

VST in the era of the large sky surveys



Report of Contributions

Contribution ID: 1

Type: **not specified**

Welcome

Tuesday, June 5, 2018 2:00 PM (15 minutes)

Presenter: MARCONI, M.

Contribution ID: 2

Type: **not specified**

Introduction

Tuesday, June 5, 2018 2:15 PM (15 minutes)

Presenter: SCHIPANI, P.

Contribution ID: 3

Type: **not specified**

The ESO Survey Landscape

Tuesday, June 5, 2018 2:30 PM (25 minutes)

Surveys have become an important observational mode of ESO telescopes. Several telescopes have been fully dedicated to surveys and large survey programmes have been carried out at others. I will provide an overview of the opportunities ESO facilities offers for surveys and survey support.

Presenter: LEIBUNDGUT, B.

Contribution ID: 4

Type: **not specified**

ESO Public Surveys: status and forward look

Tuesday, June 5, 2018 2:55 PM (25 minutes)

The ESO Public Surveys serve the science goals of the survey teams while increasing the legacy value of ESO programmes, thanks to their homogeneity and the breadth of their sky coverage in multiple bands. These projects address a variety of research areas: from the detection of planets via microlensing, to stars, the Milky Way and Local Group galaxies, to extragalactic astronomy, galaxy evolution, the high-redshift Universe and cosmology. Last but not least, the era of multi-messenger astronomy builds on the legacy value, the availability and time coverage of the survey data. I will present the current status of the ESO surveys, and illustrate the availability of science data products that are becoming browsable via the new ESO archive web interface. The forward look includes the construction of two wide-field spectrographs the Multi Object Optical and Near Infrared Spectrograph (MOONS) and the 4-metre Multi Object Spectroscopic Telescope (4MOST), on the VLT and VISTA respectively, and the calls for new community surveys on these facilities.

Presenter: ARNABOLDI, M.

Contribution ID: 5

Type: **not specified**

VST operations: the Paranal perspective

Tuesday, June 5, 2018 3:20 PM (25 minutes)

I will give a summary of how VST is currently operated by Paranal Observatory, and which resources are assigned to this task. I will also briefly describe our ongoing efforts to further streamline VST operations, and list a few challenges that limit us in that context.

Presenter: MIESKE, S.

Contribution ID: 6

Type: **not specified**

Guarding the performance and data quality of OmegaCAM/VST at ESO

Tuesday, June 5, 2018 3:45 PM (20 minutes)

“OmegaCAM on the VST telescope at the Paranal Observatory has been supported by the ESO Quality Control group since the beginning of operations in 2011. We will present the schema that monitors the performance of the instrument and controls the data quality throughout the years. It has been evolving with time, being constantly improved and adapted to new demands, but the main goals remain unchanged. The system includes continuous checks of the availability of required calibrations, assessing the quality of the calibration data, and monitoring the health of the instrument. Continuous feedback is provided to the Observatory about the status of the instrument and its data.

We will also discuss actual events from the life of OmegaCAM when our monitoring revealed problems with the instrument, and allowed for their quick repair. “

Presenter: DOBRZYCKA, D.

Contribution ID: 7

Type: **not specified**

VST ATLAS - past, present and future highlights

Tuesday, June 5, 2018 4:35 PM (25 minutes)

“VST ATLAS is a ugriz imaging survey of similar depth to SDSS and has now completed observations of 4700deg^2 of the Southern sky, making it the “Southern Sloan” - but with sub-arcsecond median seeing in all bands. With its well-matched sister VISTA Hemisphere Survey in J and K, it also covers the widest wavelength range from the ultraviolet to the infrared and into the mid-IR via WISE. ATLAS highlights so far range from quasar redshift surveys in the range $0.5 < z < 6.5$ including quadruply lensed quasars and investigations of the enigmatic CMB Cold Spot via ATLAS based galaxy redshift surveys through to the discovery of dwarf Milky Way satellite galaxies including the crucial Crater 2 dwarf and new catalogues of thousands of white dwarf stars in the Milky Way. Further results on the ISW effect and new galaxy cluster and quasar catalogues are amongst many in the pipeline. In future, these ATLAS surveys will be vital for the exploitation of X-ray surveys of quasars and rich galaxy clusters detected by the eROSITA satellite due for launch in 2019.

Ultimately they will also be vital for the follow-up of X-ray AGN + quasar + galaxy cluster redshift surveys by the ESO VISTA 4MOST fibre spectrograph due to be commissioned in 2022. “

Presenter: SHANKS, T.

Contribution ID: 8

Type: **not specified**

QSOs and gravitational lenses from UVAS/ATLAS

Tuesday, June 5, 2018 5:00 PM (20 minutes)

The u-band VST ATLAS Survey (UVAS) is the Chilean extension of the ATLAS survey. This corresponds to a second observation in the u-band for the whole ATLAS survey area, effectively doubling the exposure time of the parent survey. One of the main goals of ATLAS/UVAS is the identification of a significant number of QSOs (surface density of ~ 100 per sq deg) to trace the BAO for cosmological applications.

In this work I will present our efforts to exploit ATLAS/UVAS using machine learning and deep learning algorithms, in collaboration with computer science researchers, to identify interesting samples of objects such as QSOs and strongly lensed galaxies.

Presenter: BARRIENTOS, F.

Contribution ID: 9

Type: **not specified**

Two cosmology experiments with the VST in the 2020s

Tuesday, June 5, 2018 5:20 PM (20 minutes)

“I will describe two dedicated campaigns with the VST, which exploit its fast optics and high image quality, and will extend its survey capabilities in the spectroscopic and time-domain.

The first project consists in high-cadence monitoring of strongly lensed quasars, for time-delay cosmography. With the eCOSMOGRAIL collaboration, we are performing (almost) nightly-cadence campaigns on bright Southern lenses, aiming at 2% accuracy and precision on H_0 , and the VST will be the ideal telescope to extend these on a larger sample of lenses discovered before 2020, reaching sub-percent uncertainties on H_0 . By comparison, the three-night (foreseen) cadence of LSST is sufficient only for lenses with long delays.

The second project is a slitless-spectroscopic survey, which will provide accurate redshifts for the LSST-Euclid synergy, an accurate and wide-field object classification, and the discovery of intrinsically rare objects. Being optically “fast”, the VST can survey very wide footprints to a target depth of $i=21$, and its excellent image quality guarantees an accurate separation of overlapping spectra. Medium-low resolution spectroscopy will yield an unbiased coverage of emission-line objects (e.g. quasars up to $z=4$), a large sample of extremely metal poor stars, and the external calibration needed in the LSST-Euclid synergy to break degeneracies (between $E(B-V)$, spectral type, and redshift) in photo- z determination, beyond the forecasted ~ 0.01 accuracy limit from broad-band information only.”

Presenter: AGNELLO, A.

Contribution ID: 10

Type: **not specified**

The Universe in Full Color : Multi-Wavelength Studies of the Cosmic Star Formation History

Tuesday, June 5, 2018 5:40 PM (20 minutes)

“”The Universe in Full Color : Multi-Wavelength Studies of the Cosmic Star Formation History””

The coming of age of multi-wavelength astrophysics over the past decade has allowed us to probe deep and wide into the distant universe at all wavelengths thanks to the combination of ground-based and space-based instrumentation. This giant leap in observational capabilities has provided much insight into how different wavelengths can be used to reliably trace star formation rates and thus place stronger constraints on the cosmic star formation history and on computer simulations trying to reproduce it.

However, optimally merging different datasets remains a formidable challenge due to the size and complexity of upcoming surveys. The HELP-IDIA Panchromatic PrOject (HIPPO - <http://www.mattivaccari.net/hippo/>) aims to tackle these challenge by combining the datasets and the tools developed by HELP (<http://herschel.sussex.ac.uk>) with the cloud computing infrastructure deployed by IDIA (<http://www.idia.ac.za>) to create a cloud-computing environment for the science exploitation of multi-wavelength surveys.

I will introduce HIPPO's main objectives and illustrate the cloud-based operational model developed at IDIA. I will then detail how VST GTO and Public Survey data are being incorporated within its multi-wavelength database to support upcoming MeerKAT radio surveys of the southern skies and thus better enable studies of the cosmic star formation history.”

Presenter: VACCARI, M.

Contribution ID: 11

Type: **not specified**

Tidal Tails in Galactic Globular Clusters

Tuesday, June 5, 2018 6:00 PM (20 minutes)

We will present the status of the VST GTO program “tidal Tails of Five Galactic Globular Clusters” and of the OMEGACAM GTO program “Photometry and Astrometry of the Galactic Globule Cluster Omega Centauri”.

Presenter: NARDIELLO, D.

Contribution ID: 12

Type: **not specified**

Studying large scale structure with the Kilo-Degree Survey on the VST

Wednesday, June 6, 2018 9:00 AM (25 minutes)

The Kilo-Degree Survey (KiDS) was designed to take maximal advantage of the wide-field image quality of the VST/OmegaCAM system. Its science focuses on weak gravitational lensing by galaxies, groups and large-scale structure. I will present recent results on how cosmological constraints can be derived from KiDS lensing measurements.

Presenter: KUJIKEN, K.

Contribution ID: 13

Type: **not specified**

Rare treasures in the KiDS survey

Wednesday, June 6, 2018 9:25 AM (20 minutes)

“The Kilo Degree Survey (KiDS) is one of the ESO public surveys carried out with the VLT Survey Telescope (VST), equipped with the one square degree field of view and high angular resolution (0.2"/pixel) OmegaCAM camera. KiDS is mainly designed for weak lensing studies, providing deep imaging in four optical bands (ugri), over a 1500 square degree of the sky with excellent seeing (e.g.

0.65" median FWHM in r-band). The high image quality and deep photometry are ideal for galaxy evolution studies and for hunting peculiar and rare objects, as massive compact galaxies and gravitational lenses. For the latest Data release 3 we have determined structural parameters (effective radii, R_e , and Sérsic indices, n), planning to collect at the end of the survey the largest sample of galaxies with measured structural parameters in u, g, r and i bands, up to redshift $z=0.5$. High-quality photometric redshifts are derived using a machine learning method, which has demonstrated to reach accuracies down to $\sigma_z \sim 0.03$ with optical band only. Stellar masses are derived from stellar population synthesis (SPS) and standard SED fitting. With our unprecedented homogeneous dataset, among the most massive galaxies (with $M > 8 \cdot 10^{10}$) we search for the most compact objects (with sizes $R_e < 1.5$ kpc), which do not follow the size-mass relation. These systems are thought to be relic of superdense and massive galaxies living during earlier stages of the Universe ($z > 2$), which have survived intact having stellar populations with old ages. They represent a crucial test bench for galaxy formation processes. But, these galaxies do not have a spectral confirmation, thus we have started a multi-site/multi-facility program to determine their redshifts, velocity dispersions and the properties of the environment. Finally, the deep, subarcsecond seeing KiDS images are also suitable for a census of gravitational lensing systems, based on the (visual and automated) identification of arc-like structures around galaxies. I will discuss our first results using data from the second and third KiDS data releases.”

Presenter: TORTORA, C.

Contribution ID: 14

Type: **not specified**

A KiDS view of the Fornax dSph

Wednesday, June 6, 2018 9:45 AM (20 minutes)

Large scale surveys are facing the problem of the photometric homogeneity along wide fields of view. In this proposed contribution, I will take advantage of the released KiDS photometry of the Fornax dSph, to perform an accurate comparison with the homogeneous and deep wide-field photometries released by De Boer et al. (2012) and by Stetson et al. (2018), based on conventional mosaicing of several instruments/telescopes. All the relevant evolutionary features of Fornax dSph will be discussed, along with the identifications of the RR Lyrae variables based on the KiDS single-epoch observations, on the basis of the Fiorentino et al. (2017) catalogue.

Presenter: DALL'ORA, M.

Contribution ID: 15

Type: **not specified**

KiDSLens: Gotta catch'em all

Wednesday, June 6, 2018 10:05 AM (20 minutes)

“Strong gravitational lenses are valuable systems that can provide unique insights into a large number of open issue in cosmology and extragalactic astrophysics. For instance, strong galaxy-galaxy lensing is by far the most accurate mass-measurement technique available for the central regions of massive galaxies, providing a one-shot, purely gravity-dependent measurement of the mass enclosed by the lensed images. Thus, when combined with dynamical analysis, lensing provides excellent means of investigating dark matter in galaxies.

Strong gravitational lensing is also a very effective and successful way to investigate the distant universe, thanks to the source light magnification. Lensed quasars (QSOs), especially quadruples can work as crucial cosmological test providing firm constraints on the Hubble constant and other cosmological parameters. Unfortunately, in these mentioned cases, the biggest limitation remains the paucity of confirmed lenses.

It is for this reason that, with the KiDSLens Project, we set out to find as many as possible previously undiscovered gravitational lenses in the Kilo Degree Survey, the deepest optical imaging survey on the VST. KiDS is particularly suitable for a systematic census of strong gravitational lenses, thanks to its exceptional image quality, deep optical imaging and great spatial resolution. In this talk I will highlight the methods and techniques to find QSOs and arcs, I will show the first candidates, as part of our pilot program and also present first results based on the first spectroscopic follow-up of arc-like systems. Finally, I will focus on a very interesting case of study: the possible discovery of the first ultra-compact massive strong gravitational lens.”

Presenter: SPINIELLO, C.

Contribution ID: 16

Type: **not specified**

Central velocity dispersions of the GAMA spectroscopic database and synergies with KiDS

Wednesday, June 6, 2018 10:25 AM (20 minutes)

KiDS is one of the VST ESO public survey and up to date it has been surveying 450 deg² of the extragalactic sky.

The three equatorial regions of the Galaxy And Mass Assembly (GAMA) survey (G09, G12, and G15) overlap 180 deg² surveyed by KiDS. The redshift distribution, for the >300k galaxies in the GAMA sample, ranges between $z=0.003$ and $z=0.9$,

with a median value of $z=0.21$ and a median signal-to-noise ratio $SNR=7.3$. A synergistic approach to combined photometric and spectroscopic data products allows us to investigate a large variety of science, e.g., from training neural networks for the photometric redshift estimation, to the study of dark matter fraction and scaling relations.

Therefore, we present the kinematic analysis of GAMA galaxy spectra, with the aim of measuring central velocity dispersions.

We made an intensive use of automatic routines which exploit the Penalized Pixel-Fitting method in order to fit the spectra in the restframe wavelength range 3850-6800 Å including in the window several strong absorption lines. We currently produced a velocity dispersion catalogue containing the 80% of the galaxies in the all the fields surveyed by GAMA (including the three overlapping with KiDS), and we present the statistical analysis of the results. We have additionally exploited KiDS and GAMA photometric databases in order to investigate the Faber-Jackson relation for a subsample of spheroid dominated galaxies in the equatorial fields G09, G12, and G15.

Presenter: D'AGO, G.

Contribution ID: 17

Type: **not specified**

Data validation beyond Big Data

Wednesday, June 6, 2018 11:15 AM (25 minutes)

“From KiDs to Euclid OU-Ext to Euclid data validation.

For the OmegaCAM@VST datahandling we have build and operated the distributed information system Astro-WISE. Astro-WISE was successfully used for the processing of KiDS data and particularly its built in extreme data-lineage facilitated the quality control and re-processing of the data with improved calibrations and improved code.

Many of the aspects of the Astro-WISE approach will be applied in the data centric information system being build for the data processing for the Euclid satellite. However, the large amounts of data from Euclid in combination with the required much higher accuracies and danger of plural hidden systematics and biases forces to anticipate a new era beyond the Big data hype: data validation. In popular terms discriminating facts and fakes.

I will discuss some new steps towards advanced data validation, such as build in dynamical reference systems in the OU-Ext approach, the validation of and by machine learning, and applying extreme data lineage to trace the roots and dependencies of data products.

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Presenter: VALENTIJN, E. A.

Contribution ID: **18**

Type: **not specified**

SFR with Machine Learning for the KiDS galaxies

Wednesday, June 6, 2018 11:40 AM (20 minutes)

We present an innovative application of Machine learning methods to the derivation of Stellar Formation Rates for Galaxies in the Kilo Degree Survey (KiDS) Data release.

Presenter: LONGO, G.

Contribution ID: 19

Type: **not specified**

Strong gravitational lensing studies with Herschel and multi-wavelength follow-up observations: synergies with KiDS.

Wednesday, June 6, 2018 12:00 PM (20 minutes)

“Strong gravitational lensing is a powerful tool for modern cosmology. It is one of the few probes capable of directly mapping galactic dark matter distribution, providing independent cosmological parameter estimates while also enabling the study of individual galaxies which are otherwise too faint for detailed analysis. Lensing is therefore one of the most powerful tools to study very distant galaxies and to probe galaxy evolution and the mass distribution of our Universe up to high redshift.

The reliable identification of large samples of high-redshift lensing systems has been recently enabled by Herschel. It has been shown that the steep sub-millimeter source counts lead to a strong gravitational “magnification bias”. This phenomenon, combined with the wide areas observed by Herschel, represent an extremely efficient means of identifying a large number of strong lensing events, once the obvious contaminant populations of nearby galaxies and blazars are removed. This also represents an almost complementary way to identify lensing events with respect to the one based on optical data.

Many multi-wavelength follow-up programs with e.g. HST, SALT, ALMA have been developed to study both the background sources and the foreground lenses identified by Herschel. In my talk I will give an overview of the state of the art of the strong gravitational lensing studies enabled by Herschel, I will discuss their results in the context of future observations with e.g. JWST, Euclid and SKA and I will highlight the synergies with KiDS observations.”

Presenter: MARCHETTI, L.

Contribution ID: 20

Type: **not specified**

The KABS survey at the VST

Wednesday, June 6, 2018 12:20 PM (20 minutes)

“We present a new VST/OmegaCAM survey to observe 1000deg² in 3 optical bands (gri), with strategy and depths that are in between the ESO public surveys KiDS and ATLAS. The survey has been designed to tackle science cases of primary importance for oncoming facilities as eROSITA and 4MOST. The survey will cover sky areas which have no other high quality optical imaging and that will remain unexplored until LSST will be online. KABS will allow us to detect and characterize, in the optical, a few thousands of the eROSITA galaxy clusters out to $z > 0.8$, study about ten thousands AGN detected with eROSITA, and about ten millions of galaxies up to $z \sim 0.6$, measure galaxy structural parameters up to $z = 0.4$, and detect a few hundreds of new strong lenses, included lensed quasars which will be used for monitoring and spectroscopic follow-ups.

“

Presenter: NAPOLITANO, N.

Contribution ID: 21

Type: **not specified**

Science from VPHAS+

Wednesday, June 6, 2018 2:00 PM (25 minutes)

The application of the Galactic Plane survey, VPHAS+, to uncovering the fainter ($r > 13$) massive O and early B stars of the Milky Way disk will be described.

Presenter: DREW, J.

Contribution ID: 22

Type: **not specified**

The Accretion Discs in Halpha with OmegaCAM (ADHOC) Survey

Wednesday, June 6, 2018 2:25 PM (20 minutes)

We recently concluded the Accretion Discs in Halpha with OmegaCAM (ADHOC) survey aimed at studying the population of Pre Main Sequence (PMS) objects in a number of close-by star forming regions. As part of the survey, we imaged in r, i and H-alpha a region of 12×8 square degrees around the Orion Nebula Cluster. Thanks to the high-quality photometry obtained, we discovered three well separated PMSs in the colour-magnitude diagram towards the cluster's center. Although several reasons could be invoked to explain these sequences including unresolved binaries, independent high-resolution spectroscopy supports the interpretation that these correspond to discrete episodes of star formation, each separated by about a million years. Our observations reveal that these star-forming events occurred in the densest central regions of the cloud. The stars from the two youngest populations rotate faster than the older ones, in agreement with the evolution of stellar rotations observed in PMS stars younger than 4 Myr in several star forming regions. These results prompt for a revised look at the formation mode and early evolution of stars in clusters.

Presenter: BECCARI, G.

Contribution ID: 23

Type: **not specified**

Pulsating stars as stellar population tracers from OGLE, VISTA, VVV, Gaia and VST data

Wednesday, June 6, 2018 2:45 PM (20 minutes)

“Thanks to their variability and characteristic oscillation properties, pulsating stars such as Cepheids and RR Lyrae are traditionally used not only as distance indicators but also as stellar population tracers.

From the comparison between the observed pulsation properties and their theoretical counterparts based on nonlinear convective pulsation models we are able to constrain the intrinsic stellar properties of the investigated variables. Theoretical period-age and period-age-color relations for Cepheids allow us to reconstruct the star formation history of the Magellanic Clouds when applied to OGLE IV and VMC@VISTA Cepheid data. On the other hand the predicted dependence of the RR Lyrae pulsation properties on the helium abundance allows us to constrain the helium content of Bulge RR Lyrae as observed by the OGLE IV and the VVV survey. The model fitting of observed Cepheid and RR Lyrae light curves both from the OGLE III/IV and VMC@VISTA data provides sound constraints on all the intrinsic stellar parameters and confirms dynamical estimates of stellar masses. The same technique is being applied to Cepheids and RR Lyrae with Gaia parallaxes. Finally in the context of the STREGA@VST survey we plan to use RR Lyrae as tracers of possible stellar overdensities around the globular cluster Pal 3 and/or the dwarf spheroidal galaxies Fornax and Sculptor, as signatures of interactions with the Galactic Halo.

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Presenter: MARCONI, M.

Contribution ID: 24

Type: **not specified**

STREGA (STRucture and Evolution of the Galaxy)

Wednesday, June 6, 2018 3:05 PM (20 minutes)

STREGA (STRucture and Evolution of the Galaxy) is an ongoing VLT Survey Telescope Guaranteed Time survey, aimed at investigating the mechanisms of formation and evolution of the Galactic Halo on an area of about 150 square degrees. The main programme searches for the signatures of interaction between selected stellar systems and the Galactic Halo. We present the results obtained for a number of Galactic Globular Clusters (Omega Cen, NGC6752, Pal 12 and Pal3) and discuss future perspectives.

Presenter: MUSELLA, I.

Contribution ID: 25

Type: **not specified**

STEP@VST and YMCA@VST, a fresh look into Magellanic System stellar populations

Wednesday, June 6, 2018 3:25 PM (20 minutes)

The Magellanic Clouds (MCs) represent an ideal laboratory to study the three body interaction between a massive spiral, the Milky Way, a disk galaxy, the Large Magellanic Cloud, and a massive dwarf, the Small Magellanic Cloud.

In spite of several efforts in the recent years, an overall picture of the spatial distribution of the stellar populations in the Small Magellanic Cloud and of the details of the interaction between the Clouds and the Milky Way is still lacking. We fill this gap with the two surveys described in this contribution.

STEP@VST (The SMC in Time: Evolution of a Prototype interacting late-type dwarf galaxy) is a GTO survey devoted to the study of the stellar populations in the Small Magellanic Cloud and in the Bridge. We observed 53 sq. deg. in g,i bands down to $g \sim 24.5$ with $S/N \sim 5$ (1-2 mag below the turn-off of the oldest population) and about 56 sq. deg. in $r,H\alpha$ down to $r \sim 23$ with $S/N \sim 5$. Among other results, the study of the western region of the SMC and particularly of the Bridge shows the presence of a diffuse population as young as 100-200 Myr, an age often reported in the literature as the epoch of the last interaction between the Clouds.

With the YMCA@VST (Yes, Magellanic Clouds Again: probing the outer regions of the Magellanic system with VST.) survey, we aim at imaging an area of 110 deg sq. in g , and i filters down to $g' \sim 24-24.5$ mag with $S/N=5$ (AB). These data are deep enough to reach 1-2 magnitudes below the main sequence turn-off of the oldest stellar populations. YMCA will allow us to fill the gap left by other ongoing or planned surveys in the surroundings of the MCs, permitting to study in detail the star formation history and the extended structure of MCs outskirts. Moreover, our images will serve to search for new star clusters and faint satellites possibly associated to the MCs.

Presenter: RIPEPI, V.

Contribution ID: 26

Type: **not specified**

OmegaWINGS wide-field survey of nearby galaxy clusters.

Wednesday, June 6, 2018 4:15 PM (20 minutes)

The Wide-field Nearby Galaxy-cluster Survey (WINGS) is a wide-field multi-wavelength survey of X-ray selected clusters at $z = 0.04\text{--}0.07$.

OmegaWINGS is the wide-field extension of WINGS based on VST/OmegaCAM B- and V- observations. For each cluster, we covered a 1 sqdeg field to include the whole virial region and to extend out into the infall cluster region. A large spectroscopic follow-up campaign targeted all 46 OmegaWINGS clusters with AAOmega-AAT.

I will present OmegaWINGS data and review the main scientific results that we have obtained so far; I will then present GASP, an ongoing follow-up project aimed at studying GAs Stripping Phenomena in galaxies that is based on an ESO Large Programme with MUSE at the VLT and on complementing observing campaigns with JVLA, APEX, and ALMA.

Presenter: GULLIEUSZIK, M.

Contribution ID: 27

Type: **not specified**

The WINGS VST survey

Wednesday, June 6, 2018 4:35 PM (20 minutes)

I summarize the results achieved with the analysis of the data of the OmegaWINGS survey at VST in the u,B,V bands concerning in particular the global structure and the scaling relations of galaxy clusters. I will provide solid evidences in favor of: 1) the non-omology of the growth curve light profiles and 2) the existence of a color-magnitude relation for galaxy clusters.

Presenter: D'ONOFRIO, M.

Contribution ID: 28

Type: **not specified**

The Shapley Supercluster Survey

Wednesday, June 6, 2018 4:55 PM (20 minutes)

The multi-wavelength survey of the Shapley supercluster ($z \sim 0.05$) covers a contiguous area of 260 square Mpc centred on the supercluster core including 11 clusters showing evidence of cluster-cluster interactions. Optical (ugri) and near-infrared (K) imaging acquired with VST and VISTA allow us to study the galaxy population down to $m+6$ *at the supercluster redshift*. *A dedicated spectroscopic survey with AAOmega on the Anglo-Australian Telescope provides a magnitude-limited sample of supercluster members with 80% completeness at $\sim m+3$.* I will present the main results of this project.

Presenter: MERLUZZI, P.

Contribution ID: 29

Type: **not specified**

Mapping the Shapley Supercluster with VST and AAOmega

Wednesday, June 6, 2018 5:15 PM (20 minutes)

We present the spectroscopic follow-up of the VST Shapley Supercluster Survey (ShaSS). Using the AAOmega fibre-fed spectrograph we have obtained redshifts for >4000 galaxies, selected from 21deg² of VST i-band imaging, resulting in a homogenous and highly complete sample of $i < 18.0$ galaxies. The survey area contains eleven X-ray clusters at $z=0.05$ within the Shapley supercluster, and we use the new redshifts to show how these clusters are all connected within a single coherent structure that entirely fills the 17x17 Mpc² region covered by the VST imaging. We show how this dataset permits us to examine the impact of the supercluster environment on galaxies as a function of stellar mass, by providing a large stellar-mass limited sample ($>2.7 \times 10^9$ Msun) of confirmed supercluster members, each with their local environment characterized in detail.

Presenter: HAINES, C.

Contribution ID: 30

Type: **not specified**

VST-GAME: Galaxy Assembly as a function of Mass and Environment with VST

Wednesday, June 6, 2018 5:35 PM (20 minutes)

VST-GAME is a VST survey in four bands (u' , g' , r' , i') to perform a unique wide field coverage ($20 \times 20 \text{ Mpc}^2$ at $z=0.4$) of 12 massive galaxy clusters, at $0.2 < z < 0.6$ (z median ~ 0.4), and reaching the limiting magnitude of M^*+6 , (i.e. $10^{9.9} M_{\odot}$ at $z=0.4$). The main goal is to determine the relative importance of different cluster assembly processes in driving the evolution of galaxies as a function of mass and environment. These data will allow the investigation of galaxy populations examining the entire cluster infall regions, with the depth needed to reach stellar mass regimes where model predictions are in tension with the data. Moreover, the proposed area/filters/depth will also allow legacy science, e.g. searching for high-redshift galaxies and candidate AGN and QSOs. This survey is part of a concerted effort which includes NIR observations of VISTA Public Survey programme (G-CAV, P.I.: M. Nonino) and a massive spectroscopic campaign already in hand (e.g., CLASH-VLT, P.I.: P. Rosati) and ongoing. So VST-GAME data, together with the ancillary data already available, will result in a transformative self-consistent dataset, to test and drive the development of galaxy evolution models.

Presenter: MERCURIO, A.

Contribution ID: 31

Type: **not specified**

The Dawn of the Gravitational Wave Astronomy

Thursday, June 7, 2018 9:00 AM (25 minutes)

The last years marked the beginning of a new era of observations of the Universe. Gravitational waves were detected from binary black-hole mergers and from a binary neutron star merger by the Advanced LIGO and Virgo detectors.

Many gravitational observations and discoveries are expected in the next years with the Advanced LIGO and Virgo detectors, with strong impact on many astrophysical fields, from the physics governing compact object formation and evolution to the physics of the emission process and to nuclear astrophysics.

I summarize here some historical milestones that lead to the first direct detection, and discuss the importance of the so called multimessenger astronomy in which gravitational-wave sources are observed in all bands of the electromagnetic spectrum with ground and space telescopes.

Presenter: COCCIA, E.

Contribution ID: 32

Type: **not specified**

SUDARE: the supernova search with the VST/OMEGACAM

Thursday, June 7, 2018 9:50 AM (25 minutes)

SUDARE is a project intended to study the evolution of the supernova rate with cosmic time. A major component of the project is a supernova search conducted with the VST+Omegacam on two selected sky fields (COSMOS and CDFS). We present the result of this project, the lesson learned and the current lines of research.

Presenter: CAPPELLARO, E.

Contribution ID: 33

Type: **not specified**

GRAWITA and VST: a fruitful partnership

Thursday, June 7, 2018 9:25 AM (25 minutes)

Presenter: BROCATO, E.

Contribution ID: 34

Type: **not specified**

First weak lensing results from the VOICE survey

Thursday, June 7, 2018 10:15 AM (20 minutes)

We will present recent weak lensing results from VOICE, a nearly 5 sq. degree deep VST survey around the CDFS sky region. We will discuss the use of photometric redshift from machine learning, the dark matter map of the region, the detection of shear peaks and the first study of cluster lensing in this region.

Presenter: COVONE, G.

Contribution ID: 35

Type: **not specified**

Optically Variable AGNs in the 3 yr VST Survey of the COSMOS Field

Thursday, June 7, 2018 10:35 AM (20 minutes)

Variability characterizes AGNs at all wavelengths, with timescales from minutes to years depending on the observing window.

Variability measurements can contribute in shedding light on the underlying emission mechanism, providing constraints on the size and structure of the emitting region.

The analysis of AGN variability at different wavelengths and the study of possible correlations among different spectral windows is nowadays a major field of inquiry. Optical variability has been extensively used to identify unobscured AGNs in multi-epoch surveys. The strength of a selection method based on optical variability lies in the chance to analyze data from surveys of large sky areas by ground-based telescopes. Plus, variability allows to retrieve those AGNs characterized by low X-ray emission and hence not classified as AGNs on the basis of their X-ray properties; also, it proves effective in unearthing low-luminosity AGNs because of the anti-correlation between AGN luminosity and variability amplitude.

We tested the use of optical variability as a tool to identify AGNs in the VST multi-epoch survey of the COSMOS field, originally tailored to detect supernova events. We pushed towards deeper magnitudes than in past studies and made wide use of ancillary multi-wavelength catalogs in order to confirm the nature of our AGN candidates and constrain the accuracy of the method based on spectroscopic and photometric diagnostics.

The effectiveness of our selection technique against other traditional photometric approaches was already explored in De Cicco+ 2015. Here we confirm that the method allows the selection of high-purity (>80%) samples, and we take advantage of the long observing baseline to achieve great improvement in the completeness of our sample: the extension of the analysis from a five-month to a three-year baseline led to a significant increase in the completeness of the AGN selection with respect to optical/IR/X-ray confirmed samples of AGNs, rising from 15% up to ~50%, with a strong dependence on the source apparent magnitude.

The reliability of our selection technique is of great relevance in the framework of current and planned multi-epoch wide-field surveys (e.g., LSST), which will use variability as one of the main AGN discovery approaches, combining it with complementary selection methods.

We also present our results from the investigation of the dependence of AGN variability on black hole mass and accretion rate, performed by computing the structure function of the X-ray confirmed AGNs in our sample. Our findings support the existence of an anti-correlation with the accretion rate, while no relation with the black hole mass emerges, consistently with other works from the literature.

Presenter: DE CICCO, D.

Contribution ID: 36

Type: **not specified**

The INAF projects at optical and near infrared wavelengths

Thursday, June 7, 2018 11:25 AM (25 minutes)

Presenter: FONTANA, A.

Contribution ID: 37

Type: **not specified**

The Cherenkov Telescope Array: key science projects and multi-wavelength synergies

Thursday, June 7, 2018 11:50 AM (25 minutes)

The Cherenkov Telescope Array (CTA) will be the next generation gamma-ray observatory, open to the scientific community, to investigate the very high-energy emission from a large variety of celestial sources in the 20 GeV - 300 TeV energy range. The full array, distributed over two sites, one in the northern and one in the southern hemisphere, will provide whole-sky coverage and will improve the sensitivity with respect to the current major imaging atmospheric Cherenkov arrays (H.E.S.S., MAGIC and VERITAS) by a factor of five to twenty, depending on the energy. The large variety of science topics that CTA will investigate, from Galactic to extra-galactic sources up to fundamental physics, are addressed by means of nine Key Science Projects (KSPs) and one dark matter Programme. A particular emphasis will be put on major projects providing legacy data-sets, such as surveys and population studies, and the investigation of a few iconic classes of objects, such as gamma-ray bursts, clusters of galaxies, and cosmic accelerators. We review the current status of the CTA project, introducing the highlights from the telescope prototypes and discuss the main CTA Key Science Projects which will focus on those scientific cases that will greatly benefit from a multi-wavelength approach, involving the major facilities available at the time of the CTA scientific operations.

Presenter: VERCELLONE, S.

Contribution ID: 38

Type: **not specified**

VST: the first large survey telescope for optical polarimetry

Thursday, June 7, 2018 12:15 PM (20 minutes)

“Replacing the unused ADC by a polarizing filter would transform the VST into the first large polarimetric optical survey telescope, without affecting the current capabilities of the VST+OmegaCAM system.

Scientific cases include: mapping the Milky-Way and Magellanic clouds magnetic fields, surveys of quasar polarization, identification and variability of polarized brown dwarfs, polarimetric characterization and mapping of solar-system objects (incl. the moon, comets, and asteroids), detection of polarized signal around the L4 and L5 Lagrange points, a census of magnetic white dwarfs and Herbig Ae/Be stars, etc...

The design of the VST limits the technical implementation for the polarimetric unit to a single-beam system: therefore, we will develop data-driven calibration methods to achieve a sub-percent polarimetric accuracy.

The proposed implementation is of low cost and requires no major development, as polarizing filters of the needed size are readily available. In particular, it does not require major modification neither of VST, nor of OmegaCAM. In fact, the currently offered capabilities of the VST+OmegaCAM are preserved as the polarizing filter can be removed from the optical beam. Would this project be accepted, efforts will be needed on the design of the polarimeter unit to optimize accuracy and execution times, on the design of the calibration plan, and on the extension of the data reduction pipeline to extract the polarization signals.

“

Presenter: BAGNULO, S.

Contribution ID: 39

Type: **not specified**

GBOT (Ground Based Optical Tracking) - astrometric monitoring of the Gaia satellite from the ground

Thursday, June 7, 2018 2:00 PM (25 minutes)

The GBOT (Ground Based Optical Tracking) campaign is part of the ground-breaking Gaia satellite mission and aids Gaia in achieving the ambitious goals in astrometric accuracy. Our group based at ARI and the Observatoire de Paris obtains and reduces astrometric data obtained by 2m class telescopes from several partner institutions on a daily basis, among them, ESO's VST telescope on Cerro Paranal in Chile. The results are regularly delivered to ESOC (Darmstadt) as an input for the Gaia orbit reconstruction, which is necessary to compensate for systematic effects, such as aberration. Additionally we are routinely scanning our data for asteroids which happen to be in the field; thus far finding more than 17,000 objects, ~40% of them new. In order to confirm these objects, and to determine more about their nature, we have recently begun adding a follow up programme, also using the VST. These additional observations are invoked within 48 hours after the original GBOT observations, and are targeted in such a way, that as many of the candidates observed before can be recovered. This could serve as an example of how instruments such as the VST can supplement large whole sky surveys.

Presenter: ALTMANN, M.

Contribution ID: 40

Type: **not specified**

The WFIRST Exoplanet Microlensing Survey

Thursday, June 7, 2018 2:25 PM (20 minutes)

The Wide Field Infrared Survey Telescope (WFIRST) is a NASA space observatory designed to address key questions about the Universe and the population of extrasolar planets in our Galaxy. WFIRST is planned for launch in the mid-2020s. One of the main WFIRST science program is a statistical census of exoplanets with a microlensing survey, using about one quarter of the overall observing time. Specifically, the microlensing campaign is expected to be sensitive to detect low-mass planets at orbital separation greater than about 1 AU and to free-floating planets down to the mass of Mars. I am going to introduce the science case of microlensing exoplanets and the WFIRST mission. I will describe the expected yield of the WFIRST microlensing survey and I will report on the main outcomes of some of the current observational programs preliminary to the WFIRST mission. Finally, I will outline the possible role of the VST during the WFIRST microlensing survey.

Presenter: CALCHI NOVATI, S.

Contribution ID: 41

Type: **not specified**

Science with 4MOST

Thursday, June 7, 2018 2:45 PM (25 minutes)

4MOST is a massively multiplex multi-object spectrograph to be placed on ESO's VISTA telescope. The 4MOST survey program includes both Galactic as well as Extragalactic surveys. With its 800 high resolution and 1600 low resolution fibres distributed over a 4 degree field of view it will survey the sky down to G of about 20. This will, e.g., complement Gaia RVS for Milky Way stars and provide redshifts for galaxies. In this talk I will present the 4MOST facility and its capabilities. I will also give an overview of the surveys planned by the Consortium. The surveys span a range of topics including: studies of BAO, host galaxies for transients, galaxy clusters, galaxy evolution, the Milky Way potential and accretion history, the content of the Milky Way stellar disk, and the Magellanic Clouds. In 2019 ESO plans for a call for proposals from the Community to use 4MOST in collaboration with the Consortium. The tentative time plan and scope of this call will be discussed.

Presenter: FELTZING, S.

Contribution ID: 42

Type: **not specified**

Euclid: a space mission to study the origin of the accelerating Universe

Thursday, June 7, 2018 3:10 PM (25 minutes)

In this talk, I will present Euclid, an ESA medium class space mission selected within the Cosmic Vision framework. The primary aim of Euclid is to probe with unprecedented accuracy the properties of Dark Energy, the source of still-unknown energy at the origin of the accelerated expansion of our Universe. To reach this goal, Euclid will observe ~15000 square degrees of the extragalactic sky in both three NIR (Y, J, H) and a VIS band (corresponding to R+I+Z filter), obtaining deep photometric measurements that will allow to exploit weak gravitational lensing measurements, and with NIR spectroscopy (1.25-1.85 micron), mapping the redshift distribution of star-forming galaxies over the past 10 billion years of cosmic time. The synergy between these cosmological probes (weak gravitational lensing and galaxy clustering) will allow us to probe not only the geometry of the Universe itself, but also the growth of cosmic structures, providing the basic data for a quantum leap in our understanding of Dark Energy. In combination with the main probes, additional probes will be also exploited, such as cluster of galaxies, strong lensing statistics, CMB Euclid galaxy survey cross-correlations, giving also important insights on Dark Matter and gravity properties.

The mission will provide also a treasure of legacy data, allowing the study of several tens of millions of spectroscopic sources, and of over a billion of galaxies with imaging and photometric redshifts.

Presenter: MORESCO, M.

Contribution ID: 43

Type: **not specified**

VEGAS: VST survey of Early-type Galaxies in the Southern hemisphere

Friday, June 8, 2018 9:00 AM (25 minutes)

In the era of deep photometric surveys aimed at studying galaxy structures down to the faintest levels of surface brightness of $\mu_g \sim 27\text{-}30 \text{ mag/arcsec}^2$, the VST survey of Early-type Galaxies in the Southern hemisphere (VEGAS, see <http://www.na.astro.it/vegas/VEGAS/Welcome.html>) is producing competitive results. First results have confirmed the feasibility of VEGAS to reach the faint surface brightness levels of $27 - 30 \text{ mag/arcsec}^2$ in the g band out to about $10 R_e$ (Capaccioli et al. 2015; Spavone et al. 2017). Therefore, taking advantage of the deep photometry, we can address the build up history of the stellar halo by comparing the surface brightness profile and the stellar mass fraction with the prediction of cosmological galaxy formation. As part of VEGAS, the Fornax Deep Survey (FDS) at VST aims to cover the Fornax cluster out to the virial radius ($\sim 0.7 \text{ Mpc}$), with an area of about 26 square degrees around the central galaxy NGC1399, and including the SW subgroup centred on FornaxA. FDS is a joint project based on VEGAS (P.I. E. Iodice) and the OmegaCam GTO (P.I. R. Peletier). One of the priority science goals of VEGAS and FDS is to study the faint outer regions of the massive galaxies in groups and clusters. The large mosaics obtained with the 1 square degree field-of-view pointings of OmegaCam at VST, plus the high angular resolution of $0.21 \text{ arcsec/pixel}$ and the large integration time allow us to study, on the cluster scale, the galaxy structure from the brightest inner regions to the faint outskirts, where the stellar envelope merges into the intracluster light. The deep observations can be directly compared with the predictions from the up-to-date theories for the stellar halo formation and the relation with the galaxy environment (Iodice et al. 2016, 2017a, 2017b). Besides, the deep and multiband imaging of the VST surveys cited above allows us to derive the spatial distribution of candidate GCs (see D'Abrusco et al. 2016; Cantiello et al. 2017).

Presenter: IODICE, E.

Contribution ID: 44

Type: **not specified**

Study of galaxy stellar halos and faint structures with VEGAS@VST

Friday, June 8, 2018 9:25 AM (20 minutes)

Deep and large-scale multi-band imaging is crucial to study the galaxy outskirts, out to hundreds of kiloparsecs, where the imprints of the mass assembly reside: these are the regions of the stellar halos.

The stellar halos are extended and diffuse component with an optical surface brightness below 26-27 mag/arcsec², in the g band. They can be made of multiple stellar components, can have complex kinematics and host substructures, in the form of shells and tidal tails, which indicate gravitational interactions in the formation history of a galaxy. The relics of the interactions are also very faint, and their detection requires very deep imaging.

In the recent years, a big effort was made to develop deep photometric surveys aimed at studying galaxy structures out to the regions of the stellar halos. In the framework of the VEGAS survey, taking advantage of the deep photometry, we aim at constructing a comprehensive database with which the predictions can be compared. In particular we want to check for the presence and extent of the stars formed in situ with respect to total accreted component (e.g. Cooper et al. 2015), in order to address the build up history of the stellar halos in ETGs.

We present a detailed study of the surface photometry of some ETGs in the VEGAS sample, to constrain their formation history, and to investigate the presence of very faint substructures in its surroundings.

Presenter: SPAVONE, M.

Contribution ID: 45

Type: **not specified**

A deep look at NGC1533 in the Dorado group of galaxies with VST

Friday, June 8, 2018 9:45 AM (20 minutes)

We present a deep ($\mu_g \approx 30$ mag arcsec⁻²) surface photometry of NGC 1533, a barred early-type galaxy with an outer ring, situated in the east side of the Dorado group. The data were obtained with OmegaCAM@VST during the VEGAS surveys.

Our surface photometry reveals the presence of an extended underlying disk in NGC 1533. Relevant asymmetries, arm-like structures and tails are detected in the galaxy both via un-sharp masking and by subtraction of galaxy model.

The $g-r$ color diagram and the color map suggest the presence of star formation regions at the inner edge of the ring, especially in the north side of the galaxy. These regions with UV features were already found with Swift-UVOT observations.

Signatures of interaction between the NGC 1533, IC 2038 and IC 2039 are detected by our optical images. These signatures are in agreement with the HI map, that connects these three galaxies. Moreover these features seem to be the optical counterparts of the high-density regions of intra-group HI rings and arcs.

Presenter: CATTAPAN, A.

Contribution ID: 46

Type: **not specified**

Globular Clusters (& other compact stellar systems) in FDS and VEGAS

Friday, June 8, 2018 10:25 AM (20 minutes)

Extragalactic, unresolved GCs are possibly the simplest class of astrophysical objects beyond stars. As such, they are an important tool for understanding the formation and evolution of the host galaxies. Within the VST surveys FDS and VEGAS the study of such compact stellar systems, both for single bright galaxies (VEGAS) and for the 'entire' GC population in the Fornax cluster of galaxies (FDS), is in progress.

In my presentation, I will present and discuss the recent results for the characterization of GC properties (spatial distributions, colors, etc.) based on multiwavelength VST data from the two surveys, and describe the perspectives of future studies.

Presenter: CANTIELLO, M.

Contribution ID: 47

Type: **not specified**

Studying the co-evolution of early-type galaxies and their super-massive black holes through the eyes of VEGAS

Friday, June 8, 2018 10:05 AM (20 minutes)

Galaxy-galaxy interactions and mergers are spectacular phenomena which produce a variety of complex remnants.

These features manifest as e.g. ripples, shells, streams, tidal tails, and are commonly referred to as “fine structures”.

Their prominence is a function of time, because the galaxy potential progressively relaxes after a merger: fine structures are destined to fade out in a few Gyrs.

The morphological characterization of interaction remnants therefore provides an independent method to measure the age of an early-type galaxy (ETG), an otherwise difficult task given that their stellar population is rather uniformly old.

We present a preliminary study linking the temporal co-evolution of fine structures and of the super-massive black hole binaries which are assembled in the same merger which shaped the ETG, and we discuss it in the context of the hierarchical galaxy formation scenario.

We intend to exploit the data from VEGAS — a deep, large-field survey of Early-type Galaxies in the Southern hemisphere based on the VST telescope — to characterize faint ($25-29 \text{ mag/arcsec}^2$) fine structure features, and expand our study to a statistically significant ETG sample.

Presenter: BONFINI, P.

Contribution ID: 48

Type: **not specified**

The Fornax Deep Survey: the evolution of dwarf galaxies

Friday, June 8, 2018 11:15 AM (25 minutes)

It has long been known that the environment is a strong driver of galaxy evolution. Although this morphology-density relation is strong for massive galaxies, it is even stronger for dwarfs, because the lower gravitational potential of dwarf galaxies makes it easier for the cluster environment to affect them. For this reason dwarf galaxies are ideal to trace environmental processes in galaxy clusters.

Using the new capabilities provided by OmegaCAM we have, in the last 4 years, performed a deep optical survey of Fornax, one of the nearest galaxy clusters, named the Fornax Deep Survey (FDS, PI's Peletier and Iodice). Its u',g',r',i' observations image an area of 26 square degrees, covering the cluster inside the virial radius and also the Fornax A sub-group. The data go about 3 magnitudes deeper than the previous complete survey, the FCC (Ferguson 1989). The survey has already led to publication of several papers, which have demonstrated the usefulness of such deep high resolution data in various different scientific cases. The survey has been fully reduced, and survey papers presenting a complete sample of cluster members and their properties will appear soon (Peletier et al. 2018, Venhola et al. 2018ab). In this talk I will discuss the results of this study of dwarf galaxies, including scaling relations involving morphology, stellar populations, as well as the luminosity function, and variations of galaxy properties as a function of distance from the cluster center. Based on these I will zoom in on how galaxies evolve in the Fornax cluster, and how this differs from the larger Virgo and Coma clusters.

Presenter: PELETIER, R.

Contribution ID: 49

Type: **not specified**

The spatial distribution of Globular Clusters in the core of the Fornax cluster

Friday, June 8, 2018 11:40 AM (20 minutes)

We will discuss the properties of the extended GC system in the core of the Fornax galaxy cluster, revealed by the FDS survey. The spatial distribution and the correspondence with other photometric and kinematical tracers points toward a rich population of intra-cluster GCs. The asymmetric density structure suggests that the galaxies in the core of the Fornax cluster experienced a lively history of interactions. We will discuss the already published preliminary results and present the improved analysis allowed by the recent completion of the survey.

Presenter: PAOLILLO, M.

Contribution ID: 50

Type: **not specified**

The Fornax Deep Survey with VST: Surface Photometry of LTGs inside the virial radius of the Fornax cluster

Friday, June 8, 2018 12:20 PM (20 minutes)

Spiral galaxies and irregular galaxies, which fall under the 'Late Type Galaxies' (hereafter, LTGs) morphology classification have been researched in the past mostly concerning the evolution of structures (e.g. formation of spiral arms). These galaxies, rich in atomic and molecular gas content help us understand the kinematics and dynamics of star formation. Studying the effect of the environment (e.g. field, cluster) in which the galaxy is located in, is vital in unravelling the formation of their unique substructures. Further elaborating on this, it is important to know the position of a galaxy in the cluster, investigate their evolution through modelling (e.g. surface brightness profiles), and morphologically classify them based on their substructures (e.g. lopsided or warped disk, bars, peanut shaped bulges, spiral arms). A comprehensive analysis of these structures probe the mechanisms involved in their formation, thus distinguishing between their peculiarities. Over the past decades, researchers have been able to substantiate this by showing that brighter bulges have higher surface brightness, peanut shaped bulges are bars thickened out of the disk plane, the colour of the bulges are correlated with the central colours of their corresponding disks, stellar halos show substructures in the form of stellar streams, bulge to disk ratio increases from early type galaxies to late type galaxies, and many more. With ongoing, deeper exploration in multi-bands, of galaxies, we will be able to resolve their composition, formation, and evolution in cosmic time. With this motivation, we present LTGs, which are brighter than $m_B \leq 14$ mag inside the virial radius of the Fornax Cluster. The deep multi-band images and high resolution of the Fornax Deep Survey (FDS) data allow us to map the light distribution and colour down to a surface brightness level of 28-30 mag in g and 28-29 in i bands, thus enabling us to investigate the composition and structure of the disks in these galaxies. This image depth is also advantageous in exploring the possibilities for the mechanisms driving the formation and evolution of the substructures within these galaxies, especially under the influence of the cluster environment causing strangulation, ram-pressure stripping, galaxy-galaxy harassment. For the purpose of this research, we extracted the (i) azimuthally-averaged surface brightness profiles for each object from the sky-subtracted images in four respective bands (ii) position angle (PA), and ellipticity profiles (iii) g-i colour profiles, (iv) g-i colour maps (v) residual images and isophotal model, to point out the impressive structures that define their corresponding morphology.

Presenter: RAJ, M. A.

Contribution ID: 51

Type: **not specified**

Automated searches for low surface brightness galaxies in VST data

Friday, June 8, 2018 12:00 PM (20 minutes)

The availability of deep, wide area surveys in the optical and near-infrared regime have opened a window of opportunity for the study of the low surface brightness universe over many different scales. One of the key science goals for such research is the characterisation of low surface brightness galaxies, both in and outside of galaxy cluster environments. This includes explaining the puzzling origin of the ultra-diffuse galaxies, and answering the question of whether or not they exist with significant population in the field. Instruments like the VST provide us with deep observations, but a sophisticated approach to source detection is required to utilise them to their full potential. In my talk I will discuss new detection methods for low surface brightness galaxies and their applications, specifically towards the Fornax Deep Survey (FDS) and other VST data. The development and testing of such techniques is of prime importance for future wide-field surveys such as Euclid and LSST.

Presenter: PROLE, D.

Contribution ID: 52

Type: **not specified**

Conclusions

Friday, June 8, 2018 12:40 PM (30 minutes)