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similar to the method to measure photometric redshifts by Benitez (2000). 3) A result-analyser module: streamlines data analysis from the large output PDFs files. A fourth module to manage 3D data is being developed and a few preliminary tests are also shown.

To investigate the reliability of results obtained by MagAl, we have created a mock galaxy sample for the ALHAMBRA survey filter system (http://alhambrasurvey.com) and tried to recover their physical properties. We show that for our sample of simulated galaxies we can measure stellar ages, metallicities and extinctions with a precision of less than 0.3 dex. Also, we apply the code to the ALHAMBRA survey catalog and show that we can measure stellar masses with an accuracy of 0.2 dex when comparing to previous results like COSMOS masses measured by Bundy et al. (2006).

[1] Instituto de Astrofísica de Andalucía, Glorieta de la Astronomía, s/n, E-18008, Granada, España, (william@iaa.es).
[2] Universidade Federal de Santa Catarina, Departamento de Física.

A DATA-DRIVEN APPROACH TO THE EMISSION LINE PROPERTIES OF STAR-FORMING GALAXIES

L. Sodre Jr.[1] and A. Albernaz Sirico[1]

We present a quantitative analysis of the correlations between the equivalent widths of optical emission lines for a sample of more than 70,000 star-forming galaxies with high S/N SDSS spectra and with spectral synthesis performed with the Starlight software. We show, using statistical tools such as the distance correlation and maximal information correlation, that there are indeed strong correlations between the most prominent emission lines usually detected in the optical region of galaxy spectra. We have done, also, a Principal Component Analysis (PCA) of the synthesized continuum spectra and used up to 10 components to train an artificial neural network to estimate the equivalent widths of the emission lines, with excellent results, demonstrating that there is a strong correlation between the continuum and equivalent widths. The same analysis was performed with the symbolic regression software Eureqa, which provided functional relations between the four principal components and the equivalent widths, with an accuracy between 0.12 and 0.24 dex for different emission lines. The main motivation behind this work is to produce realistic spectra for tests of data reduction pipelines of the new generation of galaxy surveys, like J-PAS and PFS/SuMIRe.

[1] Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, R. do Matão 1226, Cidade Universitária, 05508-090, São Paulo, SP, Brazil.

THE NEBULATOM COOKBOOK

G. Stasińska[1] and C. Morisset[2]

We present a series of problems on nebular physics with detailed comments and solutions in python. Their aim is to lead the student to a better understanding of the respective roles of the different processes at play in ionized nebulae, and to use with proper insight some tools that have been developed for the analysis of nebulae. These problems have been proposed at the NEBULATOM workshop in Choroni (Venezuela, 3-16 March 2013), a capacity development workshop for Latin American astronomers on emission-line objects in the Universe. They can be downloaded from https://sites.google.com/site/nebulatomtools/

[1] LUTH, Observatoire de Paris, CNRS, Université Paris Diderot; Place Jules Janssen 92190 Meudon, France (grazyna.stasinska@obspm.fr).
[2] Instituto de Astronomía, Universidad Nacional Autónoma de México, Apdo. Postal 70264, Méx. D.F., 04510 México.

PHYSICAL CONDITIONS OF A HII GALAXY WITH EXTRAORDINARILY DENSE NUCLEUS: MRK996

E. Telles[1], T. X. Thuan[2], Y. I. Izotov[3], and E. R. Carrasco[4]

We present an integral field spectroscopic study with the Gemini Multi-Object Spectrograph (GMOS) of the unusual blue compact dwarf (BCD) galaxy Mrk 996.

We show through velocity and dispersion maps, emission-line intensity and ratio maps, and by a new technique of electron density limit imaging that the ionization properties of different regions in Mrk 996 are correlated with their kinematic properties. From the maps, we can spatially distinguish a very dense high-ionization zone with broad lines in the nuclear region, and a less dense low-ionization zone with narrow lines in the circumnuclear region. Four kinematically distinct systems of lines are identified in

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the integrated spectrum of Mrk 996, suggesting stellar wind outflows from a population of Wolf-Rayet (WR) stars in the nuclear region, superposed on an underlying rotation pattern. From the intensities of the blue and red bumps, we derive a population of ∼473 late nitrogen (WNL) stars and ∼98 early carbon (WCE) stars in the nucleus of Mrk 996, resulting in a high N(WR)/N(O+WR) of 0.19.

We derive, for the outer narrow-line region, an oxygen abundance 12+log(O/H)=7.94±0.30 (∼ 0.2 $Z_{\odot}$) by using the direct T_e method derived from the detected narrow [O III]λ4363 line. The nucleus of Mrk 996 is, however, nitrogen-enhanced by a factor of ∼20, in agreement with previous CLOUDY modeling. This nitrogen enhancement is probably due to nitrogen-enriched WR ejecta, but also to enhanced nitrogen line emission in a high-density environment. Although we have made use here of two new methods – Principal Component Analysis (PCA) tomography and a method for mapping low- and high-density clouds – to analyze our data, new methodology is needed to further exploit the wealth of information provided by integral field spectroscopy.

[1] Observatório Nacional, Rua José Cristino, 77, Rio de Janeiro, RJ, 20921-400, Brazil, (etelles@on.br).
[2] Astronomy Department, University of Virginia, P.O. Box 400325, Charlottesville, VA 22904, USA, (txt@virginia.edu).
[3] Main Astronomical Observatory, Ukrainian National Academy of Sciences, Zabolotnoho 27, Kyiv, 03680, Ukraine, (izotov@mao.kiev.ua).
[4] Gemini Observatory/AURA, Southern Operations Center, Casilla 603, La Serena, Chile, (rcarrasco@gemini.edu).

THE FORMATION OF STELLAR HALOES OF MASSIVE SPIRALS IN HIERARCHICAL SCENARIO

P. B. Tissera[1,2], T. C. Beers[4], D. Carollo[5], and C. Scannapieco[3]

We investigate the chemical and kinematic properties of the diffuse stellar haloes of six simulated Milky Way-like galaxies from the Aquarius Project. Binding energy criteria are adopted to defined two dynamically distinct stellar populations: the diffuse inner and outer haloes, which comprise different stellar sub-populations with particular chemical and kinematic characteristics. Our simulated inner- and outer-halo stellar populations have received contributions from debris stars (formed in sub-galactic systems while they were outside the virial radius of the main progenitor galaxies) and endo-debris stars (those formed in gas-rich sub-galactic systems inside the dark matter haloes). The inner haloes possess an additional contribution from disc-heated stars in the range $3-30\%$, with a mean of $\sim 20\%$. Disc-heated stars can exhibit signatures of kinematical support, in particular among the youngest ones. Endo-debris plus disc-heated stars define the so-called insitu stellar populations. In both the inner- and outer-halo stellar populations, we detect contributions from stars with moderate to low [alpha/Fe] ratios, mainly associated with the endo-debris or disc-heated subpopulations. The observed abundance gradients in the inner-halo regions are influenced by both the level of chemical enrichment and the relative contributions from each stellar sub-population. Steeper abundance gradients in the inner-halo regions are related to contributions from the disc-heated and endo-debris stars, which tend to be found at lower binding energies than debris stars. In the case of the outer-halo regions, although [Fe/H] gradients are relatively mild, the steeper profiles arise primarily due to contributions from stars formed in more massive satellites, which sink farther into the main halo system, and tend to have higher levels of chemical enrichment and lower energies. Our results show how the abundances of the stars in the stellar haloes vary with radius up to the virial radius and how the characteristics of the metallicity distributions can be linked to the history of assembly within in hierarchical clustering scenario.

[1] Consejo Nacional de Investigaciones Científicas y Técnicas, CONICET, Argentina.
[2] Instituto de Astronomía y Física del Espacio, Casilla de Correos 67, Suc. 28, 1428, Buenos Aires, Argentina.
[3] Max-Planck Institute for Astrophysics, Karl-Schwarzchild Str. 1, D85748, Garching, Germany.
[4] National Optical Astronomy Observatory, Tucson, 85719, USA.
[5] Macquarie University, Dept. Physics & Astronomy, Sydney, 2109 NSW, Australia.

METALLICITY GRADIENTS IN TIDAL TAILS AND MERGING SYSTEMS

S. Torres-Flores[1], S. Scarano Jr[2], D. Olave[1], M. Alfaro[1], C. Mendes de Oliveira[3], D. F. de Mello[4], E. R. Carrasco[5], P. Amram[6], and H. Plana[7]

We present an analysis of the metal distribution in the tidal tails of two interacting systems and in the main body of a galaxy merger: NGC92, NGC6845 and HCG31, respectively. Using Gemini/GMOS