GREAT-ESF WORKSHOP

STELLAR ATMOSPHERES IN THE GAIA ERA:

QUANTITATIVE SPECTROSCOPY AND COMPARATIVE SPECTRUM MODELLING

Thu 23 June 2011

Quantitative Spectroscopy and Comparative Spectrum Modelling of Cool Stars

09:00 Welcome & Practical info by VUB Local Organizing Committee

Session 1: (Chair A. Korn)

09:10 U. Heiter: *Comparative Modelling of the Spectra of Cool Giants*

09:40 P. Hauschildt: *The PHOENIX Model Atmosphere Package*
10:20 M. Bergemann: *Non-LTE Line Formation of Fe-peak Elements and Application to Large-scale Stellar Surveys*

10:40 Coffee break & Poster viewing
11:10 R. Collet: *The StaggerGrid Project: a Grid of 3D Model Atmospheres for High-precision Spectroscopy*
11:30 T. Aparicio Villegas: *Stellar Physics with the ALHAMBRA Photometric System*

11:50 A. Quirrenbach: *Spectroscopic Instrumentation in the GAIA Era*

12:10 Discussion Session I

12:30 Lunch at VUB restaurant

Session 2: (Chair U. Heiter)

13:30 B. Plez: *Model Atmospheres and Spectra for Cool Stars: Comparisons of MARCS and Other Brands of Models*
14:10 R. Sordo: *Libraries of Synthetic Spectra in the Gaia Mission*

14:50 A. Recio-Blanco: *Automatic Stellar Spectra Parametrisation in the IR Ca II Triplet Region*

15:20 Coffee break & Poster viewing
15:50 G. Pace: *The Metallicity Scale of Dwarf and Giant Stars*
16:10 N. Gorlova: *Abundance Analysis of Post-AGB Stars*
16:30 D. Montes: *High-resolution Spectroscopy of FGK Nearby Stars: Stellar Parameters and Chemical Tagging*
16:50 Discussion Session II

17:15 Poster viewing until **18:00**

GREAT-ESF WORKSHOP

STELLAR ATMOSPHERES IN THE GAIA ERA:

QUANTITATIVE SPECTROSCOPY AND COMPARATIVE SPECTRUM MODELLING

Fri 24 June 2011

Quantitative Spectroscopy of Hot Stars

09:00 Practical info by VUB Local Organizing Committee

Session 3: (Chair A. de Koter)

09:10 N. Przybilla: *A Comprehensive Test of Common Hydrostatic LTE and non-LTE Model Atmosphere/Line-formation Codes for Quantitative Spectroscopy of Early-type Dwarfs and Giants*
09:50 N. Walton: *VAMDC: The Virtual Atomic and Molecular Data Centre*
10:10 T. Dall: *Modelling Rotating Geometrically Distorted Stars with Inhomogeneous Surface Features*
10:30 Coffee break & Poster viewing
11:00 F. Nieva: *High-precision Stellar Parameter and Abundance Determinations of OB Dwarfs and BA Supergiants*
11:20 R. Hudec: *Tests of Simulated Gaia Bp/Rp Spectra with LDS (Low Dispersion Spectroscopy) Photographic Sky Surveys*
11:40 R. Blomme: *Hot Stars in the Gaia-ESO Public Survey*

12:00 Discussion Session III

12:20 Lunch at VUB restaurant

Session 4: (Chair A. Herrero)

13:30 J. Groh: *Modeling the Wind and Photosphere of Massive Stars with the Radiative Transfer Code CMFGEN*
14:10 S. Simon-Diaz: *The IACOB Project (WP3: Quantitative Spectroscopic Analysis of Galactic OB stars)*
14:30 Coffee break & poster viewing (removing of posters from 15:00)

15:10 A. de Koter: *The VLT-FLAMES Tarantula Survey*
15:30 Y. Chen: *XSL: The X-Shooter Stellar Library*

15:50 Discussion Session IV

16:10 Summary of Workshop (A. Lobel)
16:40 Workshop closing and Farewell by VUB LOC

GREAT-ESF WORKSHOP

STELLAR ATMOSPHERES IN THE GAIA ERA:

QUANTITATIVE SPECTROSCOPY AND COMPARATIVE SPECTRUM MODELLING

23 & 24 June 2011

Posters and coffee are in the Mandela Room of VUB Building Q at street level. Please remove your poster during the afternoon coffee-break of Fri 24 June starting from 15:00.

Posters:

P1 S. Van Eck: *A Grid of MARCS Model Atmospheres for S Stars*

P2 T. Morel: *Using CoRoT and Kepler Targets as Benchmarks for Spectroscopic Analyses of Cool Stars*

P4 J. Maldonado: *Spectroscopic Properties of Stars with Circumstellar Debris Discs*

P5 A. Chiavassa: *3-D Hydrodynamical Model Atmospheres: A Tool to Correct Radial Velocities and Parallaxes*

P6 L. Mahy: *A Quantitative Study of the O Stars in NGC 2244*

P7 F. A. Stap: *Quantitative IR Spectroscopy of Massive Stars*

P8 J. Zhang: *Stellar Parameter Estimation for the LAMOST Survey*

P9 P. Koubsky: *Gaia RVS Spectroscopy of Be Stars*

P10 P. Neyskens: *Abundance Patterns in S-type AGB Stars to Set Constraints on Nucleosynthesis and Stellar Evolution Models*

P11 A. Jorissen: *Chemically Tagging the Hyades Stream: Does it Partly Originate from the Hyades Cluster?*

G12 ESA: *Gaia Mission Overview*

G13 ESA: *The Gaia Spacecraft and Instruments*

G14 ESA: *From Observation to Catalogue*

G15 ESA: *Data Processing and Analysis Consortium*

G16 ESA: *Gaia's Scientific Rewards*

G17 ESA: *Industrial Involvement in the Gaia Spacecraft*

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TALK ABSTRACTS

SESSION I: 23 JUNE MORNING

U. Heiter: ***Comparative Modelling of the Spectra of Cool Giants***
Stellar parameters determined by analysis of high-resolution spectra have great potential but are suffering from systematic uncertainties due to inadequate physics of model spectra and different approaches used for the analysis methods. We present a comparison of a wide variety of model codes attempting to analyse the spectra of cool giants. These are the results of an experiment conducted for a GREAT-ESF workshop held in August 2010. Participants were provided with a specific set of spectroscopic and photometric data for four unidentified giant stars. We discuss their findings, possible causes for the apparent differences and possible strategies for abundance analyses of cool giant stars.

P. Hauschildt: ***The PHOENIX Model Atmosphere Package***
I will discuss some of the features of and results obtained with the PHOENIX general-purpose model atmosphere code. This will include both cool model atmospheres with PHOENIX/1D, in particular models which include non-equilibrium dust formation for L and M dwarfs and an overview over the PHOENIX/3D mode to compute spectra and spectro-images for 3D atmospheres.

M. Bergemann: ***Non-LTE Line Formation of Fe-peak Elements and Application to Large-scale Stellar Surveys***
Chemical composition of late-type (FGK) stars provides major observational constraints to the evolution of the Galaxy. Still, calculation of element abundances from observed stellar spectra is a challenging task due to the difficulties of incorporating various physical aspects of radiative transfer theory, such as non-local thermodynamic equilibrium (NLTE), into spectrum analysis codes. The codes used for automated analysis of large sets of high- and low-resolution spectra obtained in various Galactic star surveys (i.e. SDSS/SEGUE, HERES) rely on a simplifying LTE assumption. Application of existing NLTE-capable codes to such surveys is computationally prohibitive; NLTE studies are often limited to a handful of stars.
Still, significant improvement over standard LTE analyses can be made by utilizing so-called NLTE abundance corrections. I will describe our project aimed at large-scale calculations of NLTE corrections for various chemical elements. I will focus on transition metals with $22 < Z < 28$ and show some results for a grid of stellar parameters including very metal-poor dwarfs and giants. Particular attention will be given to iron, which is a proxy of stellar metallicity and is commonly used to derive effective temperature and gravity. The Fe model atom has been updated to include quantum-mechanical photoionisation cross-sections and new theoretically predicted energy levels and transitions. I will demonstrate that these NLTE abundance corrections can be easily implemented in other spectroscopic studies, such as follow-up spectroscopy for Gaia targets, enabling accurate derivation of element abundances from lines of various excitation potentials and strengths.

R. Collet: ***The StaggerGrid Project: a Grid of 3D Model Atmospheres for High-precision Spectroscopy***
I will present the StaggerGrid project, a collaborative effort for the construction of a comprehensive grid of time-dependent, three-dimensional, hydrodynamic model atmospheres of solar- and late-type stars with different effective temperatures, surface gravities, and chemical compositions. The three-dimensional model atmospheres are being generated using the MPI-parallel radiation-hydrodynamic Stagger-Code and realistic input micro-physics, including a state-of-the-art equation-of-state and up-to-date opacity data. In this contribution, I will report about the progress of the StaggerGrid project and discuss the application of three-dimensional model atmospheres to spectral line-formation calculations and high-precision spectroscopy. I will illustrate the main effects of three-dimensional model

atmospheres on the predicted strengths, wavelength-shifts, and shapes of spectral lines, highlighting the differences with respect to calculations based on classical, one-dimensional, hydrostatic models. I will focus in particular on the application of StaggerGrid models to the analysis and interpretation of data from the Gaia Radial Velocity Spectrometer (RVS) for the determination of accurate stellar parameters, elemental abundances, and radial velocities.

T. Aparicio Villegas: ***Stellar Physics with the ALHAMBRA Photometric System***
The ALHAMBRA photometric system (Aparicio Villegas et al. 2010) was specifically designed to perform a tomography of the Universe in some selected areas (Moles et al. 2008). Although mainly designed for extragalactic purposes, its 20 contiguous, equal-width, medium-band photometric system in the optical wavelength range shows a great capacity for stellar classification. In this contribution we propose a stellar classification and physical parameter estimation based on the 18 independent reddening-free Q values derived from the ALHAMBRA photometry. Based on the theoretical spectral library BaSeL 2.2 (Lejeune et al. 1998) and applied to 288 stars from the Next Generation spectral Library (NGSL, Gregg et al. 2004), we discuss the reliability of the method and its dependence on the extinction law used.

A. Quirrenbach: ***Spectroscopic Instrumentation in the GAIA Era***
I will discuss some concepts and plans for massively parallel spectroscopic instruments, which can provide huge numbers of stellar spectra. It is obviously important to match the properties and capabilities of such instruments to the requirements of quantitative modelling efforts.

SESSION II: 23 JUNE AFTERNOON

B. Plez: ***Model Atmospheres and Spectra for Cool Stars: Comparisons of MARCS and Other Brands of Models***
I will detail similarities and differences between codes used for the modelling of cool star atmospheres. I will compare models and spectra, and discuss both SEDs and spectra in the RVS domain.

R. Sordo: ***Libraries of Synthetic Spectra in the Gaia Mission***
Gaia will observe up to a billion stellar sources. Automated algorithms are under development to derive the atmospheric parameters of all observed spectra, from low resolution optical spectra alone or in synergy with high resolution spectra in the Calcium IR triplet region. To do so, a large database of state-of-the-art stellar libraries have been produced and given to the Gaia community, computed using different codes optimized for specific purposes. The choice to use different spectral codes in different regions of the HR diagram raises the problem of the coherence of the different spectra, specifically in the transition zones. I will present comparison between the libraries from the point of view of the spectra simulations used to train the Gaia algorithms. I will also present the implementation of these libraries into a Simple Stellar Population code.

A. Recio-Blanco: ***Automatic Stellar Spectra Parametrization in the IR Ca II Triplet Region***
The presentation will show what astrophysical information can be retrieved from spectra observed around the IR Ca II triplet, as the Gaia/RVS ones. We investigate the performances of two methods of automated estimation of the values of stellar parameters, based on very different mathematical approaches, allowing us to describe the main problems encountered in this spectral region.

G. Pace: ***The Metallicity Scale of Dwarf and Giant Stars***
Differences between metallicity measurements of dwarfs and giants belonging to the same open clusters, as envisaged, for instance, by Santos et al. (2009), would have tremendous implications, among the other things, on the planet formation theory and on the stellar populations in the Milky Way. They also have a tremendous importance on their own right, as they would point to possible problems

in atmosphere modelling of evolved stars. However, they have not yet been evaluated based on solid and conclusive data. We analyse and review literature and available archive data, using different models and line lists, in order to investigate the extent, the origin, and the nature of the aforementioned differences.

N. Gorlova:*Abundance Analysis of Post-AGB Stars*
We describe our analysis of the spectra of post-AGB stars (SpTs F-K, luminosity types I-II, [Fe/H]=-2.0..+0.5), obtained with the échelle spectrograph HERMES on the 1.2m Mercator telescope. We obtain atmospheric parameters and atomic abundances using hydrogen line profiles and the equivalent width (EW) of weak metal lines. Our oscillator strengths and solar abundances for the majority of elements have been consistently adjusted to match the observed solar spectrum. The EW analysis is performed with Atlas9 models using both R. Kurucz's WIDTH9 and C. Sneden's MOOG radiative transfer codes. The outlined procedure can be employed for spectroscopic analyses of high-resolution spectra in the ground-based follow-up programs of Gaia.

D. Montes: ***High-resolution Spectroscopy of FGK Nearby Stars: Stellar Parameters and Chemical Tagging***
During the last years our group has undertaken several high resolution spectroscopic surveys of nearby FGK stars. A large number of stars have already been observed and we have already determined spectral types, rotational velocities as well as radial velocities, Lithium abundance and several chromospheric activity indicators. We are working now on an homogeneous determination of the fundamental stellar parameters (Teff, log g, metallicity, [Fe/H], and microturbulent velocity) and differential abundance analysis (chemical tagging) of all these stars. All this information will allow us to ascribe these stars to moving groups and associations of different ages, and could lead to a better understanding of the star formation history in the solar neighborhood discerning between field-like stars (associated with dynamical resonances (bar) or spiral structure) and young coeval stars (debris of star-forming aggregates in the disk). In addition, all this work and methods will be very useful for preparing for the huge amount of data that will be available with Gaia.

SESSION III: 24 JUNE MORNING

N. Przybilla: ***A Comprehensive Test of Common Hydrostatic LTE and non-LTE Model Atmosphere/Line-formation Codes for Quantitative Spectroscopy of Early-type Dwarfs and Giants***
It is generally accepted that the atmospheres of cool/luke stars of spectral types A and later are described well by LTE model atmospheres, while the O-type stars require a detailed treatment of non-LTE effects. Exemplary for the two different approaches, model atmosphere structures, SEDs and synthetic spectra computed with ATLAS9/SYNTHE and TLUSTY/SYNSPEC are compared and verified for their ability to reproduce observed spectra in the transition region 15000 < Teff < 35000 K. Strengths and weaknesses of both approaches are identified. Recommendations are given how to improve the models in order to derive unbiased stellar parameters and chemical abundances for future applications, with special emphasis on Gaia science.

N. Walton: ***VAMDC: The Virtual Atomic and Molecular Data Centre***
This talk will describe the EU FP7 research infrastructure : VAMDC: The Virtual Atomic and Molecular (A+M) Data Centre (see http://www.vamdc.eu). This project is building an open framework to enable seamless access to an inclusive range of A+M data - with the first public portal due to be released for use in July 2011. Key data providers participating in VAMDC include amongst others those responsible for: VALD, BASECOL, HITRAN, CHIANTI, CDMS. I will describe how use of VAMDC offers advantages in obtaining complete and current fundamental data (e.g. atomic data as input to spectral synthesis analysis systems) which in turn improves the accuracy of detailed abundance

analyses of stars to be observed in the large spectroscopic surveys to be carried out by, or in support of, Gaia.

T. Dall: ***Modelling Rotating Geometrically Distorted Stars with Inhomogeneous Surface Features***
Simple spherical, non-rotating stellar models are inadequate when describing real stars in the limit of very fast rotation: Both the observable spectrum and the geometrical shape of the star deviate strongly from simple models. We attempt to approach the problem of modelling geometrically distorted, rapidly rotating stars from a new angle: By constructing distorted geometrical models and integrating standard stellar models with varying temperature, gravity, and abundances, over the entire surface, we attempt a semi-empirical approach to modelling. We will present our models and the methodology, and present simple examples of applications.

F. Nieva: ***High-precision Stellar Parameter and Abundance Determinations of OB Dwarfs and BA Supergiants***
We present a self-consistent spectrum analysis technique employing non-LTE line formation, which allows precise atmospheric parameters and chemical abundances of massive stars to be derived: 1sigma-uncertainties as low as ~1% in effective temperature, ~0.05-0.10 dex in surface gravity and ~20% in abundances can be achieved. Special emphasis is given to the minimization of the main sources of systematic errors in the quantitative spectral analysis. Examples of applications are discussed for OB-type stars near the main sequence and their evolved progeny, the BA-type super-giants, covering masses of ~6 to 25 Msun and a range in effective temperature from ~8000 to 35000 K. We show results for a sample of 30 stars analyzed with a semi-automatic fitting routine, achieving high accuracy and precision at the same time. We are making efforts to implement all critical steps that are handled interactively in our current approach into an fully automated line-fitting routine that will allow larger samples of stars to be analyzed at the same precision than our control sample.

R. Hudec: ***Tests of Simulated Gaia Bp/Rp Spectra with LDS (Low Dispersion Spectroscopy) Photographic Sky Surveys***
The LDS (Low Dispersion Spectroscopy) performed in various extended sky surveys with optical telescopes with objective prisma and photographic plates offers an interesting possibility to test simulated low-dispersion spectra for Gaia Bp/Rp photometers and compare them with real data, especially for objects with strong emission lines. I will give a review of astrophysics with LDS performed in the past, as well as an overview of existing extended sky surveys (with photographic plates) providing LDS data. Some of them give almost complete coverage of either the northern or southern hemisphere (e.g. the Northern and Southern Mt Wilson ~V Michigan H-alpha surveys or the German La Paz Bolivia Southern Spectral Sky Survey). I will show examples of these data and will discuss a comparison of existing LDS plate data with expected/simulated Bp/Rp data. I will show examples of real data for objects with very strong and wide emission, confirming that such emissions will be detectable with Bp/Rp. I will also discuss the importance of Gaia Rp/Bp low-dispersion spectroscopy for astrophysical studies.

R. Blomme: ***Hot Stars in the Gaia-ESO Public Survey***
The Gaia-ESO Public Survey will produce spectra of about 200,000 stars, using the VLT FLAMES instrument. This includes hot, massive stars in a number of selected clusters. I describe the on-going cluster selection as well as the work package responsible for analyzing the hot-star spectra.

SESSION IV: 24 JUNE AFTERNOON

J. Groh: ***Modelling the Wind and Photosphere of Massive Stars with the Radiative Transfer Code CMFGEN***
Massive stars are extremely luminous and characterized by mass loss through radiation-driven stellar

winds. The radiation emitted at the stellar surface may interact with the wind, making the analysis of the emerging spectrum a very challenging task. In addition to the luminosity, effective temperature, and surface gravity, several other stellar parameters impact the spectral morphology of these objects, remarkably the mass-loss rate and the wind terminal velocity. That is generally the case for OB supergiants, Luminous Blue Variables, and WR stars. CMFGEN (Hillier and Miller 1998) comprises the state-of-the-art in non-LTE radiative transfer and has been successfully applied to the above classes of objects over the last decade. The code assumes spherical symmetry, stationary outflow, and both photospheric and wind lines can be treated in non-LTE. Full line blanketing due to hundreds of thousands of spectral lines is included, as well as wind clumping. In this talk I will discuss the assumptions behind CMFGEN and present examples of models and spectroscopic analyses that can be done with CMFGEN.

S. Simon-Diaz: ***The IACOB Project (WP3: Quantitative Spectroscopic Analysis of Galactic OB stars)***

The IACOB spectroscopic survey of Northern Galactic OB stars is a long-term observational project aimed at building a multi-epoch, homogeneous spectroscopic database of high-resolution, high signal-to-noise ratio spectra of Galactic bright OB stars. At present, the database comprises more than 1000 spectra of about 200 stars with spectral types earlier than B2.

Associated to this unique spectroscopic dataset there are several working packages aimed at its scientific exploitation. Within the frame of WP3: Quantitative Spectroscopic Analysis, we may cite the development of a very powerful tool for the automatic analysis of optical spectra of OB stars based on a large grid of synthetic spectra computed with the FASTWIND stellar atmosphere code, and a line-profile fitting technique.

The tool, which provides a fast and objective way to determine the stellar parameters and the associated uncertainties of large samples of OB-type stars within a reasonable computational time, is not only being applied to Galactic stars, but also to other massive stars in external galaxies (for example, 30Dor/LMC - from the VLT-Tarantula FLAMES survey -, and IC1613).

In this talk I will present (1) the main characteristics of the FASTWIND grid and the automatic tool, and (2) some important outcomes from the IACOB project, with special emphasis in those results which will imply a mutual benefit between the IACOB and GAIA scientific projects (concerning Galactic Massive Stars).

A. de Koter: ***The VLT-FLAMES Tarantula Survey***

The VLT-FLAMES Tarantula Survey (VFTS) is an ESO Large Programme that has obtained multi-epoch optical spectroscopy of over 800 massive stars in the 30 Doradus region of the Large Magellanic Cloud (LMC). Detailed spectral classification and quantitative analysis of the O- and B-type stars in the VFTS sample, paying particular attention to the effects of rotational mixing and binarity, will be carried out in the next years to address fundamental questions in both stellar and cluster evolution. Here we present our modeling strategy for the O stars, employing the latest version of FASTWIND and Genetic Algorithm based fitting techniques. Though these results are based on optical spectra, first results on applying this method to infrared spectra will be presented as well.

Y. Chen: ***XSL: The X-Shooter Stellar Library***

We are building a new spectral library with the X-Shooter instrument on VLT telescope: XSL, the X-Shooter Spectral Library. We present here our progress in building XSL. XSL covers the wavelength range from the near-UV to the near-IR with a resolution of R~10000. At the present time we have collected spectra for nearly 400 stars. An important feature of XSL is that we have already collected spectra of more than 100 Asymptotic Giant Branch stars in the Galaxy and the Magellanic Clouds and of more than 100 hot stars in the disk of the Galaxy. I will discuss the current status and future plans for XSL.

POSTER ABSTRACTS

S. Van Eck: ***A Grid of MARCS Model Atmospheres for S Stars***
P1: S-type stars are late-type giants whose atmosphere are enriched in carbon and s-process elements because of either extrinsic pollution by a binary companion or intrinsic nucleosynthesis and dredge-up on the thermally-pulsing AGB. A large grid of S-star model atmospheres has been computed covering the range 2700 <= Teff (K) <= 4000 with 0.5 <= C/O <= 0.99. ZrO and TiO band strength indexes as well as VJHKL photometry are needed to disentangle Teff, C/O and [s/Fe]. A "best-model finding tool" was developed using a set of well-chosen indexes and checked against photometry as well as low- and high-resolution spectroscopy. It is found that applying M-star model atmospheres (i.e., with a solar C/O ratio) to S stars can lead to errors on Teff of up to 400 K. We constrain the parameter space occupied by S stars of the vast sample of Henize stars in terms of Teff, [C/O] and [s/Fe].

T. Morel: ***Using CoRoT and Kepler Targets as Benchmarks for Spectroscopic Analyses of Cool Stars***
P2: The stellar surface gravity is one of the most difficult quantities to estimate from spectroscopic data, with errors of the order of 0.2-0.3 dex being typical. In contrast, the values derived from studying the pulsation properties of the CoRoT and Kepler targets are thought to be largely model independent and accurate to within 0.05 dex. Performing a spectroscopic analysis of these stars hence offers the opportunity to assess the reliability of the classical gravity diagnostics used in cool stars, such as the ionization balance of iron or fitting strong pressure-sensitive lines.
This issue is discussed for solar-like and red giant stars observed by the CoRoT and Kepler missions. A hybrid method whereby the spectroscopic analysis is carried out fixing log g to the much more precise seismic value can be used to substantially narrow down the errors in the other parameters and ultimately abundances. This is illustrated by the results of an abundance study of a sample of red giants observed in the seismo fields of the CoRoT satellite.

J. Maldonado: ***Spectroscopic Properties of Stars with Circumstellar Debris Discs***
P4: The question of the origin and evolution of planetary systems is of fundamental importance for astrophysics. Dusty debris discs are signatures of planetary systems and, therefore, constitute valuable tools to provide new light in our understanding of how planetary systems form and evolve.
In this contribution we present the first results of an spectroscopic programme of a sample of stars with debris discs. High-resolution échelle spectra are used to determine metallicities, abundances, age (via lithium abundances, chromospheric activity) and kinematics (moving group membership).

A. Chiavassa: ***3-D Hydrodynamical Model Atmospheres: A Tool to Correct Radial Velocities and Parallaxes***
P5: I will present time-dependent, three-dimensional, hydrodynamical simulations of the whole convective envelope of massive evolved stars carried out with the radiation-hydrodynamic code CO5BOLD. Big efforts have been done to include a better treatment of opacities as well as an extension of the stellar parameters with higher numerical resolution. The final aim is the construction of a comprehensive grid of 3D global hydrodynamical simulations. I will explore the impact of the granulation pattern in the Gaia-G band on high resolution spectroscopy and intensity maps. I will focus in particular on the application to the radial velocity and parallaxes corrections to Gaia measurements.

L. Mahy: ***Quantitative Study of the O Stars in NGC 2244***
P6: NGC 2244 located in the Rosette Nebula is a young open cluster composed of seven O-type stars. A first paper focused on the multiplicity of these stars, revealed only one binary system out of the six studied stars. The binary fraction of this cluster (~17 %) has nothing in comparison to the average fraction measured on the nearby clusters (~44%). In order to better constrain this discrepancy, an

analysis based on the determination of the stellar and wind parameters of these stars with the CMFGEN atmosphere code was performed. The main results confirm that all the stars have an age between 1 and 5 Myr, and that the N surface abundance appears to be consistent with the evolutionary models for a population of stars of the same age. Moreover, this investigation exhibits the existence of dynamical interactions inside this young open cluster sufficiently strong to eject the hottest component from its centre.

F. A. Stap: ***Quantitative IR Spectroscopy of Massive Stars***
P7: Interest for NIR spectroscopy of massive stars has been dramatically increasing over the last decade. Because it allows one to observe objects inaccessible at optical wavelengths due to absorption, the IR domain offers a privileged window to study highly extinguished objects. Yet, detailed calibrations of the massive star properties at NIR wavelengths are still missing. In this context, we have acquired high resolution spectroscopy of several nearby massive stars using VLT/CRIRES, focusing on spectral lines of interest in the J, H, K and L bands. In this poster, we present the earliest results of our quantitative spectroscopic analysis. Using the unique combination of a genetic algorithm approach with the state-of-the-art non-LTE atmosphere model FASTWIND, we compare the stellar and wind properties as derived from the optical and the NIR regime. Future work and implications for NIR spectroscopy of massive stars are briefly discussed.

J. Zhang: ***Stellar Parameter Estimation for the LAMOST Survey***
P8: The LAMOST survey will observe millions of stars in the coming years to explore the origin, structure and evolution of the Milk Way. In order to derive the effective temperature, surface gravity, and metallicity from LAMOST spectra, our pipeline employed different synthetic stellar spectra libraries, which were calculated based on the newest MAFAGS atmospheric models and Kurucz 2003 atmospheric models. The validations with various tests on large empirical stellar spectral data sets with precisely calibrated parameters are presented in the paper. We will illustrate results from the spectra obtained during the LAMOST commissioning stage as well.

P. Koubsky: ***Gaia RVS Spectroscopy of Be Stars***
P9: It is expected that the RVS spectrograph on board the Gaia satellite will observe about 100,000 Be stars - early type non giant stars with emission lines - in the range 8470 - 8740 A. The RVS spectra of Be stars can show emission in Paschen lines (P16 - P13), in Ca II and N I lines with reasonable resolution (20,000). However, the H alpha line which is the primary indicator of disks or envelopes in Be stars will be covered with a very low resolution by the Gaia Bp/Rp instrument. The aim of the long-term ground-based project is to cover the H alpha and Paschen Gaia regions for many Be stars and check if a relation between properties of H alpha, Paschen and Ca II lines in Be stars could be established. No systematic study of such kind can be found in the literature.

P. Neyskens: ***Abundance Patterns in S-type AGB Stars to Set Constraints on Nucleosynthesis and Stellar Evolution Models***
P10: During their evolution on the AGB, S-type stars are the first objects to experience s-process nucleosynthesis and third dredge-ups, and therefore to exhibit s-process signatures in their atmospheres. Precise abundance determinations in S stars are of the utmost importance to set constraints on nucleosynthesis and stellar evolution models.
We present precise abundances of key s-process elements derived by using dedicated S-star model atmospheres. A special interest is paid to technetium (Tc), an element with no stable isotope. The detection of Tc is considered as the best signature that the S star is effectively populating the thermally-pulsing AGB phase of evolution.
The derived Tc/Zr abundances are compared, as a function of the derived [Zr/Fe] overabundances, with AGB stellar model predictions. The [Zr/Fe] overabundances are in good agreement with the model predictions, while the Tc/Zr abundances are slightly over-predicted. This discrepancy can help to set

better constraints on nucleosynthesis and stellar evolution models of AGB stars.

A. Jorissen: ***Chemically Tagging the Hyades Stream: Does it Partly Originate from the Hyades Cluster?***

P11: The Hyades stream has long been thought to be a dispersed vestige of the Hyades cluster. However, recent analyses of the parallax distribution, of the mass function, and of the action-space distribution of stream stars have shown it to be rather composed of orbits trapped at a resonance of a density disturbance. This resonant scenario should leave a clearly different signature in the element abundances of stream stars than the dispersed cluster scenario, since the Hyades cluster is chemically homogeneous. Here, we study the metallicity as well as the element abundances of Li, Na, Mg, Fe, Zr, Ba, La, Ce, Nd, and Eu for a random sample of stars belonging to the Hyades stream, and compare them with those of stars from the Hyades cluster. From this analysis: (i) we independently confirm that the Hyades stream cannot be solely composed of stars originating in the Hyades cluster; (ii) we show that some stars from the Hyades stream nevertheless have abundances compatible with an origin in the cluster; (iii) we emphasize that the use of Li as a chemical tag of the cluster origin of main-sequence stars is very efficient in the range 5500 - 6200 K, since the Li sequence in the Hyades cluster is very tight; (iv) we show that, while this evaporated population has a metallicity excess of ~0.2 dex w.r.t. the local thin disk population, identical to that of the Hyades cluster, the remainder of the Hyades stream population has still a metallicity excess of ~0.06 to 0.15 dex, consistent with an origin in the inner Galaxy; (v) we show that the Hyades stream can be interpreted as an inner 4:1 resonance of the spiral pattern: this then also reproduces an orbital family compatible with the Sirius stream, and places the origin of the Hyades stream up to 1 kpc inwards from the solar radius, which might explain the observed metallicity excess of the stream population.

EMERGENCY PHONE NUMBERS

in case of illness, accidents, wound care,

VUB Medical Office in Building Y

Phone: 02 629 23 00

Off Campus: emergency services

Phone: 100

INTERNET CONNECTION

- You can connect to the Internet in the meeting room and on the VUB campus.
- Make sure your laptop's WiFi is switched on and connects to the URBIZONE wireless network.
- Open your browser and point it to http://login.urbizone.be (it should point to it automatically).
- New users first have to register. Click on Registration and then on New User. Choose a Login Name and password (& confirm the password). Also provide your e-mail address at the last line of the form in case you forget your password. Press Save and then Continue in the URBIZONE welcome page to connect your laptop to the Internet.
- In case you forgot your password give your Login Name in the welcome page, click Registration below and choose Lost password? from the pull-down menu. Your URBIZONE password will be forwarded to your mailbox.
- You can connect to the URBIZONE network on campus inside and outside the VUB buildings.

SOME PRACTICAL INFO AT THE MEETING

- Bring your presentation on a USB stick and ask to upload it to the workshop laptop during the coffee and lunch breaks prior to your session. Please do not try to connect your own laptop to the projector yourself. In case you have large movies, computer animations, etc. that you want to show using your laptop please contact the LOC in advance. They will prepare it for you for projection.
- The meeting room can only be entered from the front side, so that latecomers can disturb the speakers. Please take a seat on time following the workshop program time schedule. If you are late wait until the ongoing talk finishes then enter the room.
- The door of the meeting room will stay open during the coffee breaks. It will be closed for lunch from 12:30 to 13:15. The meeting room and the poster room in Building Q are locked at 18:00 on 23 June.
- The lunches are served in the VUB restaurant at a self-service food-court. You can pay with your lunch ticket. You will have to pay for extra dishes and beverages. Vegetarian dishes are also available at the food-court. The restaurant is open from 11:30 to 13:45. Warm meals are only served between these hours. You can still order coffee, tea, soft-drinks, sandwiches, etc. in the restaurant building after 13:45 with your workshop lunch ticket.

M SUBWAY & TAXI

- The subway stop closest to the VUB is called Pétillon on Yellow Line 5 (walk towards VUB entrance 7 into the Schoofslaan and Vrijwilligerslaan).
- You can order a taxi at the VUB campus by calling TAXI VERTS 023494949. A ride from the VUB to the airport will cost about 30 Euros. You can make a taxi appointment at VUB entrance 11 on the Pleinlaan in front of (the oval) Building M.

PROCEEDINGS

- The submission deadline of the workshop proceedings is **31 Aug.** Use the Journal of Physics: Conference Series LaTeX template at http://great-esf.oma.be/proceedings.php for preparing your manuscript. Submit the PDF file to Great.esf@oma.be . The expected publication date is December 2011. In case you want to submit very long tables, large composite graphs, or extensive multi-media material (movies, computer simulations, etc.) please contact Great.esf@oma.be in advance.

Campus Etterbeek

Legend

Accommodation Office and Student Residence	P
Applied Linguistics (Erasmushogeschool Brussel)	5
Arts and Philosophy	B/C
Aula Q	Q
Bank-ING branch	F
Bicycle parking	2
Bicycle repair point	14
Bookshop (course material)	17
Cafeteria	R
CAW Mozaïek (Centre for General Social Work)	Y
Central Store for Suppliers (via entrance 13 or 6)	F
Centre for Adult Education (CVO language school)	D
Centre for Study and Coaching	F
Copyland	16
Crazy Copy Center	E
Economics, Social and Political Sciences & Solvay Business School	B/C
Engineering	K/Z
Esplanade	1
Facility Management	T
GalerY'	Y'
Health Centre	Y
HealthCity fitnessclub	L
Huis van het Hout	13
Institute for Language Education (ITO)	5
International Relations and Mobility Office (IRMO)	13
Job Service	Y
KultuurKaffee	Y'
Law and Criminology	B/C
Mail Dispatching (via entrance 13 or 6)	F
Medical Services	Y
Opinio café	3
Physical Education and Physical Therapy	L
Pleinlaan 5	5
Pleinlaan 9	9

Pleinlaan 15	15
Psychology and Education Sciences	B/C
Rectorate and Administration	M
Restaurant	R
Sciences and Bio-engineering Sciences	F / G
Security	F
Sjerp-Dilemma	Y
Social Services for Students	Y
Sport Service	L
Sports Accommodation	L
Sports Field	6
STOA	4
Student Counselling and Advice	Y

Student Information Hub	D
Student Policy	Y
Student Residence Nieuwelaan	8
Student Residence on campus	7
Student Residences Schoofslaan and Triomflaan	10
Swimming pool	L
't Complex	L
University Library	B
Vesalius College	12/13

Student Information Hub

Campus entrance

Pedestrian only entrance

Walking distance to Student Information Hub

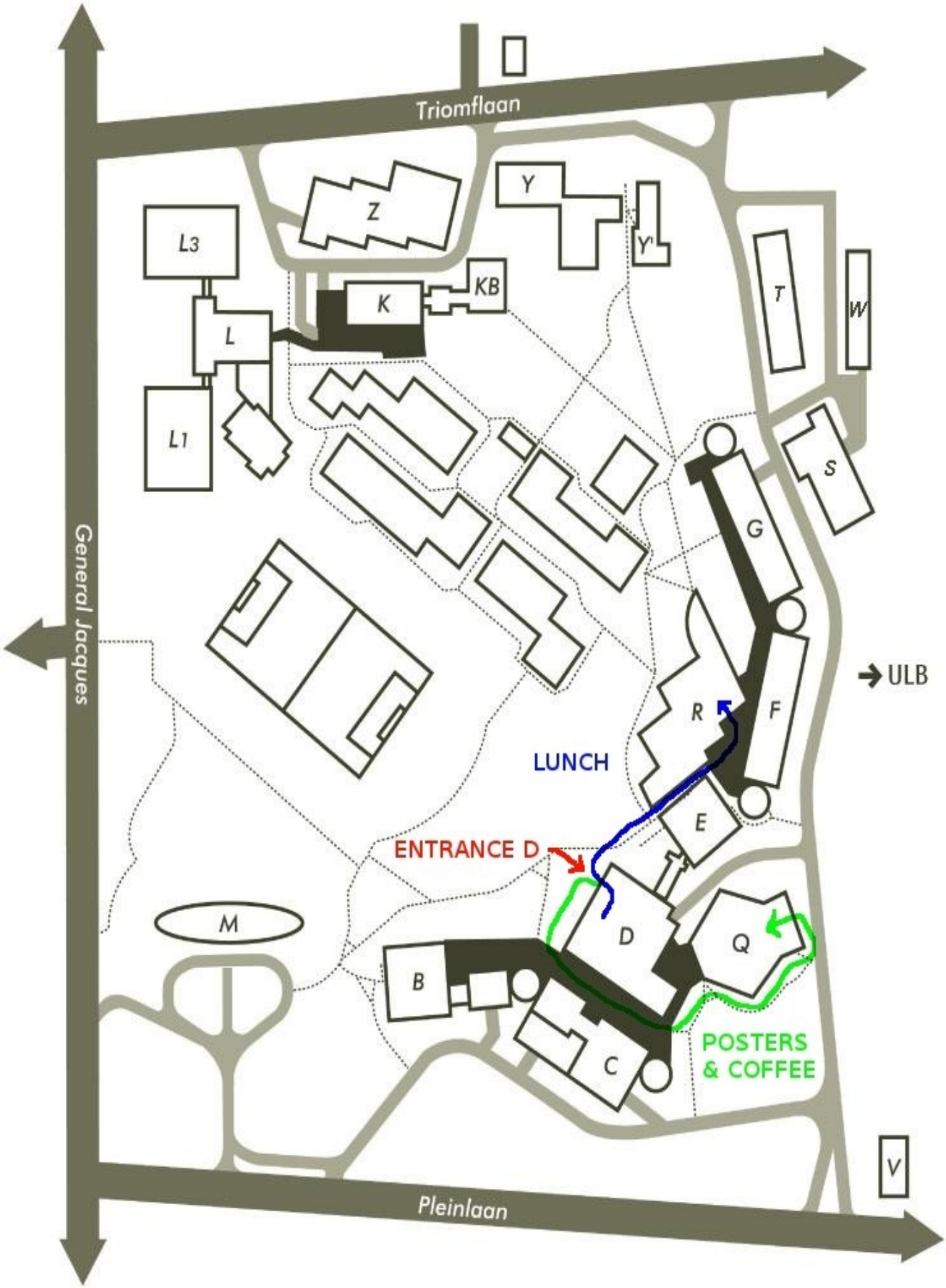
Food and Beverage

Swimming pool

Car park

Underground car park

Security [T] 02 629 21 76


Triomflaan
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6 Koning Boudewijn / Roi Baudouin
Heysel / Heizel
Houba-Brugmann
Stuyvenbergh
Bockstael
Pannenhuis
Belgica
4 Esplanade
3 Gare du Nord / Noordstation
2 6 Simonis (Elisabeth)
Ribaucourt
Yser / IJzer
Rogier
Botanique / Kruidtuin
2 Simonis (Leopold II)
Ossegem / Osseghem
Zwarte Vijvers / Etangs Noirs
Comte de Flandre / Graaf van Vlaanderen
Gare Centrale / Centraal Station
Park / Parc
Madou
Arts-Loi / Kunst-Wet
Maalbeek / Maelbeek
Schuman
Merode
Montgomery
Joséphine-Charlotte
Gribaumont
Tomberg
Roodebeek
Vandervelde
Alma
Kraainem / Crainhem
1 Stockel / Stokkel
Beekkant
Sint-Katelijne / Sainte-Catherine
De Brouckère
Bourse / Beurs
Trône / Troon
Thieffry
Pétillon
Hankar
Delta
Beaulieu
Demey
5 Herrmann-Debroux
1 Weststation / Gare de l'Ouest
Anneessens
Naamsepoort / Porte de Namur
Lemonnier
Porte de Hal / Hallepoort
Louise / Louiza
Munthof / Hôtel des Monnaies
Jacques Brel
Aumale
Delacroix
Clemenceau
Zuidstation / Gare du Midi
Saint-Guidon / Sint-Guido
Veeweide / Veeweyde
Bizet
Sint Gillisvoorplein / Parvis de Saint-Gilles
Horta
Albert
5 Erasme / Erasmus
Eddy Merckx
CERIA / COOVI
Het Rad / La Roue
4 Stalle
3 Churchill