

# Vista Science Verification

Extragalactic mini-survey

Prepared by: M. Arnaboldi, G. Battaglia, W. Freudling, P.  
Moller, M. Rejkuba et al.

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# Extragalactic mini-survey

## Participants

- ESO Vitacura- Pompei, Emanuela, Mieske, Steffen, Szeifert, Thomas, Ivanov, Valentin
- ESO Garching - Arnaboldi, Magda, Battaglia, Giuseppina, De Bilbao, Lander, Freudling, Wolfram, Hatziminaoglou, Evanthia, Hilker, Michael, Hummel, Wolfgang, Melnick Jorge, Misgeld Ingo, Moller, Palle, Neeser, Mark, Neumayer, Nadine, Nilsson Kim, Rejkuba, Marina, Retzlaff, Joerg, Romaniello, Martino, Slijkhuis, Remco, Venemans, Bram, Ziegler Bodo, Kuntschner Harald
- External : Iodice Enrica (INAF, OAC), Greggio Laura (INAF, OAPD)
- CASU/VISTA: Jim Emerson (QMUL), William Sutherland, Mike Irwin, Jim Lewis, Simon Hodgkin, Eduardo Gonzalez-Solares

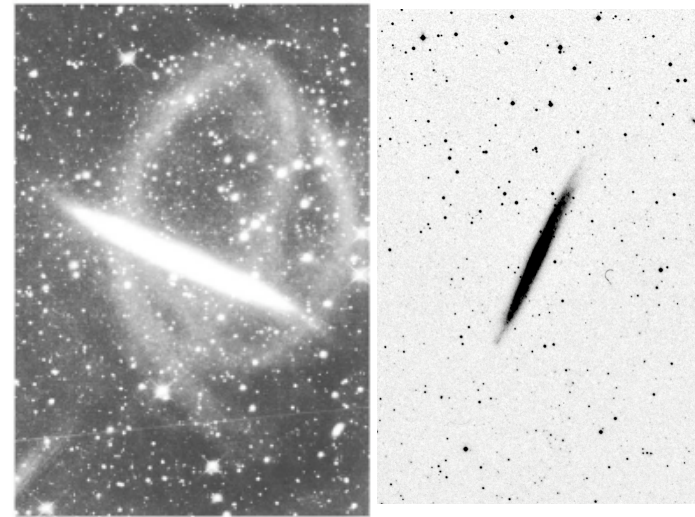
# Background – Science Verification

- SV took place from October 15 - 30, 2009.
- Half nights – first half NGC 253
- Test the end-to-end system
  - Phase 2 tools
  - Paranal pipeline, QC, observing templates tests
  - Archival of data and Paranal-Garching data flow
  - data were reduced with the VISTA Data Flow System (VDFS – CASU & WFAU)
- The two mini surveys should not overlap with the VISTA public survey projects

# Extragalactic mini survey: deep survey of the stellar halo in a nearby spiral galaxy

## Goals:

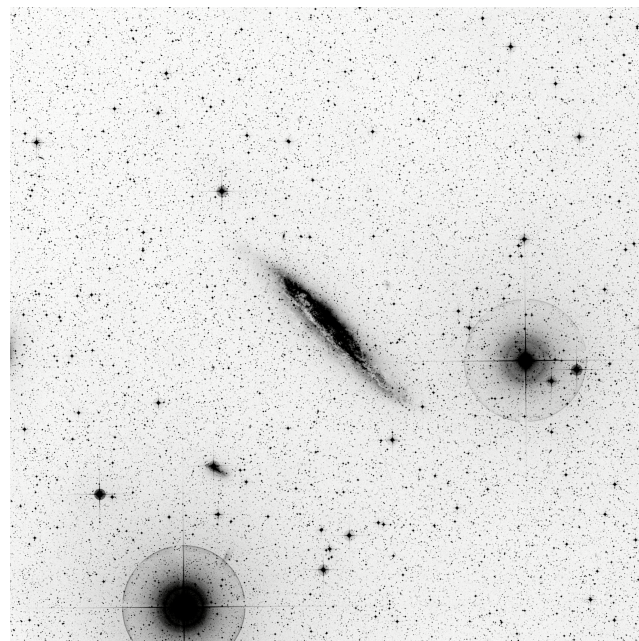
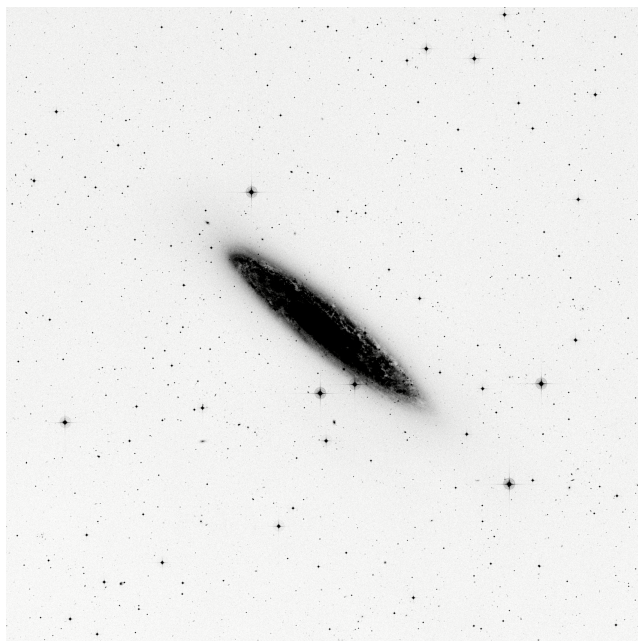
- Morphology of the disk
- Detect faint stellar halo
- LF of satellites
- Detection of GCs/UCDs
- Detection of streams
- Opacity of the NGC 253 halo
- Background High-z galaxies



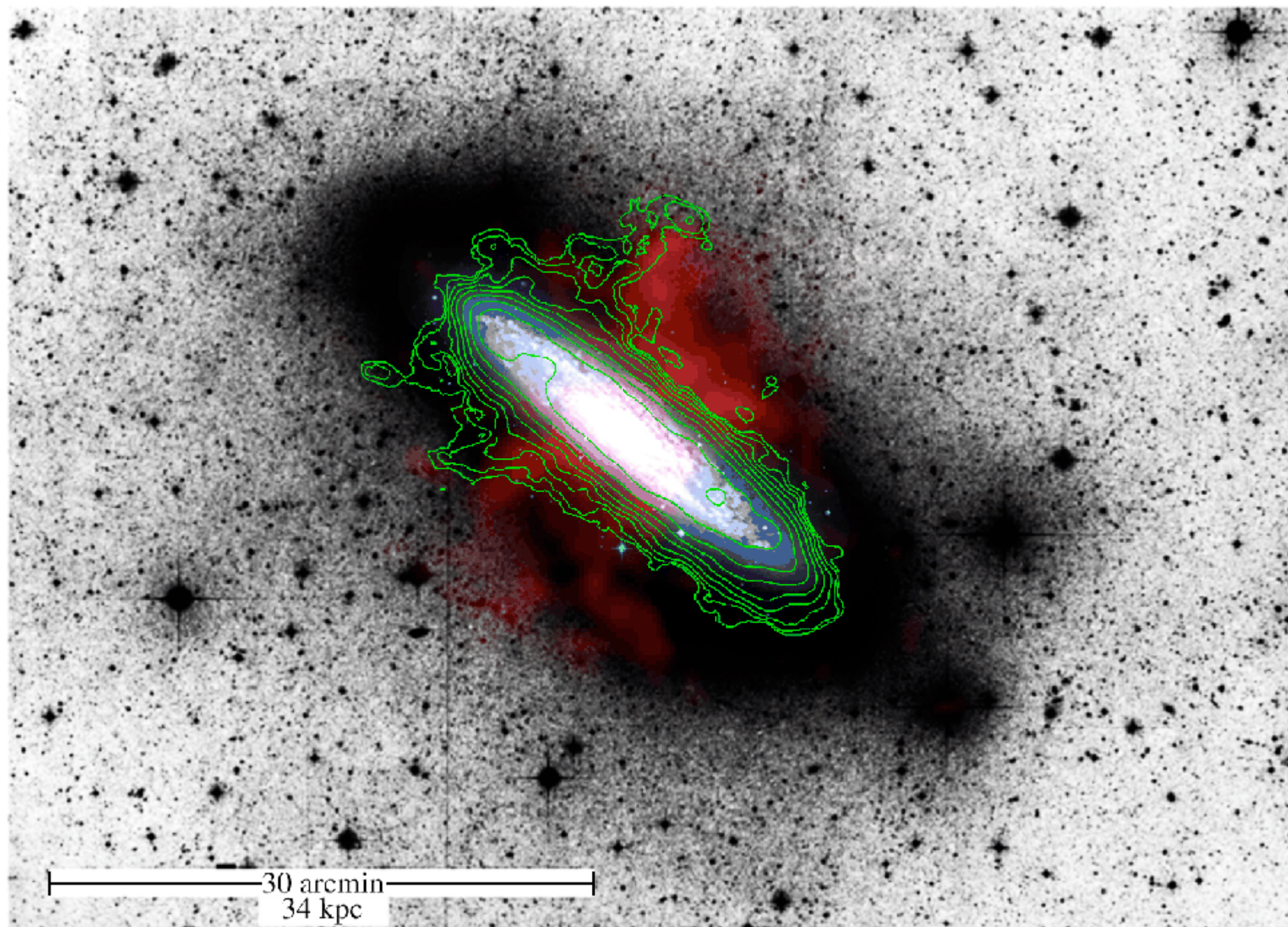
NGC 5907 18'.2 x 27'.7  
11.35 hrs BBRO image and DSS

# Target galaxies

- RGB tip brightness:
  - $[\text{Fe}/\text{H}] = -1 \rightarrow J=-5.2; H=-6.0$
  - $[\text{Fe}/\text{H}] = -2 \rightarrow J=-4.7; H=-5.3$
- 1. NGC 253 ~ 4Mpc  
00 47 33 -25 17 18 (J2000)
- 2. NGC 4945 ~ 4Mpc  
13 05 27 -49 28 05 (J2000)







# Target galaxies – NGC 253

- $m_J = 22.42$ ,  $m_H = 21.62$  (Vega mag; tip of RGB).
- Aims: detection with  $S/N \sim 10$  (complete down to  $\sim 1$  mag from RGB tip)
- Area covered by the VISTA FoV: 54 kpc x 75 kpc
  - detect stellar streams like in NGC 5907 & M31
  - Possible detection of closest dwarf satellites
- $BVR_cI_c + H\alpha$  from MPI-2.2 WFI, FORS2 I (1.75 hrs), R (3.6hrs). All data available/public

# Phase2 information

## **Area definition:**

Survey area defined as geodesic rectangle

RA=00:46:30, Dec=-25:17:40,

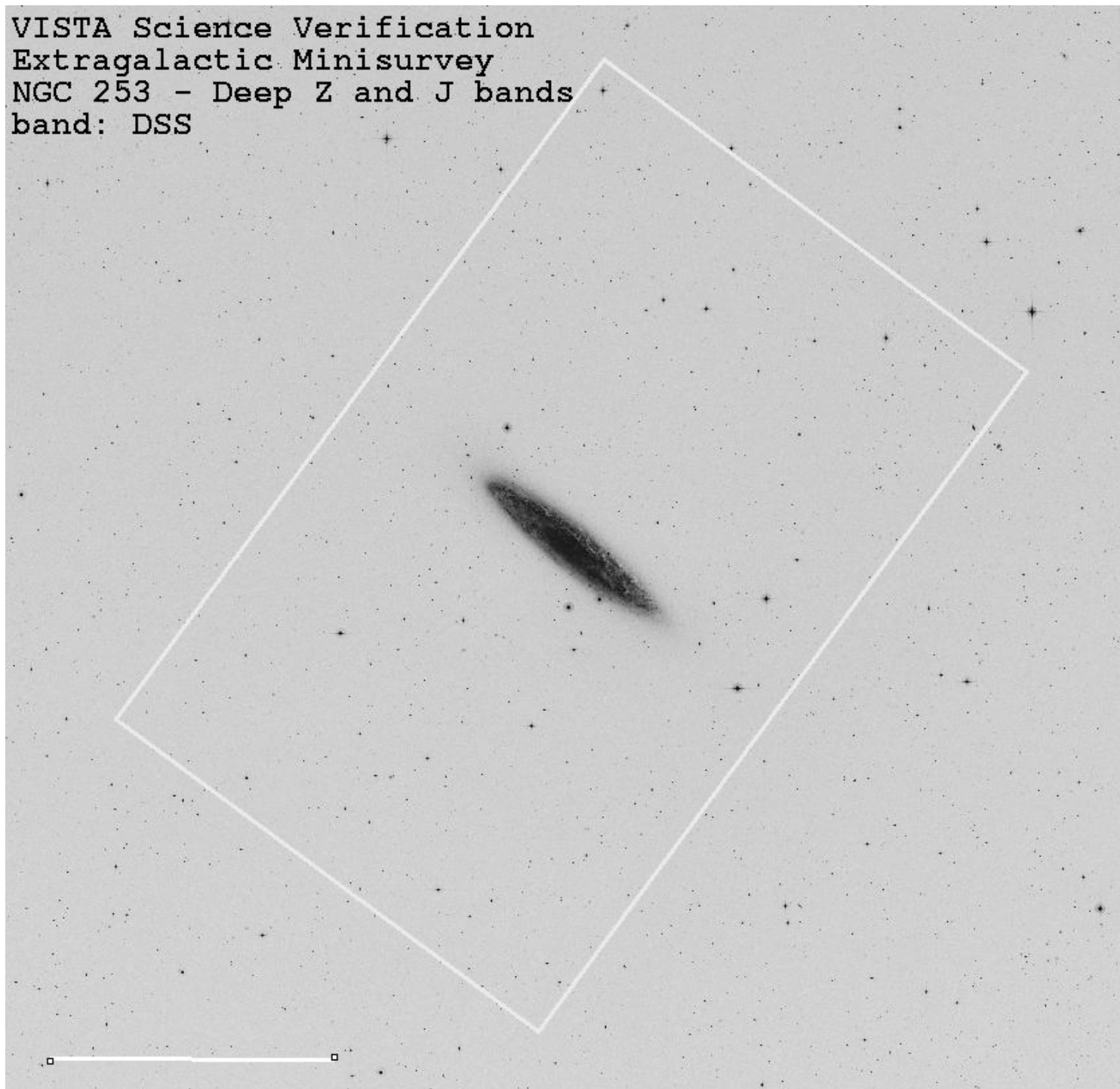
Width=1.2, Height=1.0, Angle=52

The target field is covered with one tile only

All available at [http://www.eso.org/sci/activities/vistasv/VISTA\\_SV.html](http://www.eso.org/sci/activities/vistasv/VISTA_SV.html)



VISTA Science Verification  
Extragalactic Minisurvey  
NGC 253 - Deep Z and J bands  
band: DSS



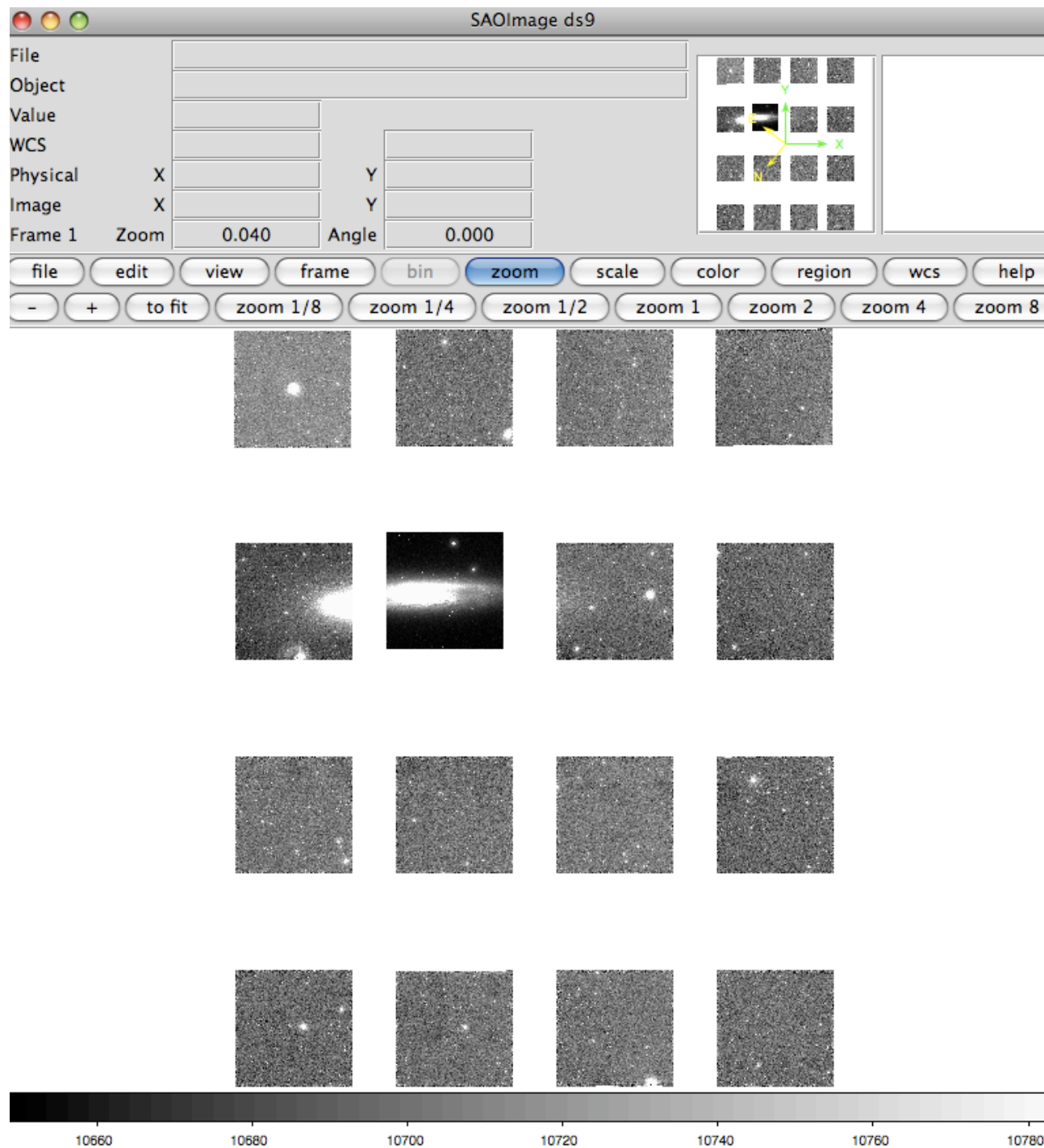
# Observing strategy

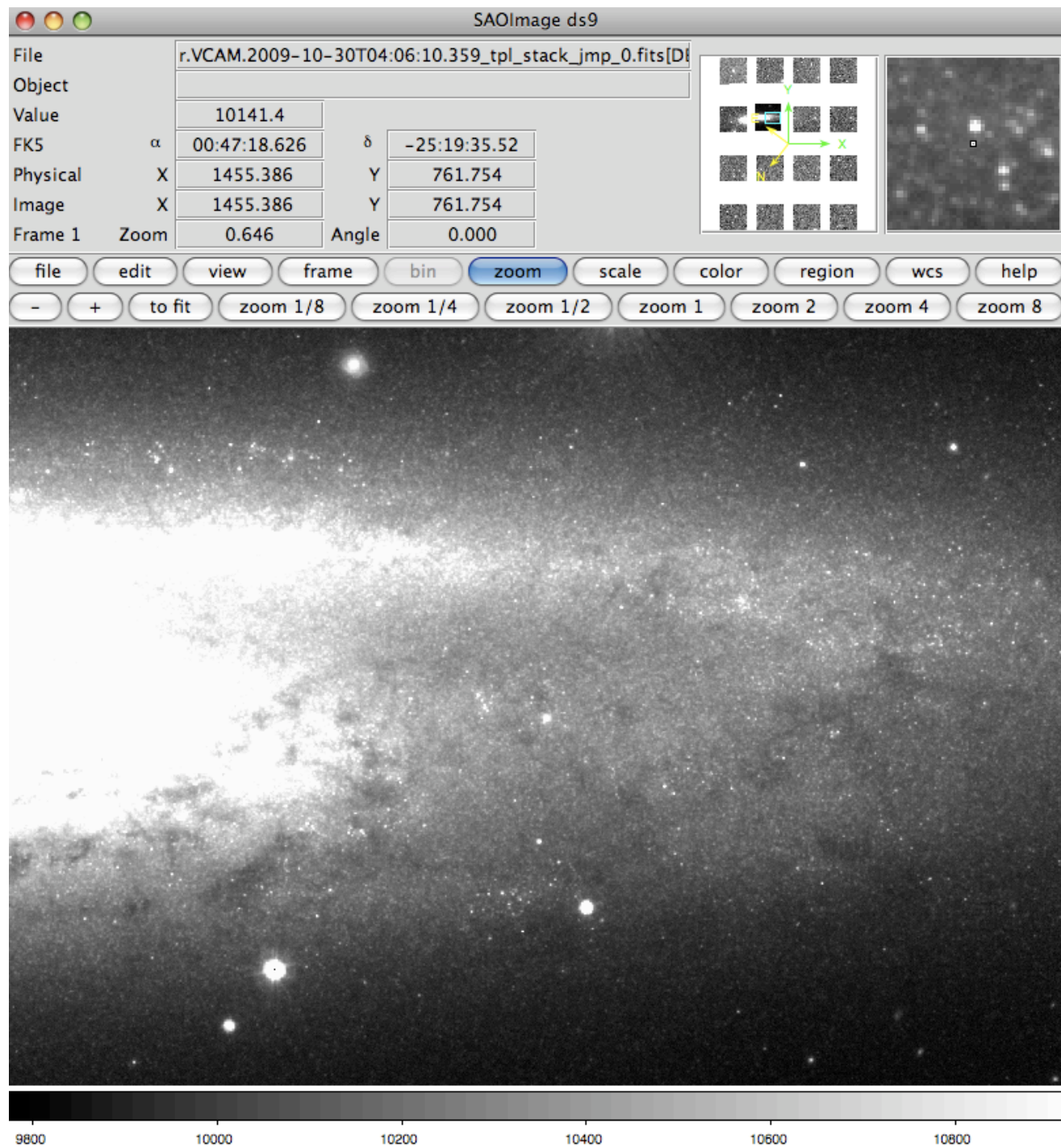
- **Deep survey observation description**
  - Tile 6 pattern used, long  $\sim 1.6$ h Obs in J and Z (bad idea...)
    - Aims to resolve the brightest RGB stars in the halo
  - NB 118 observations use different jitter patterns
- **Shallow survey observation description**
  - Complement the deeper survey
  - Central galaxy not over-exposed
  - Initially: tile3px + tile3nx  $\rightarrow$  problem!
  - Finally Y, Z, J, H, K tile 6 + one offset sky
    - the bright regions of the galaxy (bulge and central disk) can be studied and characterized

# Observations: deep survey

Z	Tile6zz	FJPME*	6hrs
J	Tile6zz	FJPME	22.5hrs
NB118	Tile6zz	FJPME	6hrs

\*to allow for sky subtraction even in the presence of a bright disk







# Next steps

- Catalogs validation and characterization of image depth
- Morphology of spiral arms & disk
- Nuclear young massive star clusters & OB associations
- Streams and satellite galaxies properties
- GCs and UCDs(?)
- RGBs in the NGC 253 halo
- High-z galaxies & Look at the extinction in NGC 253 by counting background galaxies

