Conference Abstracts

Monday, 4 May

01. Fred Watson

Enabling RAVE and GALAH – How the AAO Cooked Up its High-Fibre Diet

The technological revolution that led to today's large-scale spectroscopic surveys began in the late 1970s when Roger Angel of the University of Arizona highlighted the astronomical possibilities of low-loss optical fibres and developed experimental multi-object spectroscopy systems for the Steward Observatory. At the Australian Astronomical Observatory, the technique was quickly harnessed into an essential tool, with key developments following at both the 3.9-m Anglo-Australian Telescope and the wide-field 1.2-m UK Schmidt Telescope. The involvement continues today, with the AESOP fibre positioner now commissioned on 4MOST. This review will trace the evolution of multi-fibre spectroscopy in Australia, highlighting its role in two southern hemisphere stellar surveys as well as looking to future developments.

02. Hans-Walter Rix

USIT: the Ultimate Spectroscopic Imaging Telescope

The Ultimate Spectroscopic Imaging Telescope (USIT) is a concept for a space-based 6.5 m wide-field survey telescope that can deliver both direct images and R∼2000 slitless spectra at∼0.03''. USIT can deliver such spectral imaging across the entire sky in 10 years of surveying, yielding high-quality spectra for many billions of sources to mAB ≃ 24 at S/N≃10, matching the LSST/Rubin single-epoch imaging depth. Two science cases stand out as individually compelling flagship directions: USIT affords qualitatively new ways to probe cosmology beyond ΛCDM—with well over a billion spectroscopic galaxy redshifts at z>1 mapping expansion history at the percent level, providing qualitatively new cosmology tests. It also provides an order-of-magnitude deeper spectroscopic survey of Milky Way stars, from the central bulge to the outermost halo, probing the nature of dark matter via stellar streams and establishing whether the Galaxy harbors any surviving first-generation stars. Beyond these core cases, the legacy would be vast: from mapping the intergalactic medium and cosmic reionization, to constraining the hosts of LISA gravitational-wave sources, to complementing all-sky surveys from LSST/Rubin to DSA.

03. David W. Hogg

How do we operate extremely productive, global spectroscopic projects?

04. Amina Helmi

The Milky Way in its cosmological context

Tremendous progress in our understanding of the history and dynamics of the Milky Way has been made thanks to past and ongoing surveys. In this talk, I plan to put some of these findings in the context of the cosmological concordance model, and discuss recent progress on modeling the Galaxy with constrained numerical simulations and in contrasting these to observations.

05. Volker Springel

Cosmological simulations of Milky Way look-alike galaxies

I will discuss simulations of the formation and evolution of disk galaxies, with a focus on current results from zoom-in simulation projects like Auriga. I will in particular discuss how these calculations now enable the analysis of classic problems of galactic dynamics in a cosmological context, such as bar formation, and how they allow studies of the baryon cycle in typical Milky Way systems with growing physical fidelity. I will also muse about the legacy of Matthias' GrapeSPH code in the field.

06. Cecilia Scannapieco

Cosmological Simulations of the Formation of Milky Way–Mass Galaxies

Cosmological hydrodynamical simulations provide a self-consistent framework to investigate how galaxies assemble their stellar mass in connection with the formation history of their dark matter haloes. Gas accretion plays a fundamental role in galaxy evolution, as it supplies the fuel required to sustain star formation over cosmic time and regulates the growth of galactic disks.

In this talk, I will present results on the accretion patterns of galaxies with halo masses comparable to that of the Milky Way, focusing on the temporal and radial dependencies of gas inflow onto the disk and its coupling to star formation

and feedback-driven outflows. I will discuss how the balance between accretion, recycling, and mass loss shapes the baryon cycle and governs the buildup of stellar mass. I will also examine the characteristic chemical enrichment signatures of Milky Way–mass systems, highlighting how stellar abundance patterns encode information about their assembly histories.

07. Julio Navarro

Dark Matter Clues from the Milky Way Satellites

I will explore the constraints placed on the nature of dark matter by the Milky Way satellite population, including satellites that have yet to be discovered, and others which may have already been discovered but whose nature is still unclear. I will focus on predictions in the Lambda Cold Dark Matter scenario but will also discuss some implications for other dark matter models.

08. Carlos Frenk

Will LCDM survive to fight another day?

09. Simon White

Complementing Clues

Constraining LCDM initial conditions to produce systems with the directly observed properties of the halos of the Milky Way and M31, as well as of their relative orbit and their immediate environment leads to relatively precise measurements of their individual and joint masses, as well as characterisations of their assembly histories and of the mass distribution surrounding them. This solves a puzzle going back to the time of Hubble: why is M31 approaching at about 100 km/s while all slightly more distant galaxies are receding with an apparently cold and weakly perturbed Hubble flow?

10. Guinevere Kauffmann

Integral field spectroscopic study of stellar and ionized gas properties around edge-on disc galaxies in the stellar mass range 9 < log M* < 11

In this talk I will describe the stellar light, stellar age and emission line gas properties out to distances of 10 kpc above the galactic place for a sample of 82 low redshift edge-on galaxies from the Mapping Nearby Galaxies at APO (MaNGA) survey, contrasting Milky Way type galaxies with lower mass systems. I will discuss the prospects for the next generation of deep imaging surveys (EUCLID and LSST) for improving our understanding of the fossil record that is imprinted in the low surface brightness stellar light surrounding disk galaxies.

11. Lutz Wisotzki

The MUSE Lyman-alpha view of galaxy assembly in the young universe

12. Jarle Brinchmann

MUSE-Faint: Dissecting the faintest galaxies with MUSE

Ultra-faint dwarfs are the lowest mass and most dark-matter dominated systems known. Their shallow potential wells make them susceptible to feedback from star formation and their low baryonic content allows us to use their stars as test-particles in the dark matter potential. Here I will give a brief overview of the MUSE-Faint survey, a MUSE GTO survey of 10 ultra-faint dwarfs. After introducing the survey, I will outline how the high density of stellar spectra obtainable with MUSE can be used to constrain the dark matter content and density profiles of the galaxies and discuss how the data can be used to constrain dark matter models - I will talk about limits on primoridal black holes, axions and more generic models. I will also discuss what these data tell us about how galaxies form in these very low masss dark matter halos.

Tuesday, 5 May

13. Günther Hasinger

Cosmic Multimessenger Signals and the German Center for Astrophysics

The addition of gravitational wave measurements to the classical electromagnetic astronomy has opened a vast new area of exciting scientific studies – bringing sound to the cosmic movies. In addition, other information carriers like extreme energy cosmic rays, neutrinos, and even whole stellar systems can be used to derive physical information about the dark sector of the Universe. This field is dominated by the ecosystem of compact objects, in particular neutron stars and black holes of all sizes. The presentation reviews some of the most exciting recent developments in this field, in particular also the possible role of primordial black holes in the early universe. This is the scientific arena for the German Center for Astrophysics (Deutsches Zentrum für Astrophysik – DZA), which aims to become one of the largest centers of multimessenger astrophysics in the world. Combining astrophysics, technology development and data science in an integrated approach, the center aims to have a transformative effect on the region in central Europe.

14. James Binney

Normal modes and stellar dynamics

In most branches of physics and engineering normal modes are fundamental to understanding how systems respond to stimuli. Studies of galaxies sometimes talk about modes, but the reference is almost always to Landau poles, which are not normal modes. I'll explain what the normal modes of stellar systems are, and how they help us to understand the dynamical properties of galaxies and star clusters.

15. Arnaud Siebert

Galactic structure and dynamics with Gaia and WEAVE

In this presentation I will review the developments that were undertaken in Strasbourg over the last years in the field of the Milky Way dynamics. Based on data from the Gaia satellite and models developed by the team we were able to provide new estimates of the perturbations at play in the Galaxy and revise the Milky Way's potential model. Future data releases of Gaia combined to deep spectroscopic surveys complementing the Gaia data releases such as WEAVE and 4MOST will allow us to further our understanding of our host.

16. Alice Quillen

Galactic Resonance out of equilibrium

Large surveys show that the Galaxy is not and has not ever been in equilibrium. Orbital resonance can be transient or alternatively the strength and location of resonances can shift. If a galaxy is changing shape, then at what point is the notion of resonance unhelpful? With an eye toward development of simplified models which can relate current to past evolutionary scenarios, I will discuss approaches to predicting how transient, noisy and drifting galactic resonances affect the stellar distribution.

17. Léa Marques

The interaction and importance of bars and spirals in MW-like galaxies

Central bars and spirals are known to strongly impact the evolution of their host galaxies, both in terms of dynamics and star formation. Their typically different pattern speeds cause them to regularly overlap, which induces fluctuations in bar parameters. I will use simulations to show how this produces bursts of star formation and radial migration. Bursts do not necessarily happen at the two edges of the bar at the same time, revealing the presence of non-bisymmetric spiral modes. I will present some observational clues that it might be the case in the Milky Way, but also some preliminary results on nearby external galaxies from the MaNGA survey. Finally, I will also discuss how birth radii derived for Milky Way stars have the potential to reveal the locations of bar and spiral resonances, in particular in the context of the upcoming 4MOST observations.

18. Georges Kordopatis

Direct Evidence for Radial Migration from Large Spectroscopic Surveys

The spatial, kinematic, and chemical structure of the Milky Way disk provides powerful constraints on its dynamical evolution, but isolating stellar tracers that cleanly probe specific mechanisms remains challenging. The advent of large spectroscopic surveys has made it possible to construct such tracers at scale. In this talk, I will present a new observational study of stellar radial migration and its impact on kinematic heating, using the chemo-kinematics and ages of several million local metal-rich (LMR) stars. We define LMR stars as those that are more metal-rich than the interstellar medium expected at their guiding-center radius. This makes them natural candidates for having originated at smaller Galactocentric radii and subsequently migrated outward. I will quantify their migration signatures and associated heating trends as a function of age and chemistry, and discuss the main systematic uncertainties. Finally, I will place these results in the broader context of the path paved by RAVE, the upcoming 4MOST data releases, and future facilities for galactic archaeology.

19. Elena D'Onghia

Fossil Records of the Milky Way's Merger History in the Structure of its Disk

Galactic disks preserve long-lived structural memories of their dynamical past. Using Milky Way analogues from the TNG50 cosmological simulations, we show that mergers leave two distinct fossil signatures in stellar disks. First, satellite interactions heat the disk vertically, producing characteristic deviations in the otherwise smooth relation between stellar age and disk thickness. Second, mergers can reorient the angular momentum of the disk, generating an azimuthal misalignment between the warp structures of stellar populations formed before and after the merger. In the simulations these signatures persist for several gigayears and remain detectable even when stellar ages are uncertain at the ~20% level. While current surveys may blur the earliest events, forthcoming datasets providing more precise stellar ages, particularly from asteroseismology with PLATO combined with large spectroscopic surveys, will allow these structural diagnostics to reconstruct the merger history of the Milky Way disk.

20. Chervin Laporte

Build-up and survival of the disc: from numerical models of galaxy formation to the Milky Way

In this talk, I will discuss the build-up and survival of angular momentum in the stellar disc using a statistical suite of cosmological simulations of Milky Way-mass galaxies and observations of the Galaxy. I will show that in LCDM, rotation in the protodisc of the Milky Way can be traced back to high redshifts and can be significantly modulated by early massive mergers. I will show how the last significant merger leaves remarkable imprints on the distribution of circularities in a galaxy and how observations of field stars in the Milky Way at the present-day can be used to constrain the time of the merger. I will demonstrate how this method works on cosmological simulations and then apply it to the Milky Way. I will show how the age–metallicity relation for the stellar halo can constrain the timing of the Gaia-Sausage merger $\tau \sim 11$ Gyr. I will show that this interaction was short (about 1Gyr) with the dearth of halo and Splash stars after a lookback time of 10 Gyr, marking the end of the merger interaction. Finally, I will show that globular clusters in the metallicity range $-0.8 < [Fe/H] < -0.3$ share a formation time of $\sim$ 11 Gyr, which is interpreted as a signature of a starburst triggered by the first pericentric interaction of the GSE. I will argue that the distribution of metallicities in globular clusters provides important constraints on gas mixing in the early Universe. Finally, I will discuss the implications of the GSE on the evolution of the Galactic disc both kinematically and chemically debunking the common misconception that the GSE could be behind the chemical-bimodality.

21. Ivan Minchev

Radial migration effect on estimates of disk galaxies SFH - the MW in context

22. Olivier Bienaymé

RAVE and Gaia -- Stellar kinematics and integrals of motion

The measurements from the RAVE survey helped to prepare the RVS-Gaia survey, while the RVS survey validated the quality of the RAVE measurements. I will show how the RAVE and Gaia measurements, with stellar distances and velocities, make it possible to measure the galactic gravitational potential with greater precision over a large volume around the Sun's position. These new surveys have stimulated the development of new modelling tools, in particular those related to a third integral of motion, i.e., the Stackel's fudge. I show that improvements can still be obtained and that other exact integrals can be used, those related to parabolic and other coordinate systems.

23. Gabriele Cescutti

Galactic Archaeology with neutron capture elements

Since the gravitational wave signal GW170817, it has been proven that neutron star mergers produce neutron-capture elements, but we do not know whether they are the only producers. At present, we also do not have a clear understanding of the composition of the ejecta and the rate of these events. The answers to these questions are encrypted in the fossil records provided by the abundance patterns of ancient stars in our Galaxy.

Using these observations coupled with chemical evolution models, we present how we can improve the constraints on the nature of the first sources of neutron-capture elements: the r-process events and the first massive stars. Our findings support a scenario where at least a fraction of r-process events has exploded in a very short timescale and the massive stars at low metallicity were able to produce s-process material.

24. Guillaume Guiglion

From RAVE to Gaia and 4MOST: the power of machine-learning for Galactic Archaeology

In the era of large spectroscopic surveys, machine-learning (ML) has been playing a fundamental role in our understanding of the Milky Way formation and evolution. In this talk, I will show that RAVE played a pioneer role for the exploitation of Gaia data with ML, in particular for the characterisation of stellar chemistry in faint stars. Combining ML, spectra, magnitudes and parallaxes allows to provide robust and unprecedented chemical maps of the Milky Way with these surveys. Such a powerful method will be the cornerstone for the exploitation of current/future surveys such as WEAVE, 4MOST, and WST.

Wednesday, 6 May

25. Else Starkenburg

New views on the metal-poor Milky Way halo

The halo of the Milky Way has taught us already a lot about its history. In this talk, I will highlight some of the valuable lessons we are learning about the Milky Way build-up by pushing our understanding farther in distance - studying the less well-understood outer halo beyond 6D phase space samples - as well as further back in time. The most metal-poor stars are also likely the oldest stars of the Galaxy and, while extremely rare, they are crucial fossils of the Milky Way's

build-up phase. I will show how we study these stars and what they have started to tell us about the early assembly phase of the Milky Way as well as the nature of some of the most intriguing stellar substructures.

Finally, I will like to look forward into the future of this field, presenting outlooks for the 4MOST and WEAVE Galactic Archaeology studies into distant halo populations.

26. Andrea Kunder

The Milky Way Bulge Extra-Tidal Star Survey (MWBest)

The Milky Way Bulge Extra-Tidal Survey is detecting stripped globular cluster stars that are making up a part of the metal-poor bulge. I will report on our study of low-luminosity clusters -- clusters that are in final stages of dissolution in the field, and in particular, our observations indicating that some low-luminosity clusters are actually clumps of tidal debris stripped from massive globular clusters.

27. Cristina Chiappini

Galactic Bulge: early chemical enrichment

The earliest phases of galaxy formation and chemical enrichment are preserved in rare stellar fossils within the Milky Way bulge.

By combining stellar kinematics, ages, and detailed chemical abundances, Galactic Archeology allows us to reconstruct the nucleosynthetic conditions shortly after the Big Bang using resolved stars in our own Galaxy. Disentangling bulge populations is challenging, but forthcoming Gaia data releases and major spectroscopic surveys will deliver chemo-dynamical measurements for millions of stars, enabling the identification of chemically extreme and ancient populations. I will illustrate initial steps in this direction using current data, and discuss prospects from future spectroscopic surveys (e.g. 4MIDABLE-LR and WST), asteroseismic missions such as HAYDN, and the improved precision of Gaia next releases.

28. Wolfgang Hillebrandt

A New Cosmic Ruler: Measuring Hubble's Constant with Type IIP Supernovae

The expansion rate of the Universe, quantified by the Hubble constant (H_0), remains one of the most debated quantities in cosmology. Measurements based on nearby objects yield a higher value than those inferred from observations of the early Universe -- a discrepancy known as the "Hubble tension". Here, a new and independent determination of H_0 is presented, using Type IIP supernovae as distance indicators. By modeling the light from these exploding stars with advanced radiation transport techniques, we are able to directly measure distances without relying on the traditional distance ladder. The resulting H_0 value agrees with other local measurements and adds to the growing body of evidence for the Hubble tension, offering an important cross-check and a promising path toward resolving this cosmic puzzle.

29. Noam Libeskind

Cosmology and cosmography from peculiar velocities

30. Stefan Gottlöber

Clues to the beginning

31. Franziska Piontek

Modeling across scales: from galaxy formation to social costs of carbon

32. Tilmann Piffl

Almost full circle: from astrophysics to data science to optical engineering

33. Iliya Nickelt

Everything but the universe – AI as a cosmos of its own

34. Arman Khalatyan

Talk to the Data — Enabling Reproducibility in Modern Astronomy

Astronomy is entering an era in which the primary interface to data is no longer code, but conversation. Modern AI systems allow researchers to describe scientific goals in natural language while delegating data access, workflow design, and analysis to intelligent assistants. In this talk, I show how such AI assistants can improve transparency and reproducibility by guiding researchers through complex research infrastructures. Using FAIR-compliant platforms and containerized workflows, analyses can be made portable, versioned, and executable across different computing environments.

As an example, I demonstrate simple, conversational access to large astronomical survey data, including Gaia-based stellar catalogs, illustrating how AI can lower technical barriers while preserving scientific rigor in the age of data-driven discovery.

Thursday, 7 May

35. Jeremy Bailin

CoSANG: Simulating a Sample of Stellar Halos

New surveys will probe the outskirts of the Milky Way in ways never before possible. In order for these surveys to unlock their potential to understand the Milky Way's history, we need a key: theoretical models that we can compare to that span a variety of histories. I introduce CoSANG (Coupled Semi-Analytic/N-body Galaxies), a new series of stellar halo simulations that are more efficient than full hydrodynamic simulations, but more accurate than pure N-body simulations, and show examples of how observable properties of the halos differ for galaxies with different histories.

36. Michael Rauch

Accretion from the IGM

The growth of galaxies through infall of gas from the intergalactic medium (IGM) has remained an active frontier in the field of galaxy formation. Early work by Matthias Steinmetz enabled the first studies of the circumgalactic medium with cosmological hydro-simulations, the zone where the IGM and galaxies interact with each other, and set the stage for the theoretical study of metal-enriched gas with QSO absorption lines. I will briefly review a few key developments.

37. Christoph Pfrommer

Feedback in galaxy formation

38. Anthony Brown

Reflections on the Gaia mission

I will discuss lessons learned from Gaia as an astrophysics survey mission, emphasizing the need to complement the high accuracy astrometry with a rich set of astrophysical information. Illustrations from high impact science with Gaia will be used to make the point.

39. Steven Majewski

The Hidden Galaxy Explorer Program in After Sloan V

40. Borja Anguiano

J-ATLAS: Javalambre Andromeda and Triangulum Legacy Astrophysical Survey

In the ΛCDM paradigm, dark matter halos form hierarchically and provide the 'skeleton' on which the baryonic components of galaxies form, grow, and evolve through the hierarchical assembly of subhalos. Halo stars can have multiple, distinct origins—accreted from disrupted satellites, formed in situ, or dynamically ejected from the inner galaxy—and each pathway is expected to imprint characteristic chemical abundance patterns (e.g., metallicity and detailed element ratios) across the halo. The Andromeda Galaxy (M31) and Triangulum Galaxy (M33) offer an ideal combination of proximity and an external vantage point, enabling a detailed yet global view of halo assembly. The J-ATLAS survey adds a crucial dimension to this picture: a wide-area, homogeneous map of stellar chemical enrichment across the disks, halos, and satellite systems of M31 and M33. Leveraging the 56 J-PAS narrowband filters across the optical down to m≈23 mag, J-ATLAS will complement previous broadband efforts (e.g., Pan-Andromeda Archaeological Survey) by delivering low-resolution photo-spectra for millions of resolved stars. These photo-spectra enable robust SED fitting analyses that go beyond global metallicity, providing constraints on key abundance dimensions (e.g., [Fe/H] and multiple element-sensitive features that trace α-elements and other nucleosynthetic channels) across distinct structural components and substructures. The resulting catalog of stellar parameters and abundance estimates at

unprecedented scale will allow us to chemically tag disrupted debris, distinguish accreted versus in situ populations, and directly test ΛCDM driven halo formation scenarios through their predicted chemo structural signatures. We have already begun this effort with a pilot survey targeting the Giant Stellar Stream, using it as a benchmark substructure to validate the abundance methodology and quantify chemical gradients within tidal debris. Finally, the synergy between J-ATLAS and RomAndromeda will enable chemo-dynamical studies by combining our abundance constraints with the high-fidelity proper motions delivered by the Nancy Grace Roman Space Telescope.

41. Gerry Gilmore & Gudrun Tausch-Pebody

Early light-bending tests of General Relativity: the good, the bad and the ugly

The first light-bending test of General Relativity is the famous 1919 eclipse experiment of Dyson and Eddington. The goal was to distinguish between three predictions: zero deflection, a solar limb deflection of 0.87arcsec “Newtonian” or a solar limb deflection of 1.75arcsec “Einsteinian”. The story of this, its later detractors, and a reanalysis of the data is available in Gilmore & Tausch-Pebody 2020. This study shows that the original data analysis, and data selection, was robust. The outcomes of two accepted data sets were 1.98+-0.18arcsec and 1.61+-0.45arcsec, significantly supporting the Einstein value. The uncertainty was considerable, so a Lick expedition to a 1922 eclipse was anticipated as key confirmation. The lick data were eventually reduced by Robert Trumpler, a Swiss later Swiss/American astronomer. From two telescopes he derived a deflection of 1.75+-0.09arcsec (probable error). Good? This was widely accepted at the time as definitive support for General Relativity. Or too good? We reanalyzed the Lick data, show that Trumpler’s mean value is mathematically robust, albeit averaging out systematic errors, but that his uncertainty is very optimistic. The highly non-Gaussian data distribution is consistent with a standard error uncertainty of 0.5arcsec. Rather worse than the Dyson/Eddington result. A 1929 eclipse experiment, led by Finlay Freundlich, founder of the Einstein Tower solar telescope on Telegrafenberg, using a non-standard method, claimed a deflection of 2.24+-0.1 (pe) arcsec. This was not accepted by the community. Trumpler reanalyzed Freundlich’s data and found a deflection of 1.75+-0.27arcsec. We conclude that “success”, in the sense of community acceptance of the experimental outcome, in an ambitious project needs all of expertise, reputation, resources, and good fortune. A potentially receptive audience is arguably at least as important.

Gerard Gilmore and Gudrun Tausch-Pebody 2020 The 1919 eclipse results that verified general relativity and their later detractors: a story re-told. Notes Rec R Soc Lond (2022) 76 (1): 155–180 https://doi.org/10.1098/rsnr.2020.0040

42. Maria-Rosa Cioni

The Clouds, please to meet you

43. Roelof de Jong

4MOST and future spectroscopic surveys

I will present an overview of the 4MOST facility, from initial planning, development history, to current performance at the start of operations and planned science. I will then introduce the Wide-field Spectroscopic Telescope (WST), the logical next flagship facility of ESO, building on the success of 4MOST and MUSE.

44. Roland Bacon

The Wide-Field Spectroscopic Telescope: A Transformative Facility for Galactic Spectroscopic Surveys

The WST project aims to design and construct an innovative 10-metre class wide-field spectroscopic survey telescope (WST) in the southern hemisphere. It will feature the parallel operation of two cutting-edge instruments: a high-multiplex (30,000), large field-of-view (3 square degrees) multi-object spectrograph (MOS) operating in both low- and high-resolution modes, and a giant panoramic integral field spectrograph (IFS).

WST’s ambitious top-level requirements place it well ahead of all existing and planned facilities. In its first five years of operation, the MOS is expected to observe 300 million galaxies, 25 million stars at low resolution, and 2 million stars at high resolution, while the IFS will deliver 4 billion spectra. These capabilities will enable transformative science across a wide range of astrophysical domains, including galactic science.

WST is envisioned as the next major facility for ESO following the ELT, and a proposal will be submitted in response to the upcoming ESO Call for Ideas in 2027. The project is backed by a large consortium of leading institutes from nine European countries and Australia, with deep expertise in astronomical instrumentation and survey science.

45. Martin M. Roth

Crowded-field spectroscopy -towards Extragalactic Archaeology

It has been a long way from the introduction of the concept of the thin disk and a thick disk stellar populations in the Milky Way by Gilmore and Reid back in 1983, the precision spectroscopic identification of stars from those populations by Fuhrmann in terms of [Mg/Fe] over [Fe/H] in 1998, the first data release from RAVE by Steinmetz et al. in 2006, to present day accomplishments in Galactic Archaeology made possible with facilities like Gaia and the recently commissioned 4MOST. Yet the limitations by 4m-class telescopes to reach further out, e.g. the MW halo, or Local Group dwarf galaxies, calls for even more powerful survey facilities. In response to the ESO strategic call for ideas "Expanding Horizons", concerning new telescope infrastructure in the 2040s, the WST proposal (Wide Field Spectroscopic Telescope) stands out as a unique combination of high multiplex fiber-based multi-object spectroscopy on the one hand, with Mega-MUSE capability for integral field spectroscopy (IFS) on the other hand. Next to another level of sensitivity and survey speed for classical multi-object spectroscopy of stars, the IFS capability, combined with

ground-layer adaptive optics, will open the door for massive spectroscopy of densely crowded fields in globular clusters, Local Group dwarf galaxies, or even nearby Local Volume galaxies. I will report on the science cases currently prepared by the Resolved Stellar Populations Working Group within the ongoing WST conceptual design study in preparation for the proposal to ESO.

46. Marica Valentini

Sneak Peek into 4MOST-DR0: Spectroscopic Follow-up of Solar-like Oscillating Red Giants

We present one of the first science-driven analyses of 4MOST data obtained during Survey Programme Validation (SPV) phase, using solar-like oscillating red giants as a benchmark for instrument and pipelines performance. The experiment exploits targets from one CoRoT field and a single K2 field, the sample counts about 1,000 seismic red giants spanning a wide range in oscilaltions frequencies, metallicity, and evolutionary stage. This sample provides a controlled and well-understood test case to assess the quality of 4MOST and 4MOST Low Resolution Disk and Bulge survey (S3) spectroscopic products at the onset of survey operations.

The data are processed through the 4GP (4MOST Galactic spectroscopic Pipeline) and S3 pipelines, with the S3 pipeline iteratively incorporating seismic parameters into the spectroscopic analysis. The primary performance metric is the comparison between spectroscopic surface gravities and those inferred from seismic scaling relations and literature, allowing a direct validation of log(g) and abundances determinations delivered by the 4MOST and S3 pipelines.

Seismically refined ages, masses, radii, distances, and reddening are derived using the PARAM code and compared with the corresponding StarHorse estimates. Beyond testing the integration of seismic constraints into the spectroscopic workflow, this experiment functions as an end-to-end exercise for the S3 analysis chain, providing a critical preview of the survey products for Galactic science.

Friday, 8 May

47. Michael Kramer

MPIfR MeerKAT Galactic Plane survey

48. Tomaž Zwitter

RAVEing a career

In line with the title I will reflect on the benefits of entering large collaborations and of pursuing the scientific goals compatible with what the new data have to offer. RAVE was officially about radial velocities, but in reality it was much more. Development of some techniques of automated data reduction, quality control and spectra classification has been vital and at that times novel. Along came the thoughts on how to measure the spectrograph's RV accuracy and resolving power. Also, what the radial velocity actually is and what are relations between its accuracy and precision. I will wrap this up with some reflections on other spectroscopic surveys and how the broadness of the arguments one has to deal with in a spectroscopic survey make writing of a textbook a viable goal.

49. Kseniia Sysoliatina

Modeling the Milky Way Disk: Constraints from the White Dwarf Population

50. Philipp Richter

The gaseous halo of the Milky Way

51. Martin Haehnelt

The Past, Present and Future of Damped Lyman Alpha absorption

I will give my personal take on exploiting the strong signature of Lyman-alpha damping wing absorption as a versatile probe of neutral hydrogen in environments as diverse as the ISM of high-redshift galaxies, the circum-galactic medium and the not yet ionized Intergalactic Medium during the epoch of reionization.

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