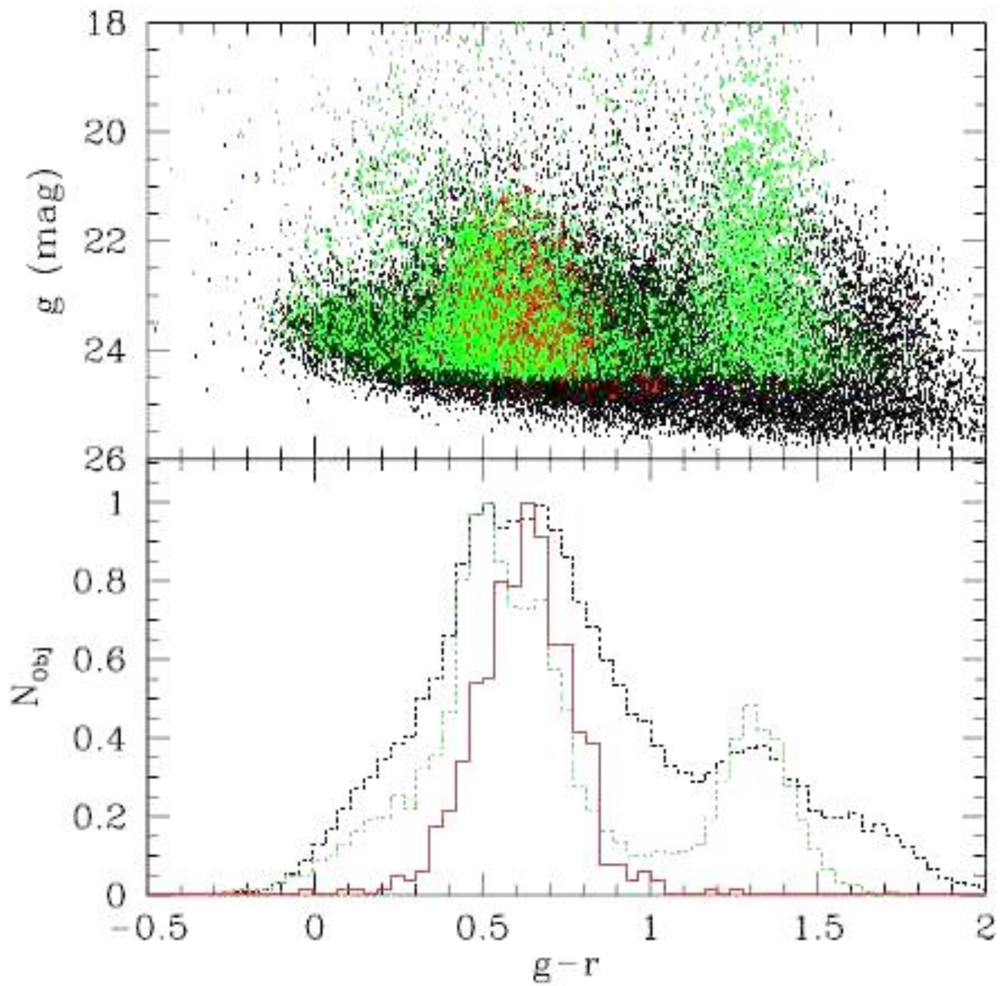
All dots: ~ **41.000** sources detected over *g*, *r* and *i* VST frames centered on NGC1399.

The original, unmatched catalogues contained:

115.000 *g*,
94.000 *r*,
45.000 *I* sources.

The matching radius was 0.8 arcsec.

VEGAS: Photometry of stellar images around NGC 1399/1404

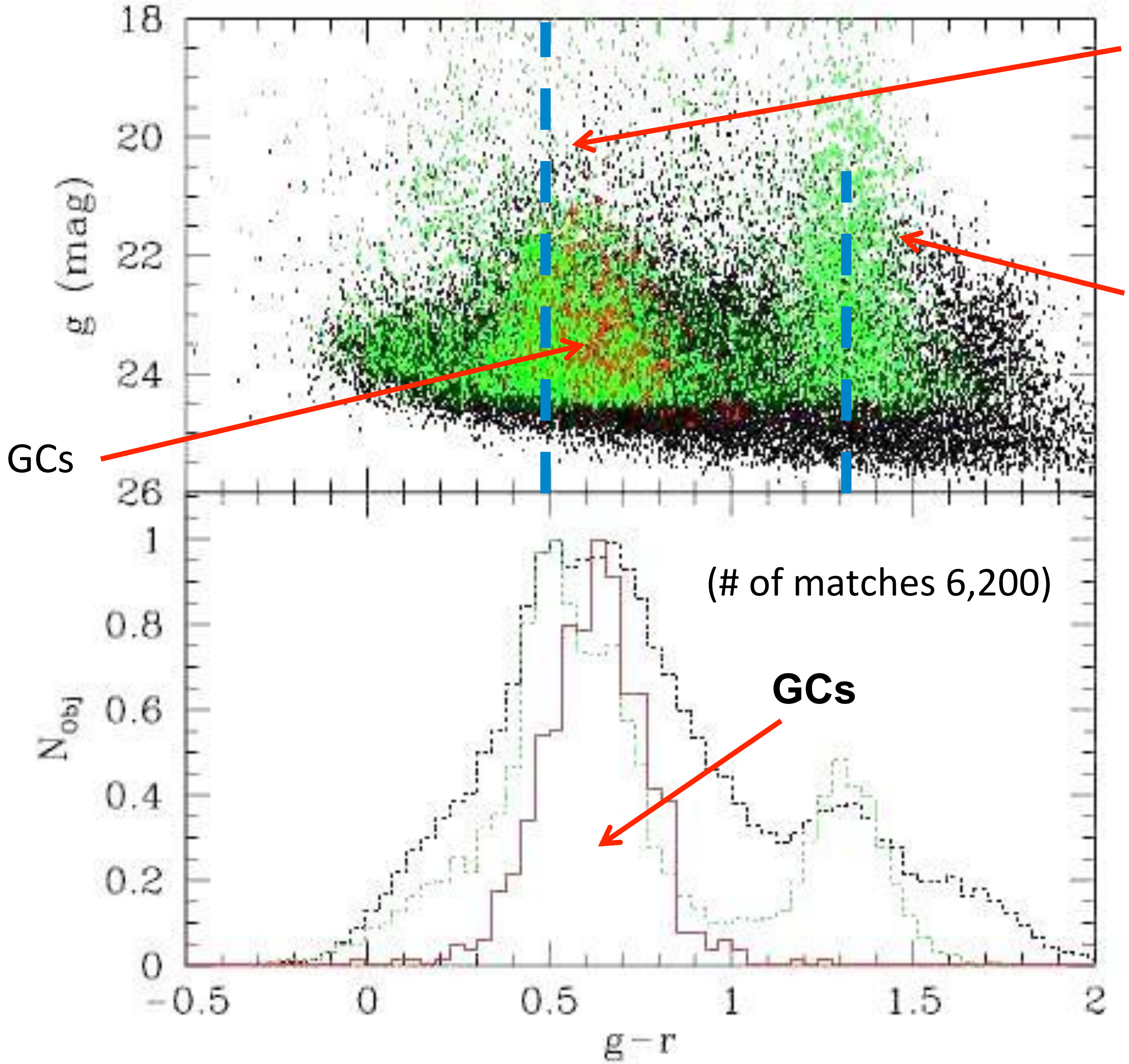


Green dots: sources with **photometric error < 0.1 *g*-mag**, and with **SExtractor CLASS_STAR classification parameter > 0.9** in *g*-band.

Total number ~11.000

This should be regarded as the catalogue of point-like sources.

VEGAS: stellar images sample around NGC 1399/1404



MS TO stars of old stellar populations: **4,500 objects including extragalactic GCs**

Nearby, intrinsically faint and low-mass stars in the MW (# 2100)

The GCs of NGC 1399 & 1404 have expected (*g*-*r*) color in the range 0.3-0.9 mag.

VEGAS: GCs of NGC 1399/1404matching HST-ACS

GC candidates obtained matching the *gri*-bands VST catalogue with the ACS Fornax Cluster Survey (ACSFCS, Jordan et al., 2007*, ApJS* 169, 213) GC candidate list.

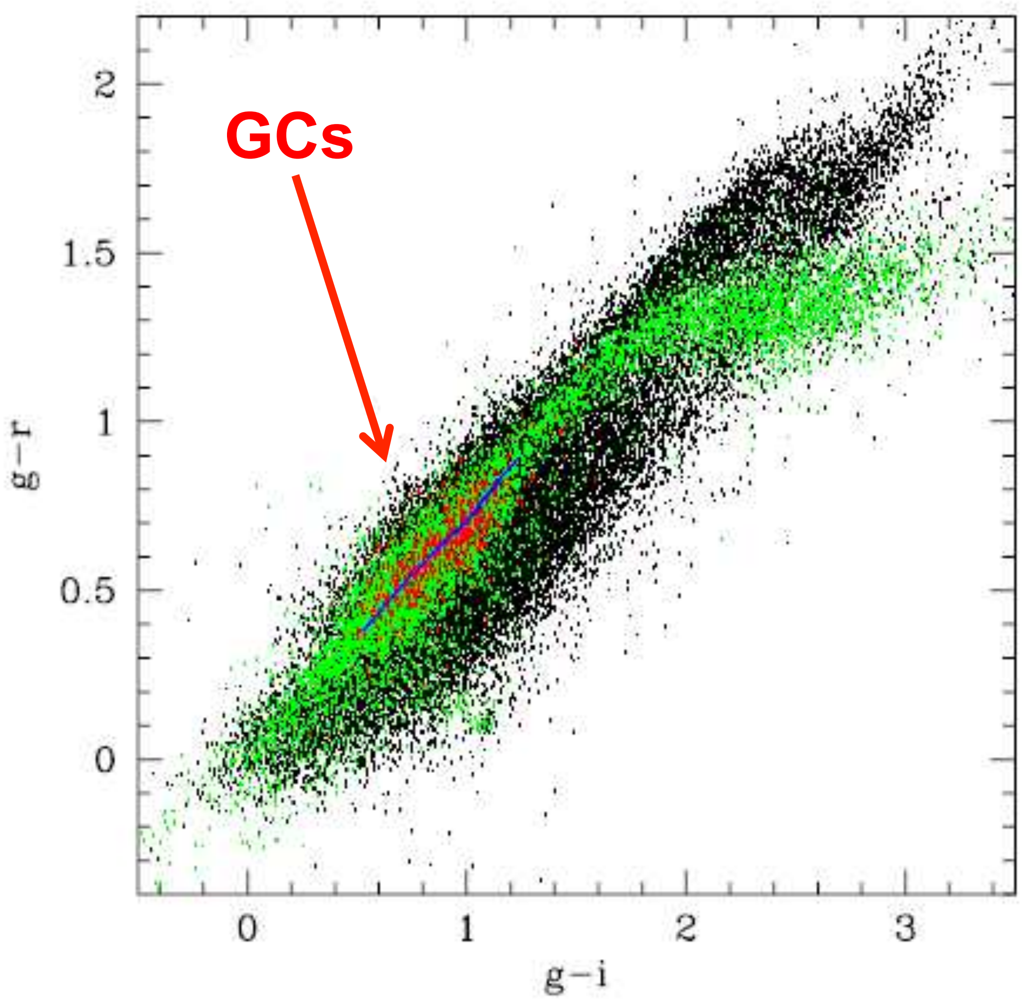
Matching radius =1 arcesc .

The original ACS list: ~**1050 sources**,
the final ACS-to-VST matched catalogue: ~**650 sources**.

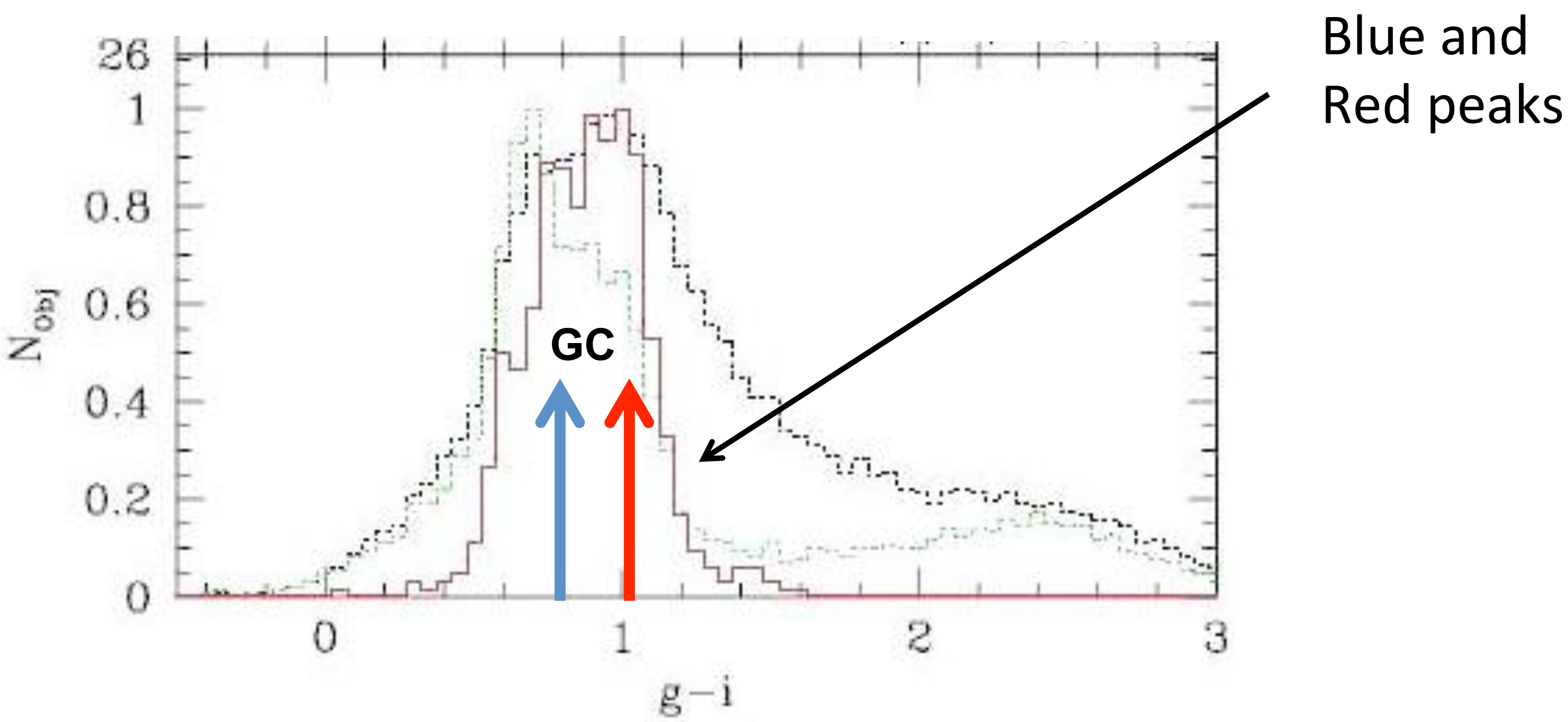
The number of matching increases to **~850 sources** if the *i*-band VST frame (the shallowest frame of the three) is excluded;
to **~900** if the *g*-band only (the deepest one) is adopted for the matching.

As for GCs VST detection is 85% of that of HST

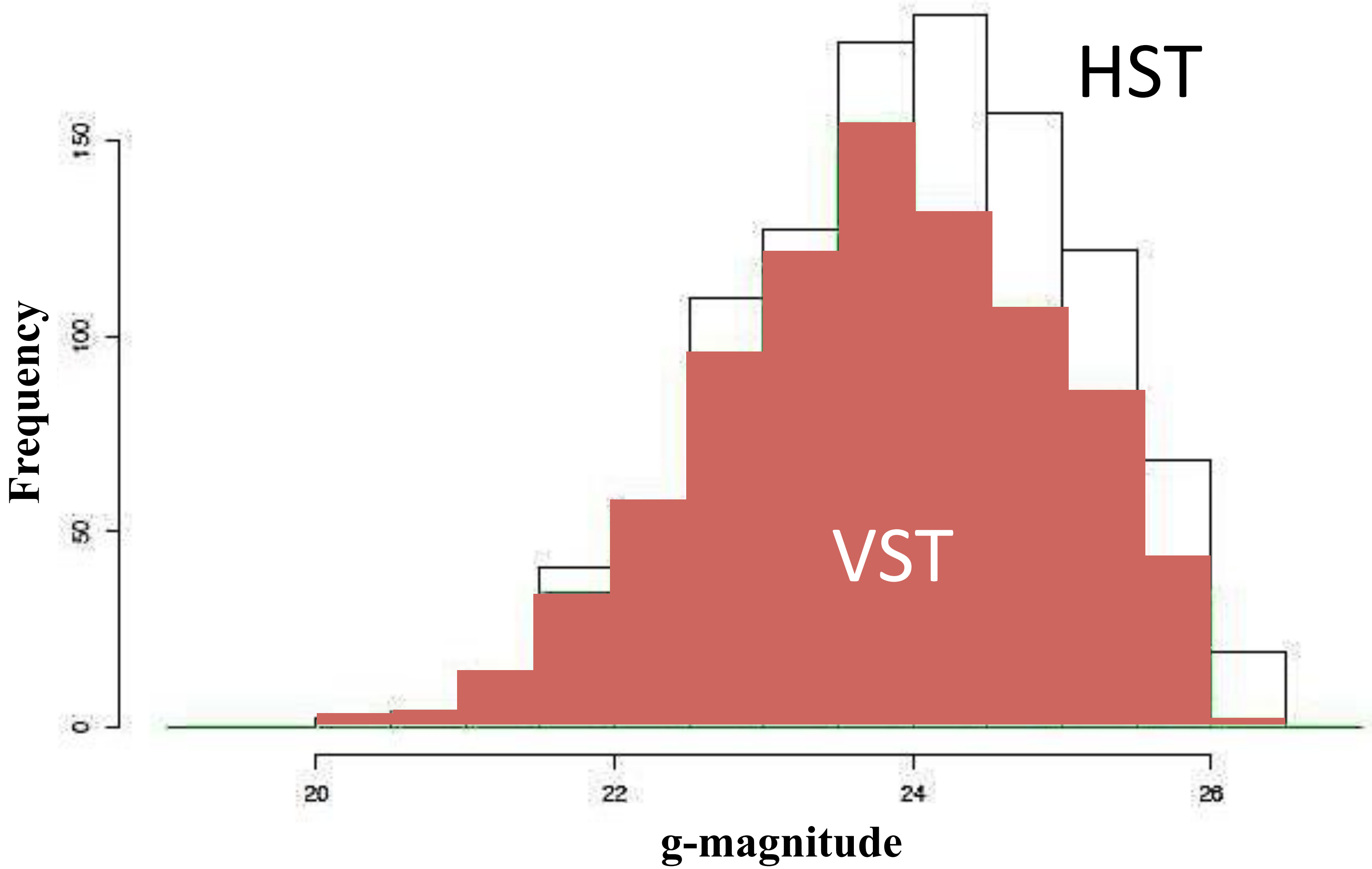
VEGAS: GCs of NGC 1399/1404matching HST-ACS



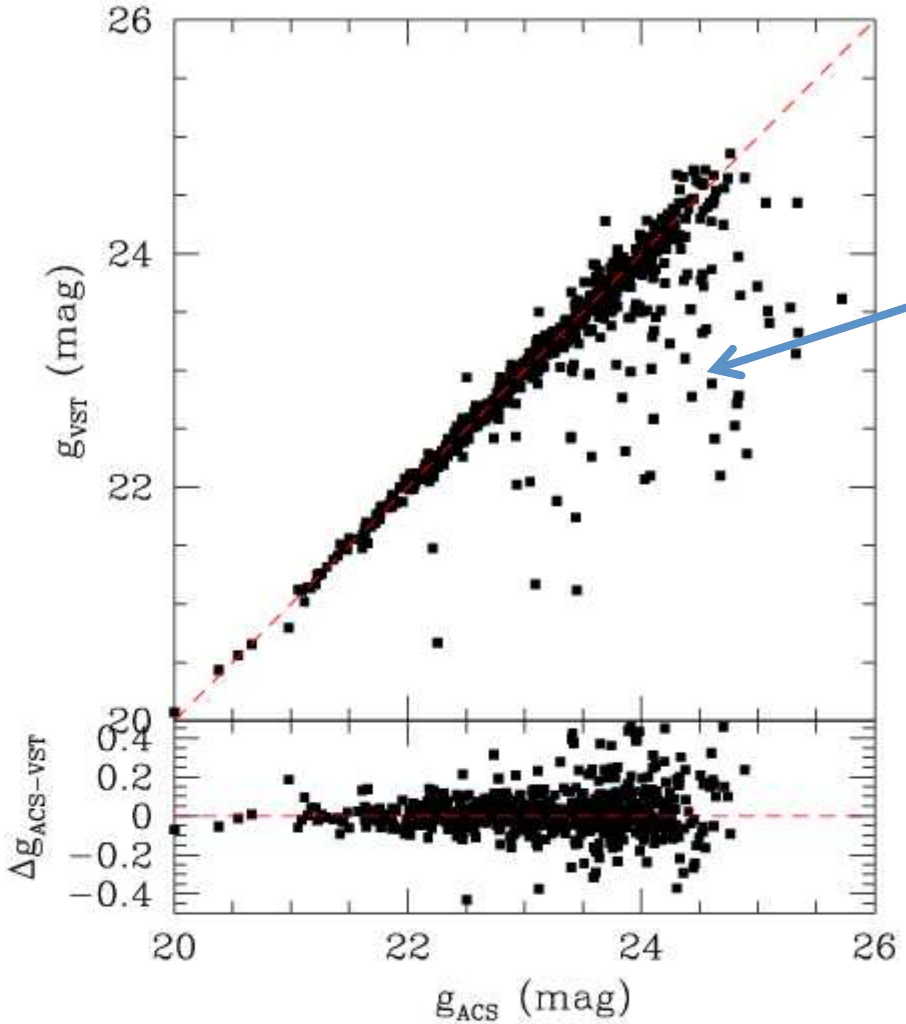
VEGAS: two peaks in color for GCs of NGC 1399/1404



VEGAS: lost and found – VST GCs vs HST GCs



VEAGS: comparing VST with ACS photometry of GCs

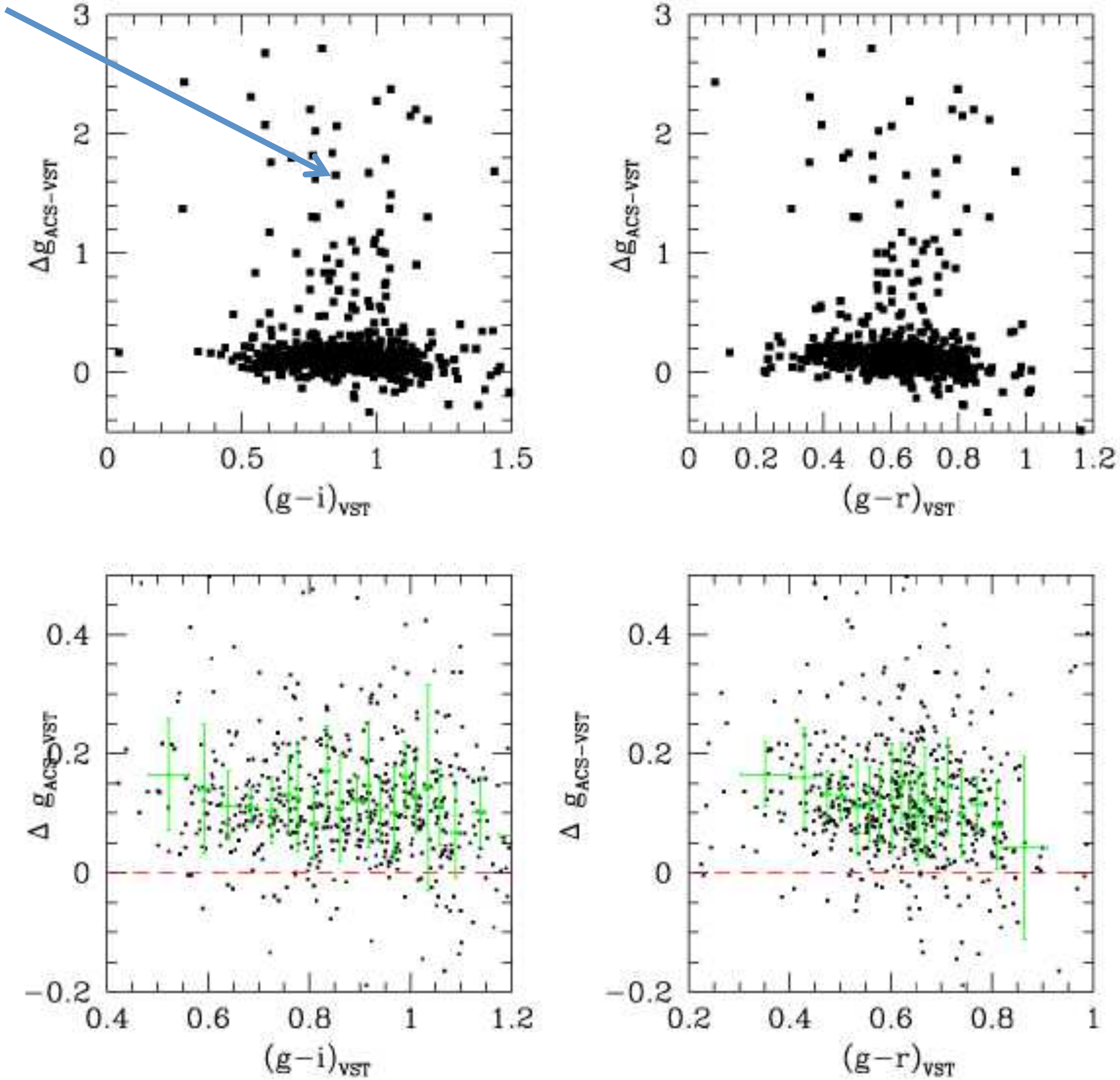


blended objects

Zero point difference of 0.1 mag, independent of the magnitude, not accounted by pass-band differences (0.01 mag)

VEGAS: ACS – VST GC photometry vs color

blended objects



STEP: SMC in Time-Evolution of a Prototype interacting late-type dwarf galaxy

P.I. Vincenzo Ripepi (INAF-Capodimonte Astronomical Observatory)

in collaboration with:

M. Marconi, I. Musella, M. Dall'Ora, M.I. Moretti (*INAF-OAC*)
M. Capaccioli (*Univ. Naples Federico II*)
M. Tosi, G. Clementini, M. Cignoni, D. Romano, F. Cusano (*INAF-OABo*)
M.R. Cioni (*Univ. Hertfordshire, UK*)
E. Cappellaro (*INAF-OAPd*)
E. Brocato (*INAF-OARM*)
G. Raimondo, M. Cantiello (*INAF-OATeramo*)
A. Nota, M. Sirianni (*STSCI, USA*)
J.S. Gallagher (*Univ. Wisconsin, USA*)
E. Grebel (ZAH, D)

STEP: goals

- **Study of SFH of SMC and of its stellar clusters:**
  - trends with position?
  - connection with interaction history?
  - cluster and field Age-Metallicity relations?

- **Systematic investigation of the Wing and Bridge populations:**
  - SFH of the intra-cloud population ?
  - how did the stellar component of the Bridge form?

- **Impact of metallicity on Pre-MS accretion and on the global SF properties:**
  - star formation rate and efficiency; IMF.

STEP: strategy and collaborations

Strategy:

•*g′*,*i′* photometry of 74 sq. deg. around the **SMC** and the **Bridge** at V~24.5 mag with S/N=10.

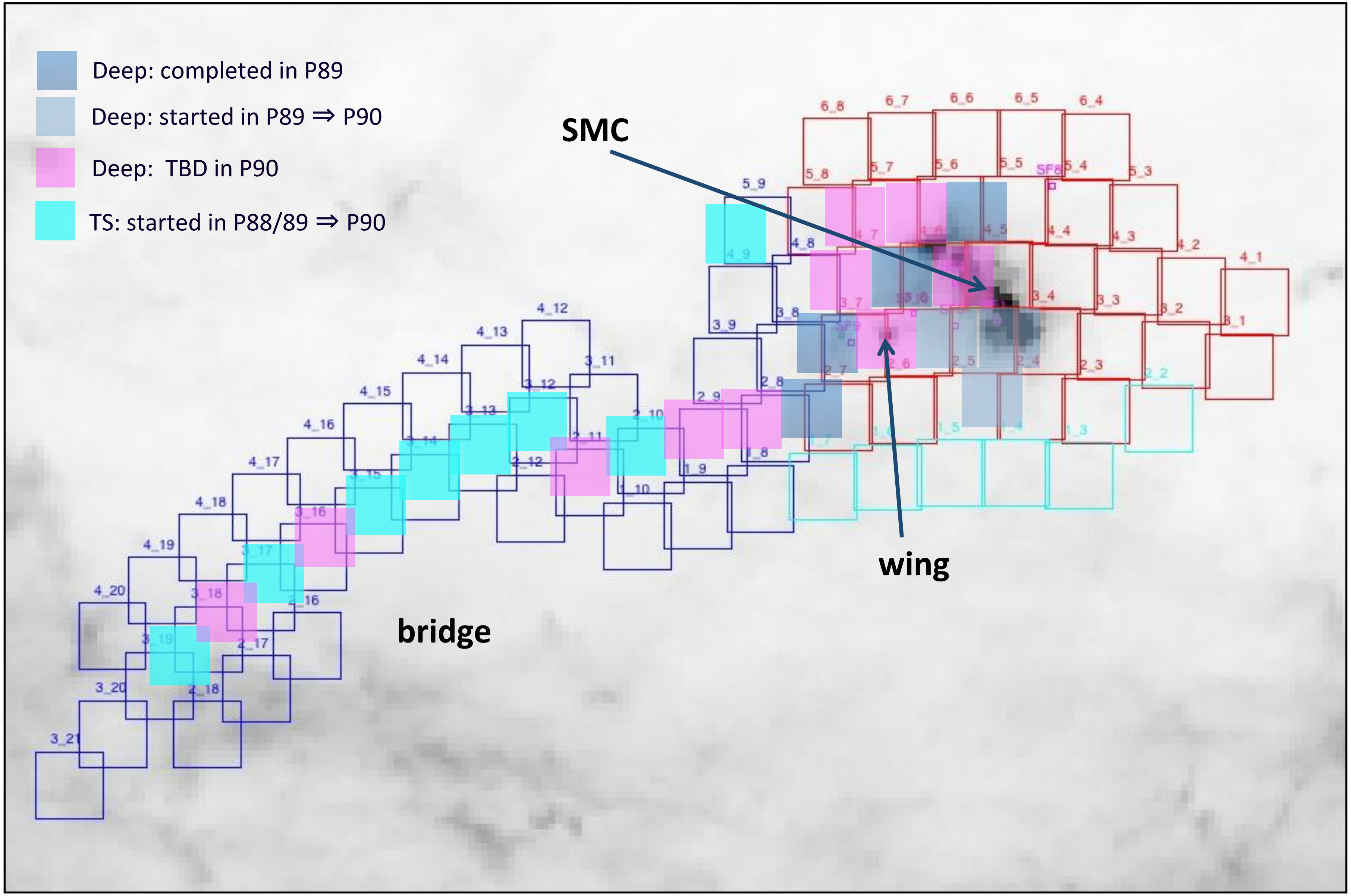
•*g′*,*i′* time series photometry over 8 sq. deg. along the **Wing** and the **Bridge**: at V~19.5 mag (~magnitude of RR Lyrae stars) with S/N=100 (V~24.5 mag with S/N=10 on the summed images).

•*r′*, Hα imaging of the **SMC body** and the **Bridge** to reach *r′*~22.5 with S/N=5.

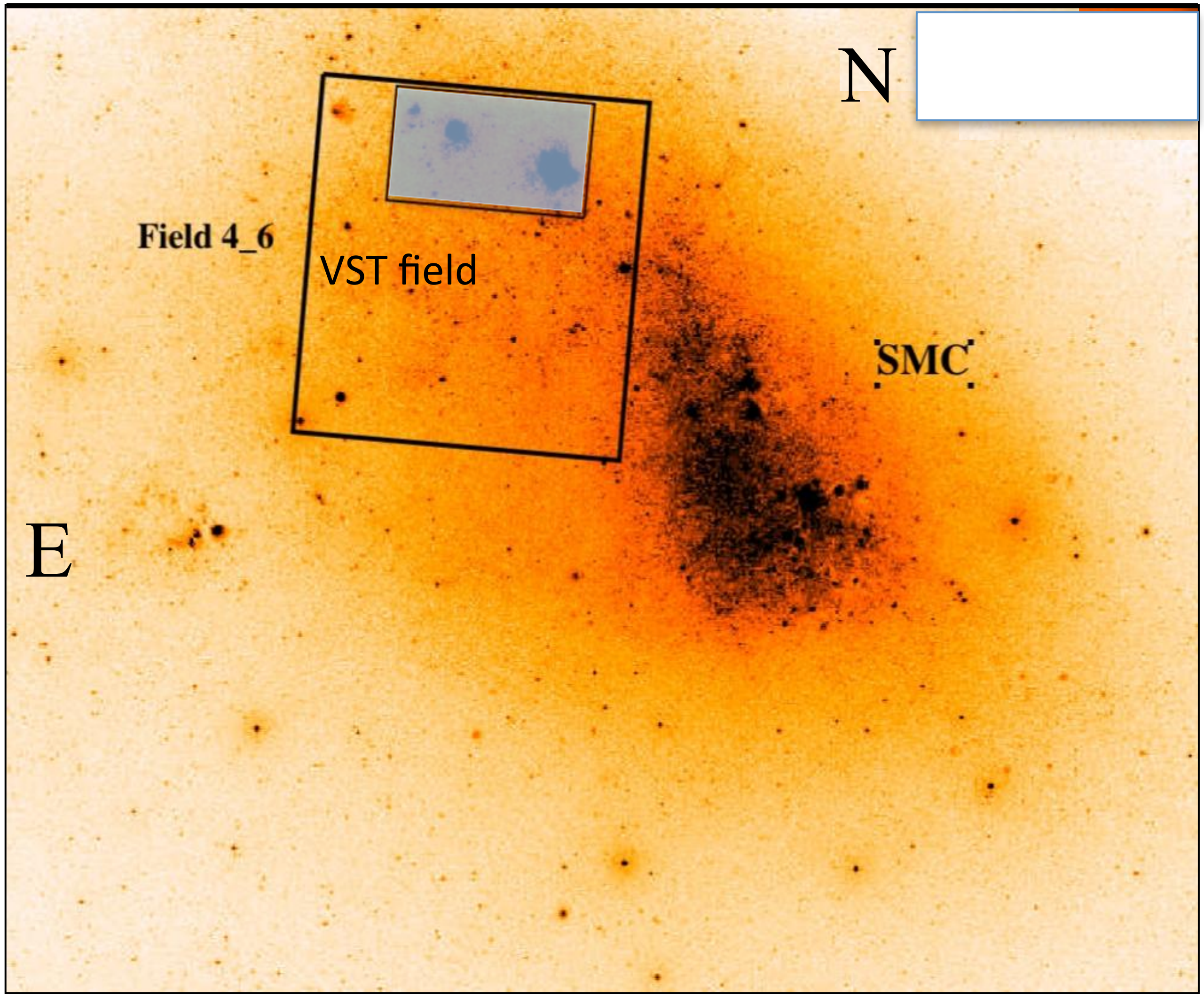
Complementary data/programs:

•HST/VLT photometry/spectroscopy of selected fields/clusters;
•VMC@VISTA survey (PI: M.R. Cioni): YHKs photometry of the Magellanic System (LMC, SMC, Bridge, Stream): 184 sq. deg. at Ks=20.3 mag in five years;
•FLAMES/FORS2/XSHOOTER/MAD@VLT; WFC3@HST follow up planned.

STEP: survey (planned/done)

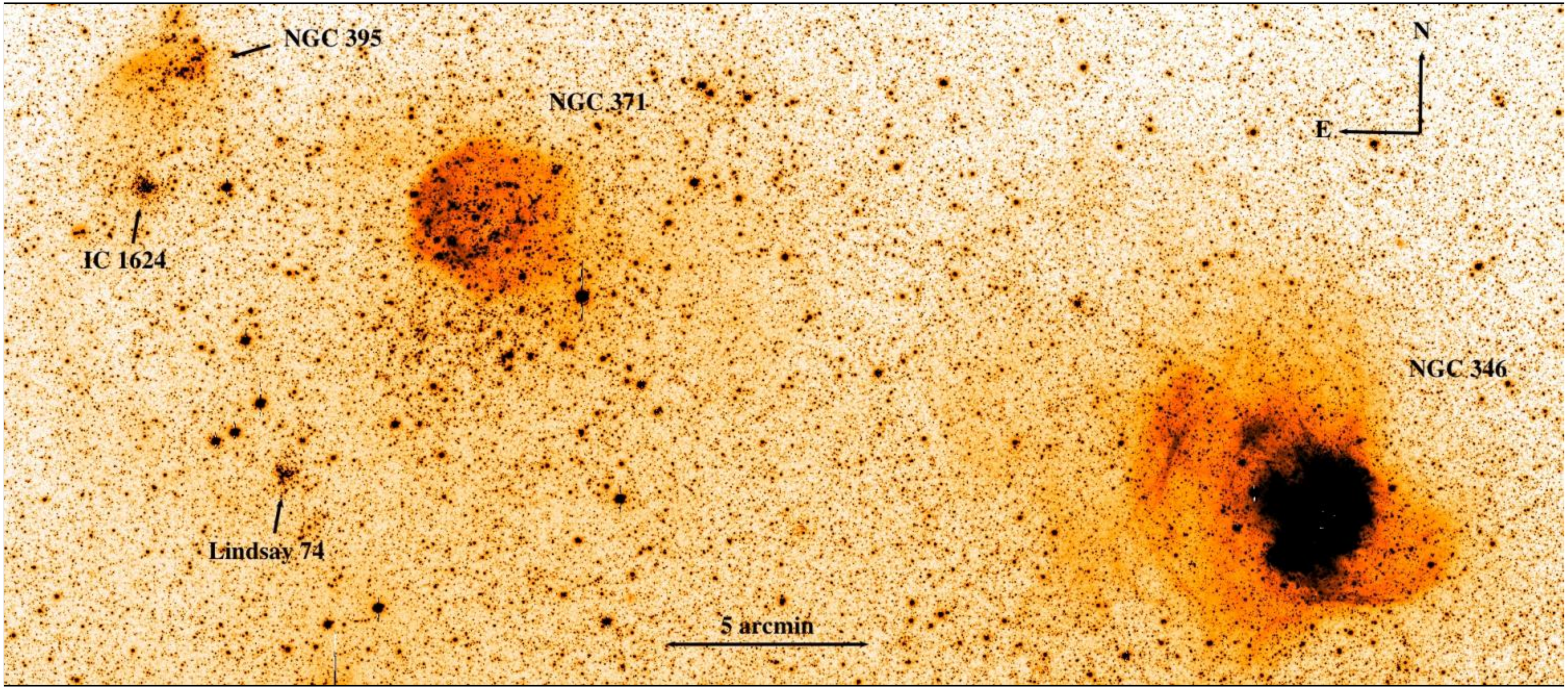


STEP: one VST field

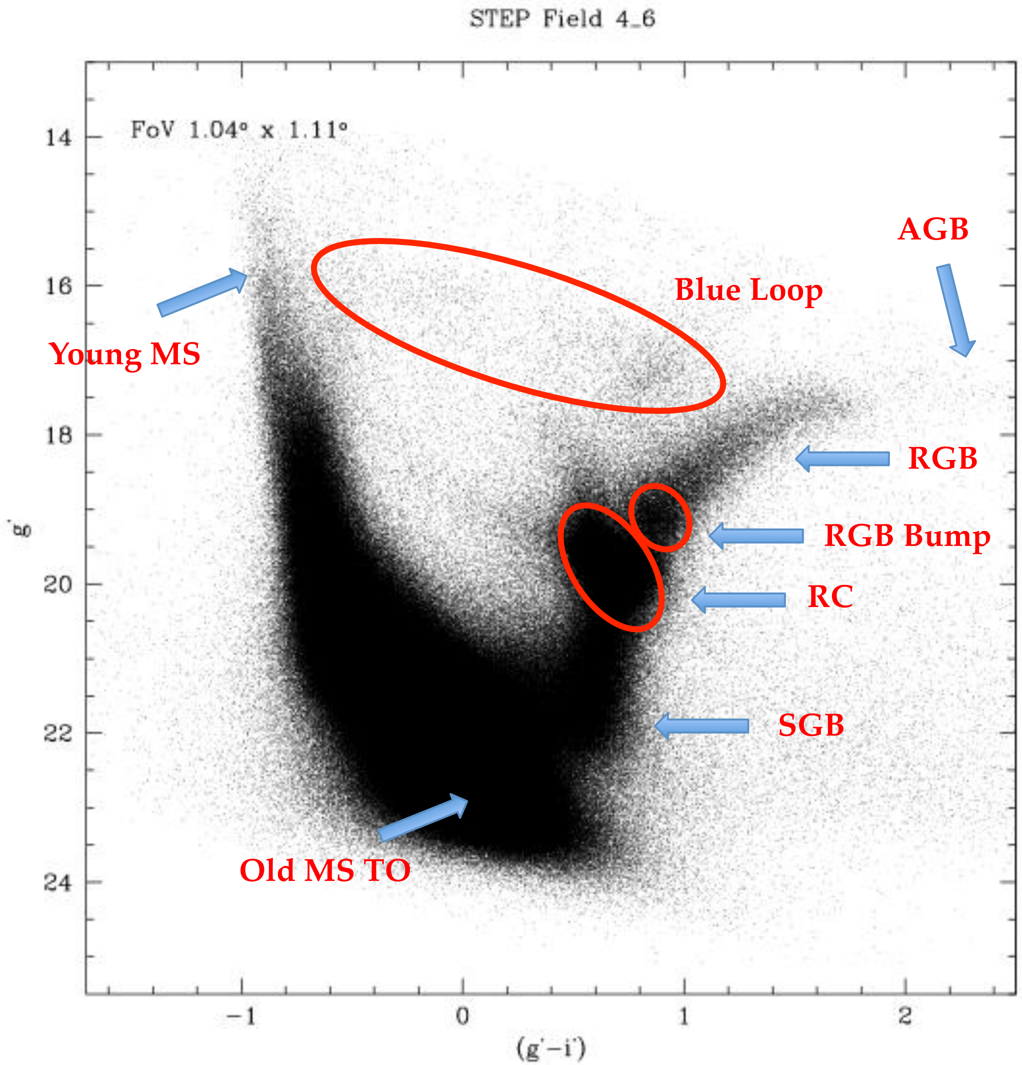


STEP: SMC star formation regions

portion of the VST g-band image



STEP: preliminary CMD of 4_6 Field



- Pre-reduction and astrometry with VST-Tube
- Photometry with Daophot/Allstar (VstTube)

STREGA@VST:
Structure and Evolution of the Galaxy

P.I. Marcella Marconi (INAF-Capodimonte Astronomical Observatory)

in collaboration with :

INAF-OAC: I. Musella, V. Ripepi, D. De Martino, M. Di Criscienzo, M. Dall'Ora, G. Coppola, R. Molinaro

INAF-OOAA @ Rome, Teramo, Turin, Padua

Universities of Naples Federico II, Torvergata Rome, Pisa, Bologna, Hertfordshire

STREGA main scientific goal

Investigate Halo formation mechanisms

Tools:
1) Variable stars (RR Lyrae, LPVs)
2) Main-Sequence and Turn-Off stars

- **Tracing tidal tails and halos** around stellar clusters/galaxies
- **Identifying new very faint stellar systems** by using recent techniques (Belokurov et al. 2006)
- **Mapping extended regions of Fornax orbit** → Fornax stream

<u>STREGA further goals</u>

- **Investigate Disk and Halo White Dwarfs and Interacting binaries populations**
- **Galactic star counts ⇒ Galactic structure**

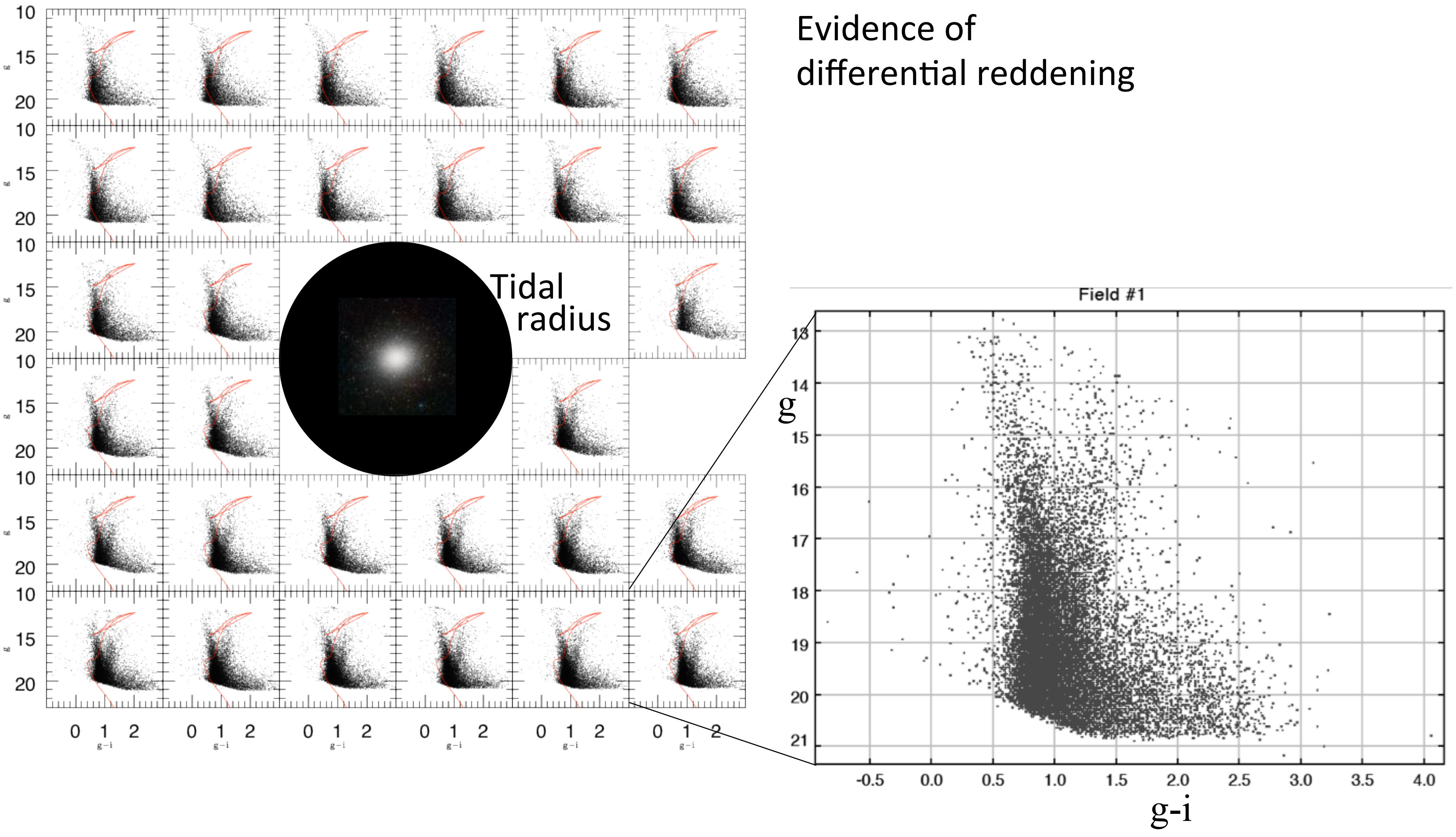
STREGA: Omega Centauri run 088.D-4015(C)

32 fields observed around Omega Centauri
to cover up to 3 tidal radii

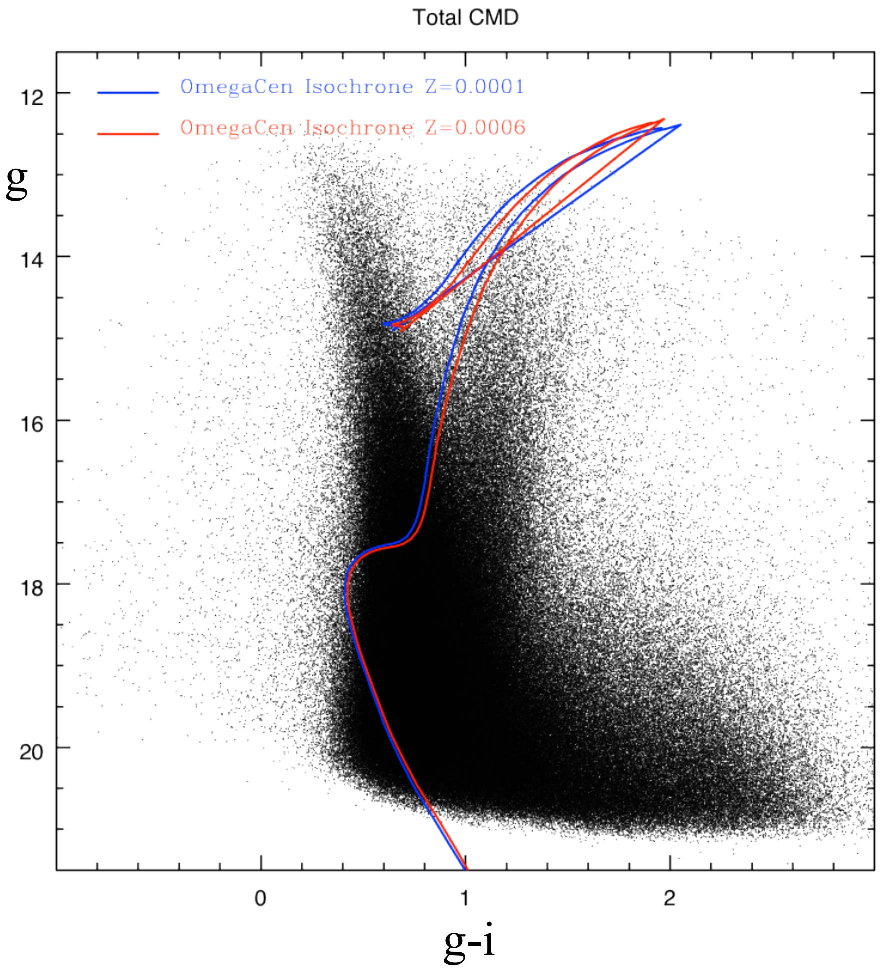
	Expected	Obtained
Seeing	1.0	0.8
Air Mass	1.5	1.25
Moon	bright time	bright time
Limiting magnitude:	1 mag under TO	2 mag under TO
g_{SDSS} =	18.5mag	19.5mag
r_{SDSS} =	18.3mag	18.6mag
i_{SDSS} =	18.3mag	18.6mag
S/N	50	50
Observing Time	2.7h	2.6h

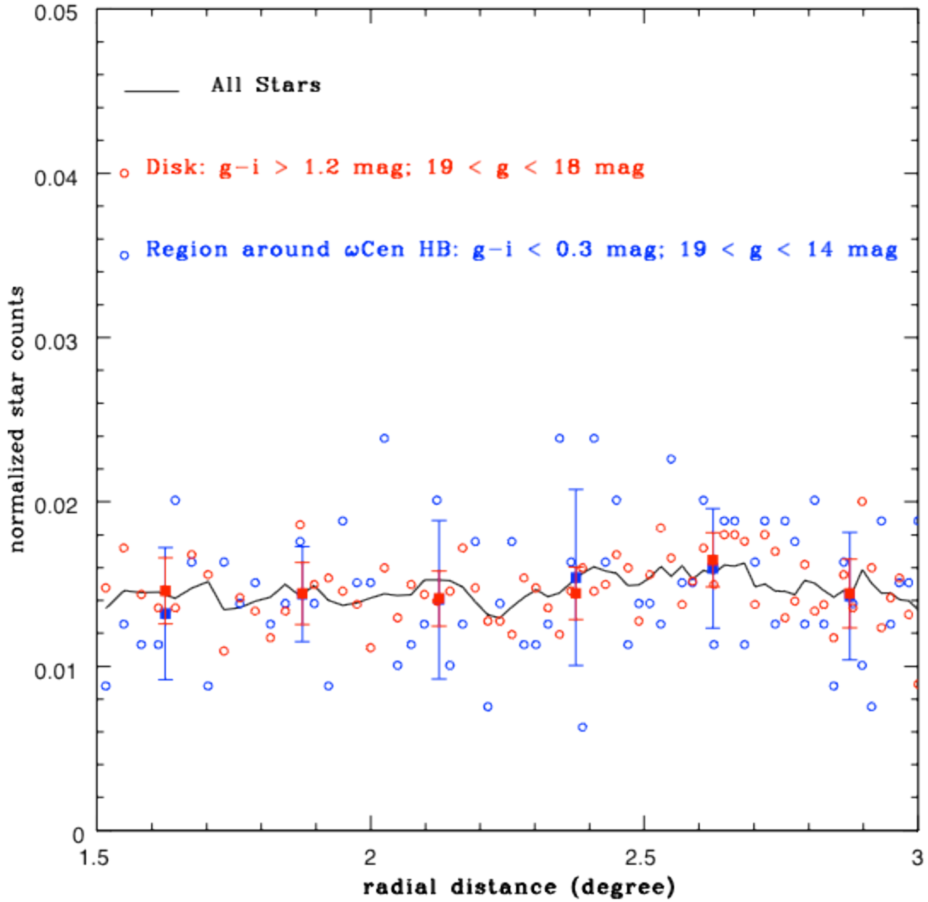
STREGA: preliminary CMDs (30 fields)

Evidence of differential reddening



STREGA: preliminary CMD and star counts





VST-ACCESS:

Galaxy Evolution in the Shapley Supercluster: from Filaments to Cluster Cores

PI: Paola Merluzzi (INAF-Capodimonte Astronomical Observatory)

Partners:

INAF-OAC: G. Busarello, A. Mercurio, A. Rifatto
Steward Observatory (AZ, US): C. P. Haines
Australian National University: M. Dopita, F. Vogt
Monash University (Melbourne, AU): K. A. Pimbblet
University of Innsbruck (A): S. Schindeler, D. Steinhauser, M. Heider, H. Höller
University of Birmingham (UK): S. Raychaudhury, G. P. Smith
University of Durham (UK): R. J. Smith

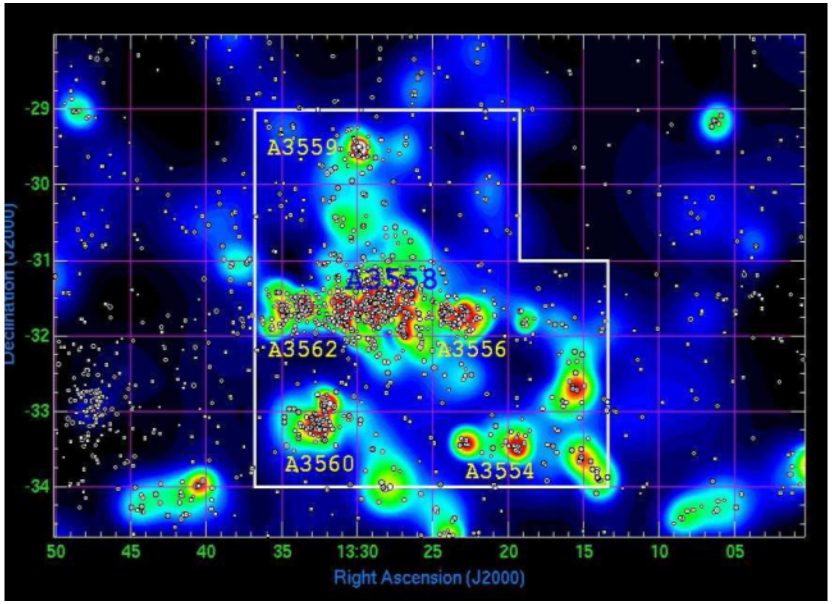
VST-ACCESS:

Science aims

The VST survey, already complemented with spectroscopic, NIR and MIR data, will constitute a unique data-set to investigate the relative importance of nature and nurture on galaxy evolution as a function of environment and galaxy mass

through

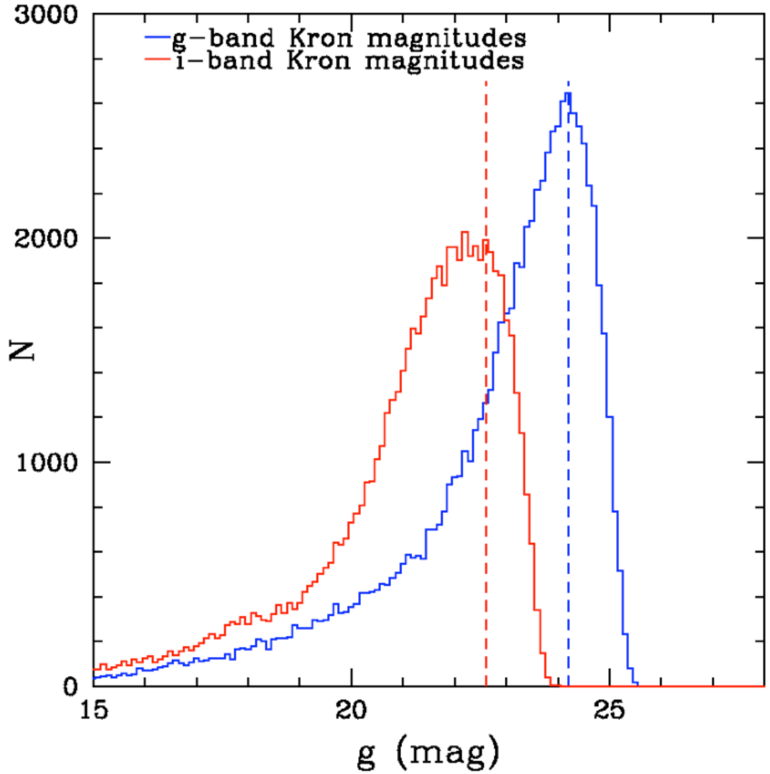
- morphological classifications (CAS parameters), structural parameters and bulge-disk decompositions.
- star formation rates from *u*-band luminosities (taking advantage from the multi--wavelength data in the SSC)
- internal color gradients
- stellar masses and accurate photo-z (δz < 0.03) with the available WISE near-IR photometry.
- the first deep, multi-band catalogue of the Shapley Supercluster, the reference data-set for future studies on this unique cosmological structure.



VST-ACCESS: survey characteristics

Area: 23 deg^2 (260 Mpc^2 at z = 0.05)
Bands: u', g', r', i'
Detection limit: r'_{AB} = 25 mag (S/N=5 in 3" ap.)
Limit for star/galaxy separation: r'_{AB} = 23.5 mag (M$_r$* + 8.5 at z ~ 0.05)

morphology, photo-z, internal color gradients down to M$_r$* + 6 at z ~ 0.05



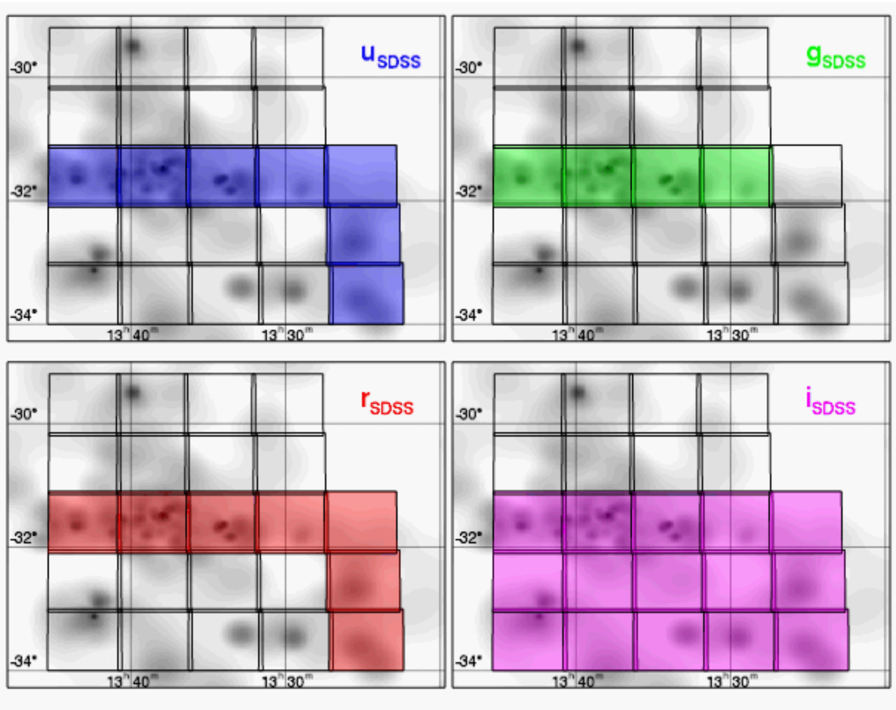
band	com. mag	int. time	seeing
g	24.2 ~L* + 8.5	1400 s	0.56"
i	22.6 ~L* + 8	1000 s	0.47"

depth requirements: achieved

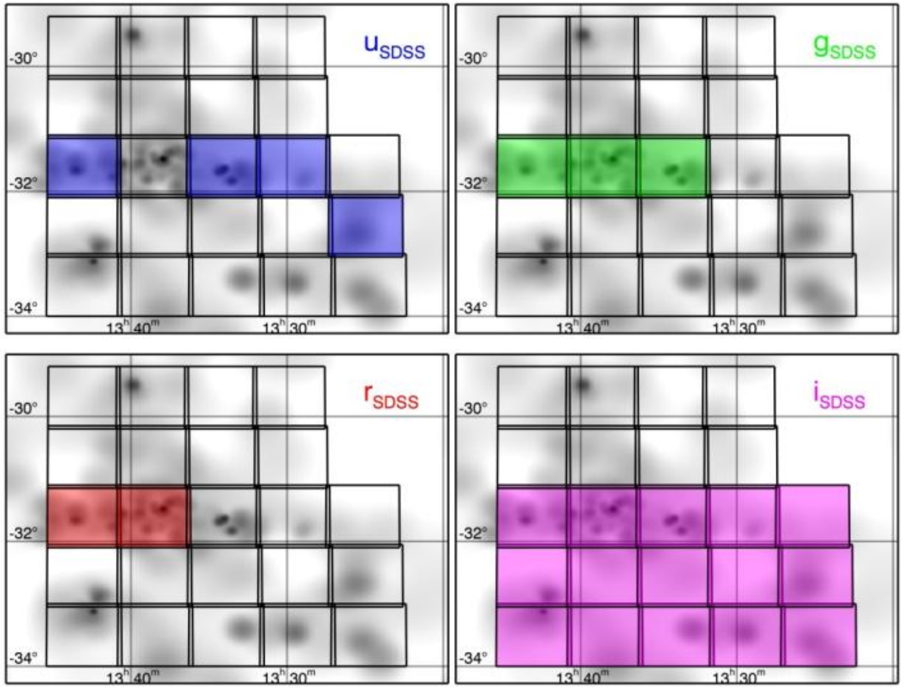
VST-ACCESS: sky coverage

Observations in P88 and P89: allocated 23.6 h, 64% executed

Planned



Observed



VST-ACCESS: data progress

80% of the carried out observations are reduced

i-band catalogue for the whole 15 deg^2 covered

Work in progress:

- fixing the "cleaning" procedure for catalogues;
- tuning the algorithms to estimate photo-*z*, stellar masses on the field observed in four bands;
- estimating the galaxy density to characterize the environment.

Already available in the whole area WISE IR data (3.4, 4.6 μm) down to K*+4

Planned in the near future:

- morphological classification via CAS (Conselice 2003)
- calibration of *u*-band indicator for star formation

Already available in the Shapley Supercluster Core UV (GALEX) and MIR (Spitzer)

VST-ACCESS: data progress

Hunting for complementary data:

SVISTA: Shapley Supercluster Survey at VISTA
to extend the NIR data to K=19.9:

•Stellar mass function of galaxies as function of the environment reaching stellar masses $M=10^7 M_{sun}$
•To quantify the effects of the environment on the dwarf galaxy population comparing the results of Shapley to those of GAMA.

AAOmega spectroscopic survey through OPTICON:
How Environment Transforms Dwarf Galaxies in the Shapley Supercluster Core

Collect the first complete mass-selected sample for this kind of structure down to the dwarf regime, $M<2x10^9 M_{sun}$ (2400 galaxies).
Dynamical analysis to identify different cluster substructures and split the sample into different environments (e.g. relaxed cluster core, outskirts / high velocity infalling galaxies/groups).
Determine the preferred environment(s) for starburst and post-starburst dwarf galaxies

VST-ACCESS: hunting transforming galaxies

The high-quality VST optical imaging of VST to select candidates being in the process to be transformed by their interaction with the environment and/or other galaxies via morphology

VST-ACCESS: hunting transforming galaxies

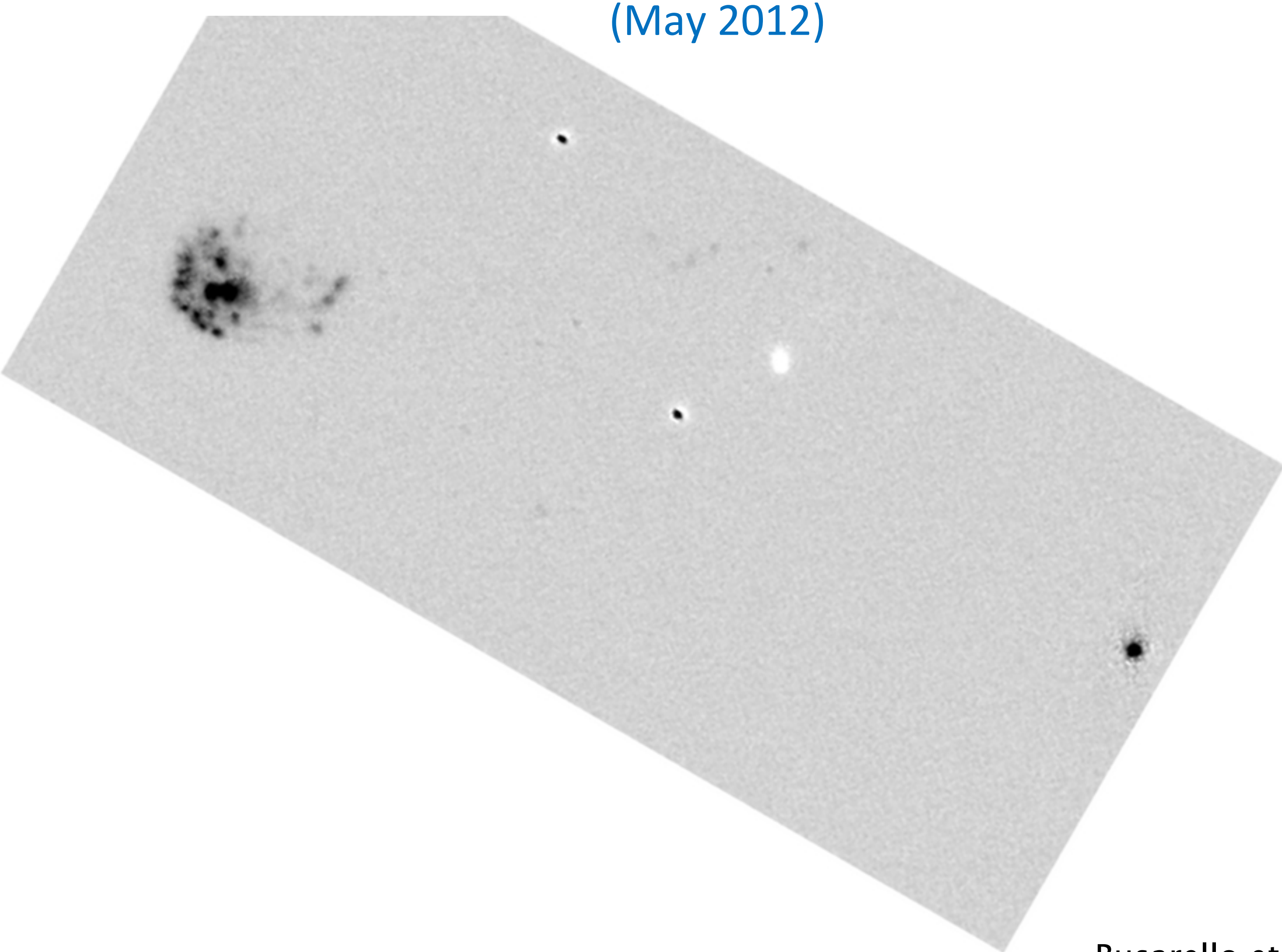
VST-ACCESS: the galaxy SOS 0909630

VST gri composite image

Complex morphology and hints of outflowing matter

VST-ACCESS: the galaxy SOS 0909630

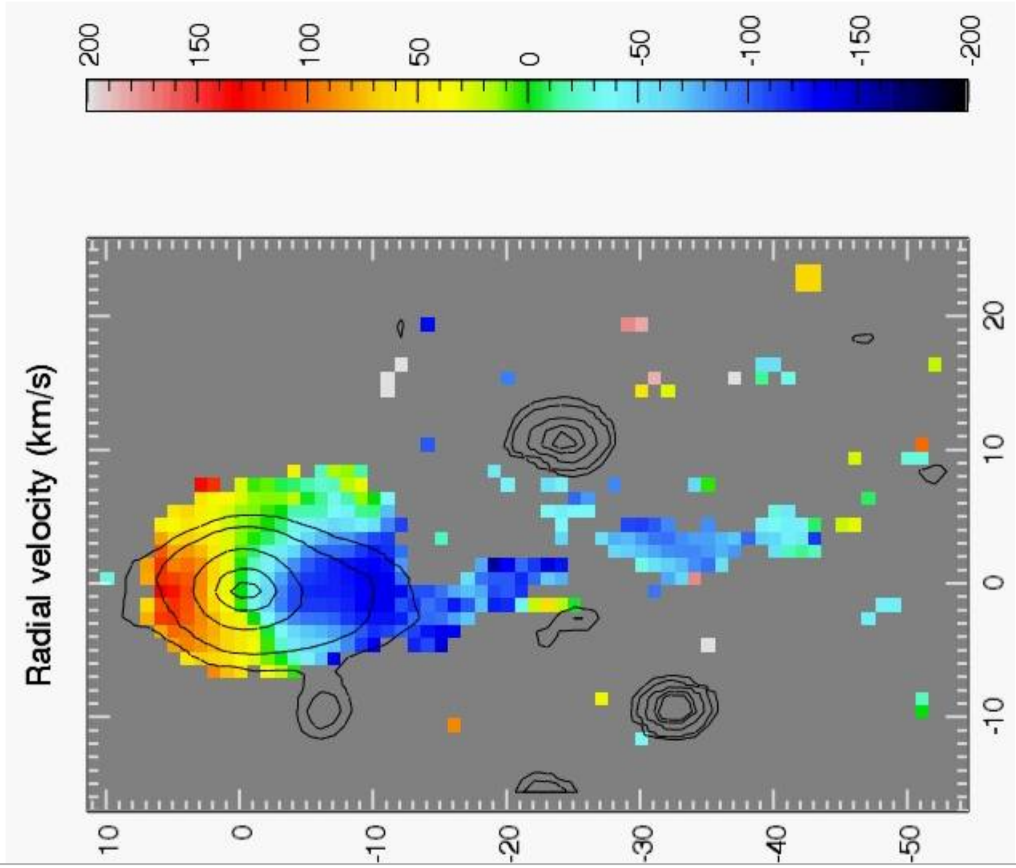
Hα imaging with MMTF at Magellan-Baade 6.5m telescope
(May 2012)



Busarello et al. in preparation

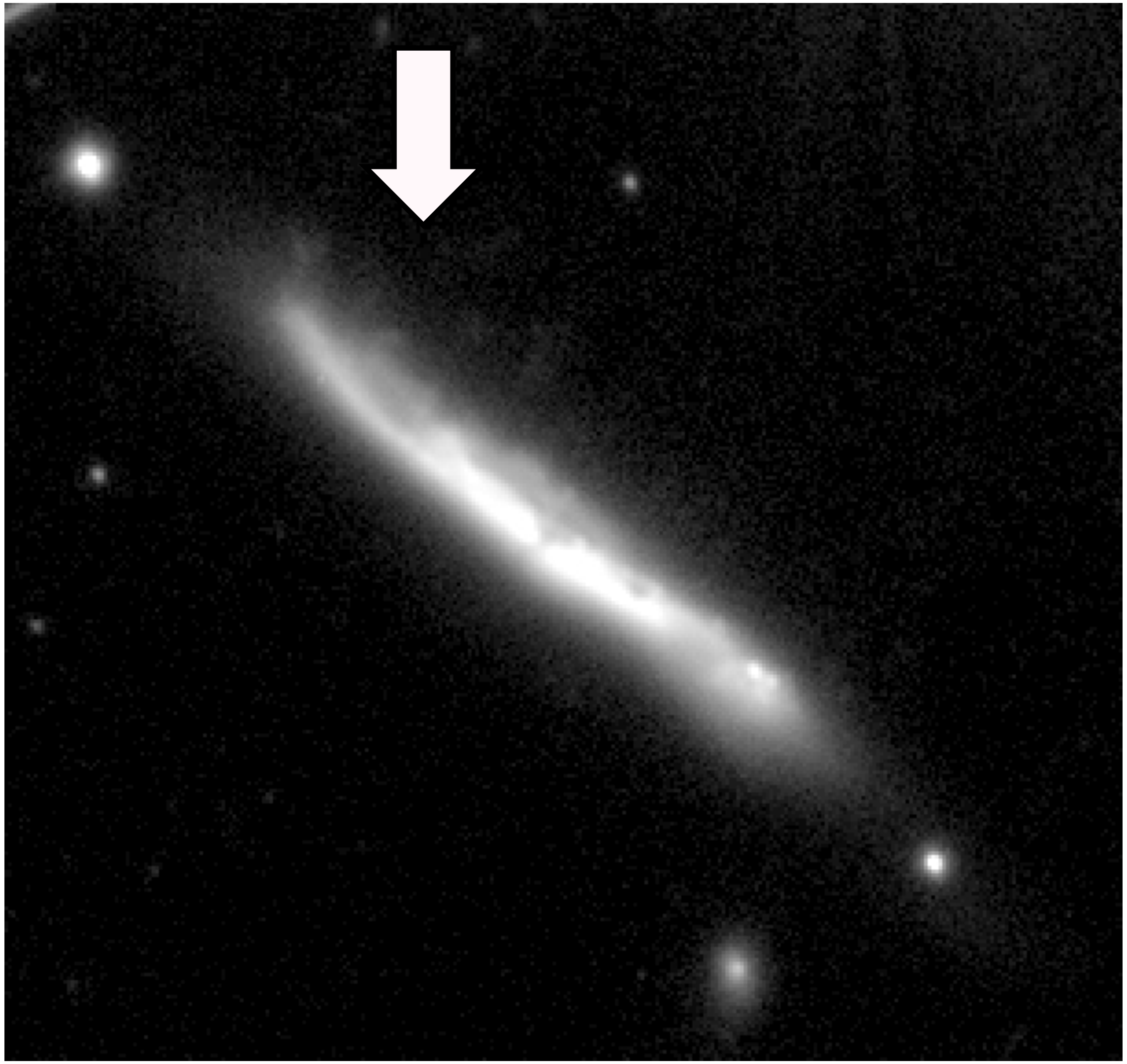
VST-ACCESS: the galaxy SOS 0909630

Integral-field spectroscopy with WiFeS at ANU 2.3m telescope
(April 2012)



The detached gas seems to remember the rotation of the disc supporting the fact that we are observing gas outflowing from the disc.
Why this gas is ionized? Star formation or shock-ionized?

VST-ACCESS: the galaxy SOS 114372

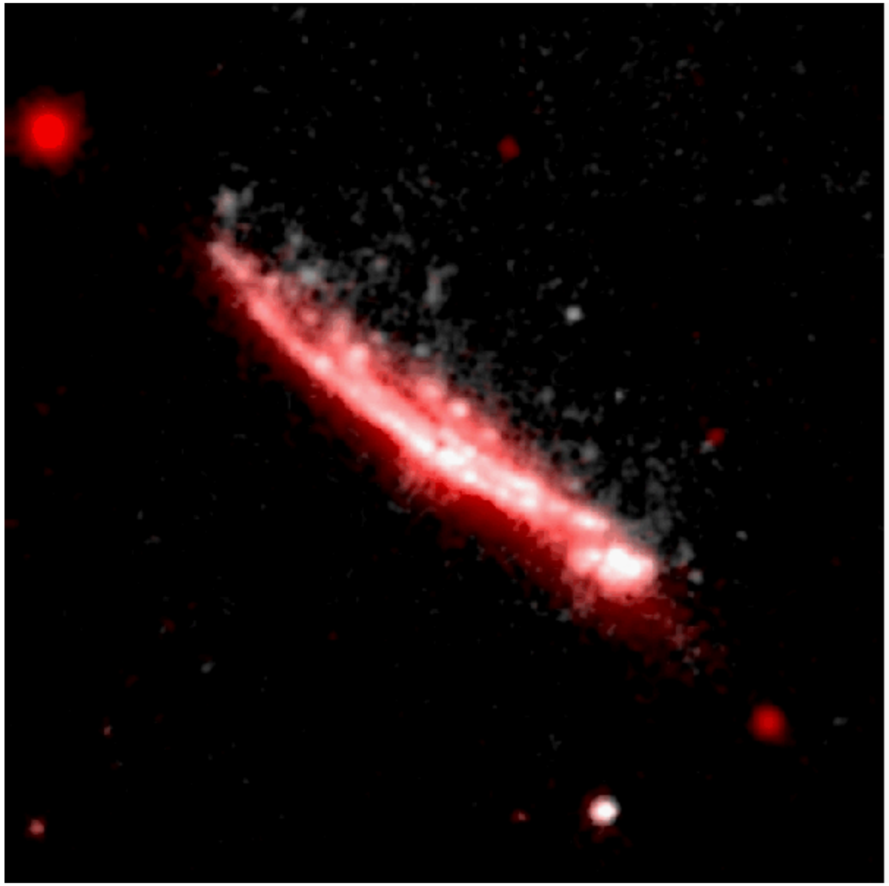


Merluzzi et al. 2012, MNRAS, submitted

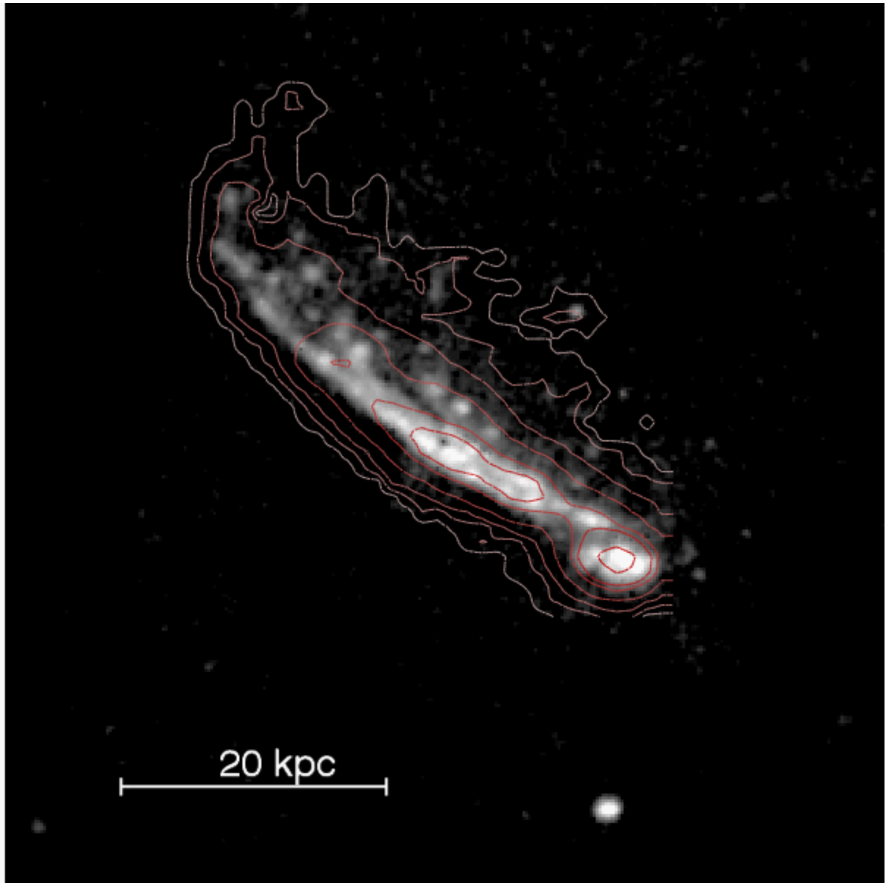
VST-ACCESS: the galaxy SOS 114372

WiFeS IFS (April 2010, 2011) and Hα imaging with MMTF (May 2012)

MMTF Hα (white) over the UKIRT K-band image (red)

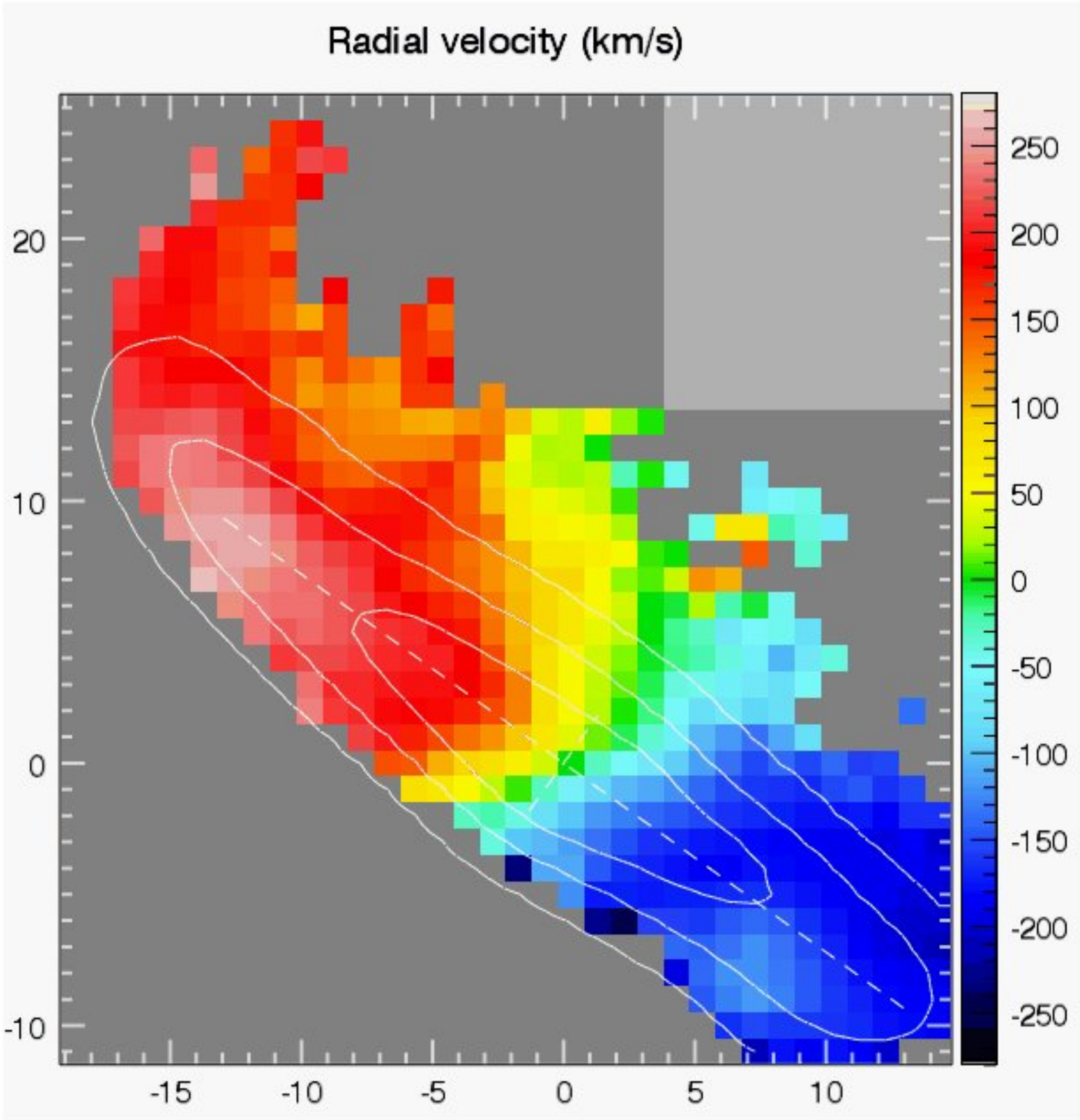


Hα (image MMTF – isophotes WIFeS IFS)



Merluzzi et al. 2012, MNRAS, submitted

VST-ACCESS: the galaxy SOS 114372



Ionized gas velocity field

Investigating

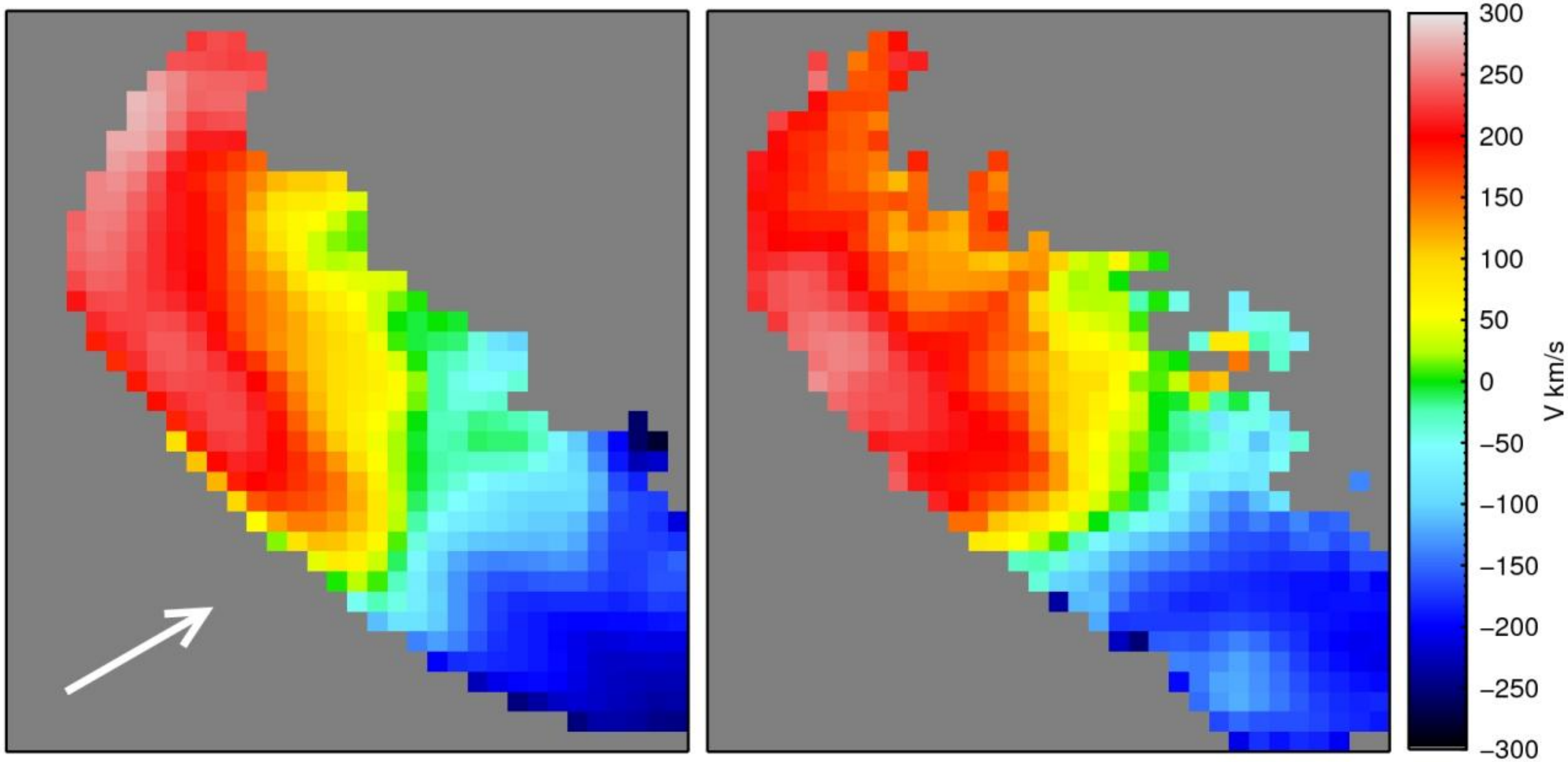
gas and stellar kinematics
+
properties of the gas and stellar populations (emission-line diagnostics, stellar population synthesis and photoionization models)

ram-pressure stripping

Merluzzi et al. 2012, MNRAS, submitted

VST-ACCESS: the galaxy SOS 114372

N-body/hydrodynamical simulations



model galaxy

Merluzzi et al. 2012, MNRAS, submitted