VIII SERBIAN CONFERENCE ON SPECTRAL LINE SHAPES IN ASTROPHYSICS

6-10 June 2011, Divčibare, Serbia

BOOK OF ABSTRACTS

Eds. Luka Č. Popović, Darko Jevremović and Dragana Ilić

Astronomical Observatory

Belgrade, 2011

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SCORPIO AT THE 6-M TELESCOPE: CURRENT STATE AND PERSPECTIVES FOR SPECTROSCOPY OF GALACTIC AND EXTRAGALACTIC OBJECTS

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Significant part of observations at the Russian 6-m telescope is carried out using multi-mode focal reducer SCOPRIO. Lot of scientific data have been collected using observations in the direct imaging, slit spectroscopy and Fabry-Perot interferometry modes during past ten years. Some results of these observations are considered in this review. Also we present a short description of new generation instrument SCOPRIO-2 (SCORPIO-New).

Invited lecture

EXTRAGALACTIC FIR/SUBMM SPECTROSCOPIC RESULTS FROM THE HERSCHEL SPACE OBSERVATORY

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The far-infrared and submillimetre (FIR/submm) window is amongst the least explored spectral regions of the electromagnetic spectrum. It is, however, one of the most interesting regions to study the interstellar medium of both the Milky Way and other galaxies. Most of the emission in the FIR/submm region is thermal continuum emission from interstellar dust. However, it also contains thousands of emission and absorption lines tracing the neutral, ionized and molecular phases of the interstellar medium.

We present new spectroscopic results on galaxies in the nearby and high-z universe, based on observations taken with the Herschel Space Observatory. In nearby galaxies, FIR/submm observations can trace various transitions of mainly CO and H_2O and enable us to map the conditions of the dense interstellar medium. [CII] line observations in nearby, low-metallicity dwarf galaxies indicate a missing phase of the interstellar medium that can be connected to the dark gas recently detected by Planck. In the high-z universe, mm follow-up observations of Herschel detected ULIRGs (and in particular, lensed high-z ULIRGs) prove to be a unique way to trace not only the redshift, but also the conditions in the interstellar medium.

Invited lecture

PLASMA GENERATED WITH GAS MIXTURES AT ATMOSPHERIC PRESSURE

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Several applications, such as metal surface nitriding, medical instrument sterilization and chemical analysis have been developed or improved using a gas mixture as plasmogen gas.

Research carried out on these subjects covers the aspect of knowing the processes that take place in the plasmas which depend on the densities of the different plasma particles and their energy values. Because of this it is important to measure the values of plasma parameters (densities and temperatures) in order to comprehend the physical behaviour of plasmas used with the purpose of their practical applications.

Emission spectroscopy techniques are non-invasive and allow us to obtain information about the plasma parameters analyzing the radiation emitted by the discharge. In this way, starting from the intensities and broadenings of the spectral lines, which appear in these spectra, we obtain information regarding the plasma parameters.

When more than one kind of gas is present in a discharge the interaction among the different particles can have an important influence over the profiles of the plasma spectral lines. Therefore, research on the application of the methods developed for single gas plasmas to gas mixture plasmas is necessary.

This research has been supported by the Ministry of Science and Innovation (Spain) and FEDER Funds within the framework of the projects ENE2005-00314 and ENE2008-01015.

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Invited lecture

STARK BROADENING AND WHITE DWARFS

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White dwarf and pre-white dwarf atmospheres are one of the best examples for the application of Stark broadening research results in astrophysics, due to plasma conditions very favorable for this line broadening mechanism. For example in hot hydrogen-deficient (pre-) white dwarf stars T_{eff} = 75 000 K - 180 000 K and log g = 5.5-8 [cgs]. Even for much cooler DA and DB white dwarfs with typical effective temperatures of 10 000 K - 20 000 K, Stark broadening is usually the dominant broadening mechanism.

We will review the classification and evolution of white dwarfs, in particular from the point of view of the significance of Stark broadening and our work on investigation of this line broadening mechanism in atmospheres of such stars.

We will discuss also the organization and search of atomic data needed for such investigations, especially their organization in the STARK-B database (http://stark-b.obspm.fr/), and the new search facilities which will provide the collective effort to develop Virtual Atomic and Molecular Data Center (VAMDC - http://vamdc.org/, Dubernet et al., 2010).

References

Dubernet, M. L. et al.: 2010, *J. Quant. Spectrosc. Radiat. Transfer*, **111**, 2151.

Invited lecture

STARK BROADENING OF CARBON AND OXYGEN LINES IN HOT DQ WHITE DWARF STARS: RECENT RESULTS AND APPLICATIONS

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White dwarfs stars are traditionally found to have surface compositions made primarily of hydrogen or helium. However, a new family has recently been uncovered, the so-called Hot DQ white dwarfs, which have surface compositions dominated by carbon and oxygen with little or no trace of hydrogen and helium. Deriving precise atmospheric parameters for these objects (such as the effective temperature and the surface gravity) requires detailed modeling of spectral line profiles. Stark broadening parameters are of crucial importance in that context. I will thus present the results from our new generation of model atmosphere including the latest Stark broadening calculations for the CII and OII ions (Ben Nessib, Sahal-Bréchot, Dimitrijević).

Invited lecture

THE EMISSION LINES IN QUASARS - WHAT THEY TELL US

G. J. Ferland

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I will discuss the current treatment of line formation, and resulting profiles, in the spectral simulation code Cloudy. I will emphasize the broad line region of AGN. Particular emphasis will be placed on unsolved problem related to the formation of the ultraviolet and optical emission lines.

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VARIABILITY OF DOUBLE-PEAKED EMISSION LINES IN AGNs AS PROBE OF THE BLR STRUCTURE

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Double-peaked emission lines, observed in a subset of AGNs, are regarded as a kinematic signature of line production in an accretion disk. The double-peaked line profile is observed to vary greatly with time, even becoming single-peaked at times in a few AGNs, highlighting the connection between double-peaked emitters and the general population of AGNs. Monitoring programs of double-peaked emitters often require many years since the variability timescale is several months. In order to optimize these monitoring programs, we target double-peaked emitters with low black holes mass, allowing us to build large multi-wavelength datasets in only one or two observing cycles. Then, we develop models of broad line region structure that include an accretion disk and an outflow and compare them with the observed variability of double-peaked line profiles, which allows us to put some constraints on the parameters in our models.

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HABITABLE ZONES AROUND MAIN SEQUENCE STARS: APPROXIMATIONS FOR THE SPECTRAL ENERGY DISTRIBUTION

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The habitable zone (HZ) around a given central star is defined as the region within which an Earth-like planet might enjoy the moderate surface temperatures required for advanced life forms. At present, there are several models calculating the habitable zone. One class of models utilises climatic constraints for the existence of liquid water on a planetary surface. Our approach is based on an integrated Earth system analysis that relates the boundaries of the HZ to the limits of photosynthetic processes. We start with the calculation of the HZ for the solar system and extend it to other central stars different from the Sun. During a star's main sequence lifetime there is usually an increase in luminosity and changes in effective temperature. The change in star's effective temperature has the following effect: for two stars with the same bolometric luminosity the redder will have a greater proportion at infrared wavelengths and is more effective in raising the planetary surface temperature. This effect is taken into account by a parabolic relation between the stellar flux and the star's effective radiation temperature. In this way, we are able to calculate the HZ for central stars of different masses, including F- and M-stars. We apply our model to calculate the HZ around the M-type star Gliese 581 and discuss the possible existence of two habitable planets: Gliese 581d at the outer edge of the HZ and Gliese 581g at an almost perfect Goldilock position.

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Invited lecture

NEW PARADIGMS FOR THE NATURE OF THE LINE- AND CONTINUUM-EMITTING REGIONS OF AGNs

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Although the general picture of how AGNs function has become clearer in recent years, major observational puzzles threaten to undermine our fundamental beliefs about the AGN phenomenon. These puzzles include AGNs with extremely asymmetric emission line profiles, inconsistent multi-wavelength variability, rapid apparent changes in the direction of gas flow and the sizes of emitting regions, a curious insensitivity of gas in some narrow velocity ranges to changes in the ionizing continuum, and differing dependencies of polarization on gas velocity. I show that all these puzzles can be readily explained by off-axis variability. I discuss observational tests of the hypothesis.

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PLASMA POLARIZATION IN MASSIVE ASTROPHYSICAL OBJECTS

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Macroscopic plasma polarization, which is created by gravitation and other mass-acting (inertial) forces in massive astrophysical objects (MAO) is under discussion. Non-ideality effects due to strong Coulomb interaction of charged particles are introduced into consideration as a new source of such polarization. Simplified situation of totally equilibrium isothermal star without magnetic field and relativistic effects is considered. The study based on variational formulation of equilibrium statistical mechanics. It leads to conditions of constancy for generalized (electro)chemical potentials and/or conditions of equilibrium for all forces acting on each charged specie. New "non-ideality force" appears in such consideration. Hypothetical consequences of gravitational, inertial and non-ideality polarization on thermo- and hydrodynamics of MAO are under discussion.

References

Iosilevskiy I.: 2009, *Contrib. Plasma Phys.*, **49**, 755, astro-ph:0902.2386v1

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KINEMATICS AND STRUCTURE OF THE BROAD LINE REGION IN AGN

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We will present some results of selected AGN observed with the 10m Hobby-Eberly Telescope. Based on spectral variability campaigns we calculate the distance of the line emitting regions from the center, the structure in the broad-line region for different emission lines, as well as the mass of the central black hole. In a vew cases we got information on the structure and velocity field of the broad-line region based on line segment variations - the so called 2D-reverberation mapping method.

We will introduce a newly detected trend of emission line width with respect to the emission line shape in the spectra of active galaxies. We demonstrate that broad-line active galactic nuclei rotate faster than narrow-line ones.

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VAMDC AS A RESOURCE FOR ATOMIC AND MOLECULAR DATA AND THE NEW RELEASE OF VALD

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The Virtual Atomic and Molecular Data Centre (VAMDC, see M.L. Dubernet et al. 2010, JQSRT 111, 2151) is an EU-FP7 e-infrastructure project devoted to building a common electronic infrastructure for the exchange and distribution of atomic and molecular data. It involves two dozen teams from six EU member states (Austria, France, Germany, Italy, Sweden, United Kingdom) as well as Russia, Serbia, and Venezuela. Within VAMDC scientists from many different disciplines in atomic and molecular physics collaborate with users of their data and also with scientists and engineers from the information and communication technology community. In this talk an overview of the current status VAMDC and its capabilities will be provided. In the second part of the talk I will focus on one of the data bases which have become part of the VAMDC platform, the Vienna Atomic Line Data Base (VALD). VALD has become a well-known resource of atomic data for spectroscopy particularly in astrophysics. A new release, VALD-3, will provide numerous improvements over its predecessor. This includes both the data contents which feature the inclusion of new sets of atomic data for both precision spectroscopy (i.e., with data for observed energy levels) as well as opacity calculations (i.e., with data involving predicted energy levels). Data for selected diatomic molecules is now included in the distribution and a new system for data distribution and data referencing provides for more convenience in using the enhanced and improved sets included in the third release of VALD.

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Invited lecture

THE INFLUENCE OF THE SPECTRAL ENERGY DISTRIBUTION ON BROAD-LINE REGION EMISSION IN AGN AND QUASARS

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The broad-line region (BLR) emission of Active Galactic Nuclei and Quasars is powered by photoionization by the powerful continuum of the central engine. While broadly similar from object to object, there is a range of behavior, characterized by e.g., the Baldwin Effect and the Boroson & Green Eigenvector 1. At the same time, the spectral energy distribution (SED) of the continuum is observed to vary from object to object; this behavior is most commonly described in terms of the well-known anti-correlation between the UV luminosity and α_{ox}, the point-to-point spectral index between the UV and X-rays. In this talk I will discuss our work from the past $\sim$ 10 years on the influence of the shape of the spectral energy distribution on broad-line region emission. We have found simply-understood phenomena, e.g., in which a hard SED has been shown to be responsible for strong high-ionization lines. We have also found less direct links between the SED and the BLR emission, including the "cooling-challenged" BLR, as well as evidence for modification of the SED by transmission through a wind. Finally, I will describe the results of recent large-scale modeling efforts to understand in a very general way the link between the broad-line region emission and the spectral energy distribution.

Invited lecture

A PHOTOIONIZATION METHOD FOR BLACK HOLE MASS ESTIMATION

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Determining the masses of the central compact objects believed to power all active galactic nuclei is relevant to our understanding of their evolution and of their inner workings. Keys to present-day mass estimates are the assumption of line broadening due to virial motion of the emitting gas, and a correlation between distance of the broad-line emitting region from the central compact object and active nucleus luminosity. I discuss the merit and the limitations of an alternative method based on the knowledge of the physical conditions of the broad line gas derived after an appropriate multi-component analysis of the line profiles. This "photoionization method", applied to UV intermediate-ionization lines shifted in the visual band appears to be promising for at least a sizable population of high-z quasars.

Invited lecture

MICROLENSING BASED STUDIES OF THE UNRESOLVED STRUCTURE OF AGN AND THE COMPOSITION OF LENS GALAXIES

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Multiple images of quasars formed by gravitational lensing are typically seen through the lens galaxy. The granulation of the galaxy in stars or other compact objects induces local (microscopic) but strong fluctuations in the gravitational potential that subdivide each image in several micro-images changing the expected flux of the image (flux anomalies). This phenomenon, quasar microlensing, allows to study both the unresolved structure of the source and the composition of the lens galaxy. In particular, we will present some studies of microlensing statistics useful to measure the quasar source size and the mass of microlenses in the lens galaxy.

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RECENT RESULTS FOR WIDTHS OF LINES IMPORTANT IN THE SPECTRA OF COOL STARS

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Accurate pressure broadened profiles are required for the modelling of atmospheres of cool stars, including the Sun. The accuracy of calculations depends on two main considerations: the accuracy of the interatomic potentials that are used and the validity of the theory of spectral line broadening that is employed. The present fully quantum-mechanical calculations of the line widths are based on the original theory of Baranger in which the problem is reduced to considering only binary atom-perturber collisions, but in which the additional impact approximation is not made. This means that the complete wavefunctions for the atom-atom scattering processes are included rather than just their asymptotic forms.

Results will be shown for applications to various spectral lines including lines of alkalis and rare gases broadened by hydrogen and rare gas perturbers.

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Invited lecture

THE STARBURST - AGN CONNECTION: A CRITICAL REVIEW

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Nuclear activity and star formation processes represent two key elements in the evolution of galaxies across the cosmic ages. In spite of the very different physical backgrounds, several arguments suggest that they should be closely connected. On the basis of simple theoretical considerations, indeed, the transport of appreciable amounts of fuel to the AGN scale is very likely to trigger star formation in the gas. Young stellar populations, in their turn, are expected to affect the properties of the inter-stellar medium, leading to a complex balance of interactions among nuclear activity and star formation. This scenario is also supported by the observation of Super Massive Black Holes and host galaxy properties, which strongly suggest a common evolutionary track. However, despite several years of extensive investigation, the relationship among the two processes still has to be properly explained. Here we provide a careful review of some of the most important observations, which are relevant to the issue of the connection among AGN and starburst events. Based on a wide sample of observations, we present a careful analysis of the spectral signatures connected with AGN and star formation activity. Expanding the concept of the distinction among star forming galaxies and true active nuclei, we provide systematic evidence for a role of recent starburst events in the circum-nuclear regions of active galaxies and we discuss the possibility of its influence onto the AGN environment. We further analyze the age, mass, and metallicity properties of star forming and active galaxies, illustrating that they are arranged in a sequence that is consistent with the identified relation.

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Invited lecture

COMPARISONS AND COMMENTS ON ELECTRON AND ION IMPACT PROFILES OF SPECTRAL LINES

S. Sahal-Bréchot[1], M. S. Dimitrijević[2] and N. Ben Nessib[3]

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Stark broadening theory is now mature and is currently exploited for calculating many data of widths and shifts for numerous lines of many elements and various degrees of ionization that are needed for spectroscopic diagnostics and modelling in astrophysics, laboratory and technological plasmas. A great number of data, obtained through the semi-classical perturbation theory, have been calculated by our research team; tables have been published in international journals for many important neutral atom and ion emitters and typical needs of temperatures, and electron and ion densities. They are currently implemented in the STARK-B database which participates to the European effort within the VAMDC (Virtual Atomic and Molecular data Centre). Despite of that, a great number of data are still missing and their orders of magnitude would at least be welcome. In the present lecture, we will revisit the comparison, orders of magnitudes and trends of the Stark widths and shifts in the impact approximation, by considering and discussing their semiclassical perturbation expressions: electron versus positive ion collisions, trends within ion perturber charges and masses, charges of the ion emitters, atomic structure and quantum numbers of the involved atomic levels, and so on. We will also emphazize the necessity of providing fitting formulae, since their results are essential for the modelling codes of stellar atmospheres and stellar envelopes. The coefficients of our proposed fitting formulae will be inserted in STARK-B.

STARK-B: http://stark-b.obspm.fr
VAMDC: http://www.vamdc.eu

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Invited lecture

OPTICAL SPECTROSCOPY WITH THE TECHNOLOGY OF VIRTUAL OBSERVATORY

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The contemporary astronomy is flooded with a exponentially growing petabyte-scaled data volumes produced by powerful ground and space-based instrumentation as well as a product of extensive computer simulations and computations of complex numerical models. The efficient organisation and seamless handling of this information avalanche stored in a world-wide spread heterogeneous databases and the facilitation of extraction of new physical knowledge about the Universe is a primary goal of the rapidly evolving astronomical Virtual Observatory (VO). We give an overview of current spectroscopic capabilities of VO and identify the future requirements indispensable for detailed multi-wavelength analysis of huge amounts of spectra in a semi-automatic manner.

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Invited lecture

STOCHASTIC PROCESSES APPLIED TO LINE SHAPE CALCULATIONS

R. Stamm, D. Boland, H. Capes, M. Christova, R. Hammami, M. Koubiti, Y. Marandet, A. Mekkaoui, L. Mouret, J. Rosato

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Accurate line shapes are required for the diagnostic of various laboratory and astrophysical plasmas. For example, the determination of the stellar parameters is often based on hydrogen line profiles, lines which are also commonly used for the density diagnostic of laboratory plasmas. Detailed line shapes are also needed for an accurate calculation of the plasma opacity, a radiative property essential for the modeling of plasmas. Stark broadening calculations are performed with different approaches, based on the particle or the microfield point of view. A particle point of view is adopted in the impact theory (Griem, 1964) and unified theory (Smith et al. 1969; Voslamber 1969) often used for a description of electron broadening. A standard approach of Stark broadening takes a microfield point of view for the ionic perturbers. Neglecting the motion of the ions then requires the knowledge of the one and only probability density function (PDF) of the static microfield P(E). For many couples of plasma conditions and line transition, ion dynamics has to be retained, motivating the development of different methods: kinetic theory (Dufty 1969), Monte carlo type simulations (Stamm et al. 1984), and stochastic processes (Brissaud and Frisch 1971, Seidel 1977, Stehle 1994). We will discuss these approaches in conditions of low density plasmas for which the ion perturbers can never be treated with a static approximation. Stochastic processes then make use of other statistical properties of the microfield like the PDF of the time intervals for a microfield change. We will take a look at the accuracy vs. efficiency trade-offs of the algorithms using the microfield point of view, discuss the relevance of the improvement of stochastic processes, and of their possible application to neutral broadening.

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Invited lecture

BROAD-LINE PROFILES OF QUASARS: ARE THERE TWO QUASAR POPULATIONS?

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The last ten years have seen large databases of moderate resolution and s/n spectra for Type 1 AGN. We focus on Hβ where the largest databses exist. Are broad Hβ profiles basically all the same or is there evidence for significant diversity? We will show that at low redshift (z<0.8) there is not only diversity but evidence for a real dichotomy in broad line properties of quasars which affects all inferences taken from broad line measures. Sources with FWHM Hβ = 1 − 4000 km/s (we call them Population A) show simple Lorentz-like profiles that likely yield the most reliable black hole mass estimates. Broader Hβ profiles (population B) are more complex and require at least two components for an adequate parametrization. Broad Hβ profiles for almost all radio-loud sources fall in this category. We explain how this profile description changes at higher redshift.

Progress reports

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Progress report

A STATISTICAL STUDY OF THE UV Si IV RESONANCE LINES' PARAMETERS IN 20 Be STARS

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Many hot emission stars present absorption lines with complex profiles. These complex profiles are explained if we consider that they result from a number of Satellite Absorption Components (SACs), which are created in different density regions. Here, we study the complex profiles of the Si IV resonance lines $\lambda\lambda$ 1393.755, 1402.77 Å in the spectra of 20 Be stars, using the Gauss-Rotation model (GR model), with which we also calculate the kinematical and some physical parameters of the regions where these lines are created, such as the absorbed or emitted energy, the column density and the optical depth.

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6-10 June 2011, Divčibare, Serbia
Book of Abstracts, Eds. L. Č. Popović, D. Jevremović and D. Ilić
Astronomical Observatory Belgrade, 2011

Progress report

DEPENDANCE OF EXCESSIVELY BROADENED Hα PROFILE ON CATHODE MATERIAL AND GAS PRESSURE IN A GLOW DISCHARGE

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Excessive Doppler broadening of hydrogen lines has been detected in various types of laboratory plasma for over two decades. However, the exact cause of this phenomenon is a subject of an ongoing debate. The collision model explains this broadening as coming from acceleration of the ions in the electric filed, charge exchange processes, and subsequent backscattering from the cathode. It was shown previously that width and shape of hydrogen lines in glow discharge depends on the cathode material. In this paper the collision model for excessive broadening was tested by determining the specific conditions in which the use of material with reduced atom backscattering alters the line shape and space distribution. Copper and graphite cathodes were used in an abnormal glow discharge. Investigation was performed in two orthogonal directions of observation in pure hydrogen and argon-hydrogen mixture. Line profiles were analyzed using the fitting procedure for decomposition of the profile into components that correspond to different excitation processes. It is shown that magnitude of the left wing of Hα profile is reduced only at low pressures and high voltages. Shape of the profile and space distribution is found to depend on discharge parameters for both cathode materials.

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Progress report

SPECTRAL LINES MEASUREMENTS IN CLUSTER GALAXIES: HINTS ON THEIR STAR FORMATION HISTORY

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The Wide-field Imaging Nearby Galaxy cluster Survey (WINGS) is a project aiming at the study of the cosmic variance of the cluster population in the local universe ($z< 0.07$) and the influence of environment on the physical properties of cluster galaxies. This survey has provided the astronomical community with a high quality set of photometric and spectroscopic data of 77 galaxy cluster. The study of such a large amount of objects requires the development of automatic tools capable of extracting as much information as possible from the data. I will describe a new method to automatically measure the equivalent width of spectral lines with a good accuracy. In this way it is possible to easily classify galaxies according to the presence/absence and intensity of given lines, namely [OII] Hδ, reflecting in this way their stellar content. Based on these widely used spectral classification criteria, we give a broad but still significative description of the characteristics of star-forming and post-starburst galaxies in local clusters, as function of the cluster's characteristics.

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Progress report

AB INITIO DETERMINATION OF ATOMIC STRUCTURE AND STARK BROADENING PARAMETERS: Pb IV AND RECENT RESULTS

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In this work, we present a review of our previous ab initio calculations of Stark broadening parameters. Those results are determined using semi-classical perturbation method for Stark width and shift calculations and SUPERSTRUCURE (SST) code for determination of atomic structure. SST code takes into account configuration interaction and relativistic effects are introduced as perturbation of the non-relativistic Hamiltonian.

Triply ionized lead (Pb IV) is characterized by a strong resonance lines and it is a candidate for spectroscopic detection in hot DA white dwarfs. Pb IV resonance lines are also detected in photospheres of subdwarfs stars.

New results are also presented for some spectral lines of Pb IV of the type $5d^{10}nl$ - $5d^{10}n'l'$. Energy levels and oscillator strengths are calculated using Hartree-Fock Relativistic approach (HFR) and Stark broadening parameters are determined using semi-classical perturbation approach. Stark widths and shifts are presented as a function of temperature for perturber density of 10^{17} cm^{-3}. Such data are important for laboratory and technological plasmas and also for modelling and spectral diagnostics of stellar atmospheres.

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Progress report

SPECTRAL SYNTHESIS AS A TOOL FOR STELLAR AND GALACTIC ASTRONOMY CHALLENGES AND PERSPECTIVES

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Atmosphere models and theoretical spectra are an essential instrument in the analysis of stellar atmospheres, and by extension, provide a fundament for a variety of fields such as stellar evolution, studies of planetary systems and galactic chemical abundances. Wide field surveys including future space missions and the rapidly evolving power of multi-object and integral field spectroscopy are going to provide an unprecedented wealth of observational data. The are creating an increased demand for extensive spectral databases that can presently only be satisfied by classical tools of 1D stellar atmospheres and spectral synthesis. At the same time, obtaining high precision spectral models requires an accurate treatment of convection effects, both due to the impact of convective energy transport on the atmospheric temperature structure and of the turbulent velocity field on line broadening. Both affect line formation and limb darkening, and are inferred from 3D radiative hydrodynamic (RHD) simulations, which can only be performed for a select set of model parameters with today's computational resources. I will discuss the benefits 1D spectral models can gain from RHD simulations and their limits, as well as the status of the treatment of NLTE effects, and outline perspectives for an improved parameterised convection treatment.

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Progress report

A COMPLEX STELLAR LINE-OF-SIGHT VELOCITY DISTRIBUTION IN NGC 524

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We present the detailed study of the stellar and gaseous kinematics of the high luminous nearly face-on lenticular galaxy NGC 524 derived from long-slit spectroscopic observations obtained with the Russian 6-m telescope and the IFU data from the SAURON survey. The analysis of the stellar line-of-sight velocity distribution (LOSVD) has revealed the presence of a strong asymmetry, that led to non-physical values of the h3 and h4 parameters in the Gauss-Hermite parametrization. We developed a non-parametric recovery technique requiring no a priory knowledge of the LOSVD. We confirmed a strong asymmetry of the NGC 524 LOSVD using this technique. We propose a two-component model of spectra where different stellar population components are convolved with pure Gaussian LOSVD. This approach is based on the NBursts full spectral fitting technique. We discuss the origin of the complex stellar LOSVD and the gaseous kinematics of NGC 524.

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Astronomical Observatory Belgrade, 2011

Progress report

OPTICAL EMISSION LINES AND THE X-RAY PROPERTIES OF TYPE 1 SEYFERT GALAXIES

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The spectrum of Type 1 Seyfert galaxies is characterized by prominent broad emission lines and by the presence of a strong continuum of ionizing radiation. In the framework of the accreting black hole model, which provides the most viable interpretation of nuclear activity in galaxies, the broad emission line profiles and intensities carry fundamental information concerning the dynamics of the line emitting plasma and its ionization properties. In view of the extremely compact nature of the Broad Emission Line Region (BELR) and of the ionizing radiation source, a thorough analysis of the spectra originated by these components represents the key to investigate the physics behind Active Galactic Nuclei (AGN). In this contribution we report on the study of the optical emission lines and X-ray spectra of a sample of Type 1 AGN, collected at the *Sloan Digital Sky Survey* database and observed by the *XMM-Newton* satellite. Exploiting the different instruments carried onboard *XMM*, we identify the spectral components of the soft and hard energy bands (in the range from 0.3 keV up to 10 keV). The properties of the X-ray continuum and of the Fe Kα line feature are investigated in relation to the optical broad emission line profiles and intensity ratios. The resulting picture of emission, absorption and reflection processes is interpreted by means of a BELR structural model that was developed on the basis of independent optical and radio observations.

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Progress report

OBSERVATIONS OF HCN HYPERFINE LINE ANOMALIES TOWARDS LOW AND HIGH MASS STAR-FORMING CORES

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HCN is becoming a popular molecule for studying star formation in both low and high mass regions and for other astrophysical sources from comets to high red shift galaxies. However, a major and often overlooked difficulty with HCN is that it can exhibit dramatic non-LTE behaviour in its hyperfine line structure. Individual hyperfine lines can be strongly boosted or suppressed. In low mass star forming cloud observations, this could possibly lead to large errors in the calculation of opacity and excitation temperature while in massive star forming clouds, where the hyperfine lines are partially blended due to turbulent broadening, errors will arise in infall measurements that are based on the separation of the peaks in a self-absorbed profile. This is because the underlying line shape is unknown if hyperfine anomalies are present. We present a first observational investigation of these anomalies across a wide range of conditions and transitions by carrying out a survey of low-mass starless cores (in Taurus and Ophiuchus) and high mass protostellar objects (in the G333 giant molecular cloud) using hydrogen cyanide (HCN) J=1-0 and J=3-2 rotational lines. We quantify the degree of anomaly in these two lines by considering ratios of individual hyperfine lines compared to LTE values (R_{02} and R_{12}, see figure). We find that all the cores observed demonstrate some degree of anomaly while many of the lines are severely anomalous. We conclude that HCN hyperfine anomalies are common in both lines in both low mass and high mass protostellar objects and we discuss the differing hypotheses for the generation of the anomalies in light of the results and the implications for the use of HCN as a dynamical tracer. We also present model fits to selected low mass starless cores in both HCN lines as well as the HCN J=1-0 observations of several of the high mass protostellar cores. The radiative transfer code that was used has been equipped with a newly calculated, self-consistent, set of hyperfine collisional rate coefficients complete with quasi-elastic rates. Our conclusion is that current 3D non-LTE radiative transfer codes are incapable of matching the observed anomalous hyperfine lines especially amongst HCN rotational transitions and that there is much need for development of a 3D non-LTE code that takes account of the overlap of molecular transition lines.

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Astronomical Observatory Belgrade, 2011

Progress report

A STUDY OF THE C IV BALs IN HiBALQSOs SPECTRA

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When Broad Absorption Lines (BALs) appear in the spectra of quasars, they have very complex profiles, which cannot be fitted with a known physical distribution. In order to explain these profiles, we suppose that the Broad Absorption Line Regions (BALRs) are not homogeneous but they consist of a number of density regions or ion populations with different physical parameters. Here, we study the UV C IV BALs in the spectra of a group of High ionization Broad Absorption Line Quasars (Hi BALQSOs). Using the Gauss-Rotation model (GR model), we calculate some kinematical parameters of the BALRs, where these lines are created. We point out that the result of all the absorption lines that are created in these density regions is the observed complex profile.

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Astronomical Observatory Belgrade, 2011

Progress report

CHEMI-IONIZATION/RECOMBINATION PROCESSES AS FACTORS OF THE INFLUENCE ON THE SPECTRAL LINE SHAPES IN STELLAR ATMOSPHERES

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In this work, the chemi-ionization processes in atom- Rydberg atom collisions, as well as the corresponding chemi-recombination processes are considered as the factors of the influence on the atom exited-state populations in weakly ionized layers of stellar atmospheres. The presented results are related to the photospheres of the Sun and some M red dwarfs as well as weakly ionized layers of DB white dwarfs atmospheres. It has been found that the mentioned chemi ionization/recombination processes dominate over the relevant concurrent electron-atom and electron-ion ionization and recombination process in all parts of considered stellar atmospheres. The obtained results demonstrate the fact that the considered chemi ionization/recombination processes must have a very significant influence on the optical properties of the stellar atmospheres. Thus, it is shown that these processes and their importance for non-local thermodynamic equilibrium modeling of the solar atmospheres should be investigated further.

Progress report

PLASMA TECHNOLOGY AS A NEW PRESERVATION TECHNIQUE

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Consumers are increasingly aware of the health benefits and risks associated with consumption of food. To meet consumers' expectations, the food industry is devoting considerable resources and expertise to the production of wholesome and safe products.

The aim of our research has been to introduce Plasma Technology as a new food Preservation Technique. For this reason, it has been assessed the action of a surface wave discharge generated at atmospheric pressure on browning of sherry Fino wine and growth rate in lentils. In this study emission Spectroscopy techniques were used.

As far as sherry Fino wine samples treated is concerned, it has been found that the application of active species in an Ar-N_2 (2%) postdicharge manages to keep the characteristic pale yellow colour of this wine avoiding its browning.As for treatments in lentils, it has been demostrated that the joint effort of both active species and UV radiation from an Ar-N_2O (1%) plasma has inhibited the germination of lentils.

According to the results obtained in this research, there seems to be enough evidence to suggest that Plasma Technology could be consider as a new Preservation Technique.

This research has been supported by the Ministry of Science and Innovation (Spain) and FEDER Funds within the framework of the project no. ENE2008-01015.

Posters

Poster

OBSERVATIONS OF NGC 3077 GALAXY IN NARROW BAND [SII] AND Hα FILTERS

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We present preliminary results of the observations made with 2m RCC telescope at NAO Rozhen, using narrow band [S II] and Hα filters. The main target was to identify supernova remnant and HII region candidates in interaction regions in M81 galaxy group, particularly in the NGC 3077 galaxy. Tidal interaction between galaxies in this group, as well as large HI structure in NGC 3077, are supposed to led to enhanced star formation which will result in a number of HII regions and supernovae, whose remnants we have tried to detect.

Poster

MODELING OF THE Hα SPECTRAL LINE EMISSION REGION IN NGC4151

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We analyzed a number of the Hα spectral line profiles of NGC 415 observed in a period of 11 years (from 1996 to 2006). Assuming that the broad component of emission lines are emitted from the broad line region (BLR), which may be very complex, we applied the two-component model (the broad component of an emission line is constructed from the disk emission + emission of the surrounding region with isotropic velocities). We varied the parameter values for the model and compared simulated profiles to observed spectra, with the aim to model variations of the NGC 4151 BLR emission, which affect the Hα line profile variations.

Poster

STARK SHIFT OF THE 305.2 nm AND 322.1 nm Pb IV LINE

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Stark shift of the 305.2 nm and 322.1 nm Pb IV (triply ionized lead) spectral lines have been measured in a pulsed helium plasma. The linear low-pressure pulsed are was used as a plasma source. Lead atoms are produced, as impurities, by sputtering from the lead plates. We have found opposite sign of the measured Stark shift in comparison with the calculated ones.

Poster

ON THE ENERGY TRANSFER INTO THE CADMIUM ENERGY DIAGRAM

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A linear low -pressure pulsed arc was used as an optically thin plasma source. A pulsed discharge was produced in a pyrex discharge tube. Helium was chosen as the carrier gas. The cadmium atoms were sputtered from the thin cadmium cylindrical plates located in the homogeneous axial part of the discharge tube. The helium plasma was operated at electron temperatures up to 19000 K and 1.1×10^{23} m^{-3} electron density. The stepwise ionization processes via the high lying singly ionized (Cd II) energy levels, populated well due to Penning and charge exchange effects, provide high density of the Cd III (and Cd IV) ions in our helium plasma. The temporal evolutions of the spectral line intensities were monitored using a spectrograph and ICCD camera as a highly sensitive detection system. We have observed intense Cd I, Cd II and Cd III spectral lines with well defined profiles.

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Poster

STARK BROADENING OF Ar I SPECTRAL LINES IN THE VISIBLE PART OF THE SPECTRUM FOR STARK-B DATABASE AND VIRTUAL ATOMIC AND MOLECULAR DATA CENTER (VAMDC)

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Data on the Stark broadening of spectral lines are of interest for diagnostics, modelling and investigations of various plasmas in astrophysics, laboratory, technology and fusion research, as well as for laser designing and laser produced plasma investigations. Argon spectral lines, which are useful not only for laboratory and technological plasmas but also were observed in stellar atmospheres, are of particular interest, especially in the visible. In order to complete data on Stark broadening parameters for Ar I line in the visible, we determined Stark widths and shifts due to electron-, proton-, and ionized helium-impacts, for nine lines ($\lambda\lambda$ = 4191.0, 4259.4, 5912.1, 6043.2, 6045.0, 6752.9, 7503.9, 7514.6, 7724.2 Å), using jK coupling and semiclassical-perturbation theory.

The obtained results will enter in the STARK-B database (http://stark-b.obspm.fr/), which is a part of Virtual Atomic and Molecular Data Center (VAMDC - http://vamdc.org/, Dubernet et al., 2010), supported by EU in the framework of the FP7 "Research Infrastructures - INFRA-2008-1.2.2 - Scientific Data Infrastructures" initiative, with aim to build an interoperable e-Infrastructure for the exchange of atomic and molecular data.

References

Dubernet, M. L. et al.: 2010, *J. Quant. Spectrosc. Radiat. Transfer*, **111**, 2151.

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Poster

STARK BROADENING OF Ne II, Ne III AND O III SPECTRAL LINES BY COLLISIONS WITH PROTONS AND HELIUM IONS FOR STARK-B DATABASE AND VIRTUAL ATOMIC AND MOLECULAR DATA CENTER (VAMDC)

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The data on Stark broadening of spectral lines of interest for diagnostics, modelling and investigations of stellar atmospheres and other various plasmas in astrophysics, laboratory, technology and fusion research, obtained by us using semiclassical perturbation method, are organized in the STARK-B database (http://stark-b.obspm.fr/). We note as well that this database is a part of Virtual Atomic and Molecular Data Center (VAMDC - http://vamdc.org/, Dubernet et al., 2010), supported by EU in the framework of the FP7 "Research Infrastructures - INFRA-2008-1.2.2 - Scientific Data Infrastructures" initiative.

In Djeniže et al. (2002) and Milosavljević et al. (2001) we determined Stark broadening parameters due to collisions with electrons for 15 Ne II and 3 Ne III, and in Srećković et al. (2001) for 5 O III multiplets. However, for stellar atmospheres research, Stark broadening data due to collisions with principal ionic perturbers, protons and ionized helium, are also useful. In order to complete data to be included in STARK-B database, we determined here these additional data. Also, we determined within the semiclassical perturbation method electron-, proton-, and ionized helium impact broadening parameters for the important Ne II $2s^2 2p^4(3P)3p\,^2D^o$ - $2s^2 2p^4(3P)3d\,^2P$ spectral line in the visible part of the spectrum.

References

Djeniže, S., Milosavljević, V., Dimitrijević, M. S.: 2002, *Astron. Astrophys.*, **382**, 359.

Dubernet, M. L. et al.: 2010, *J. Quant. Spectrosc. Radiat. Transfer*, **111**, 2151.

Milosavljević, V., Dimitrijević, M. S., Djeniže, S.: 2001, *Astrophys. J. Suppl. Ser.*, **135**, 115.

Srećković, V., Dimitrijević, M. S., Djeniže, S.: 2001, *Astron. Astrophys.*, **371**, 354.

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Poster

STARK BROADENING DEPENDENCE ON THE UPPER LEVEL IONIZATION POTENTIAL WITHIN DIFFERENT SERIES OF THE NEUTRAL MAGNESIUM SPECTRAL LINES

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Electron and proton impact Stark width dependences on the upper level ionization potential within different series of the neutral magnesium spectral lines have been studied. It was found that the dependences previously observed for the electron contribution also exist for the proton impact contribution to the Stark broadening parameters. The emphasis is on the fine structure influence on the studied Stark parameter dependences. The found relations can be used in both cases for prediction of new Stark broadening data, thus avoiding more complicated procedures.

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Book of Abstracts, Eds. L. Č. Popović, D. Jevremović and D. Ilić
Astronomical Observatory Belgrade, 2011

Poster

CROSS SECTIONS FOR ELECTRON IMPACT EXCITATION OF O VI LINES

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For some astrophysical and laboratory plasmas, an important process responsible for line emission is the electron impact excitation of highly charged ions. Transitions in O VI have been observed in stellar spectra, in white dwarfs, in the solar corona, and in the solar transition region, where the two resonance lines at 1031.924 Å and 1037.614 Å are among the brightest emitted. The knowledge of the excitation cross sections for this ion is very important for the spectroscopic diagnostics. In this work, the distorted wave approach has been used to calculate electron impact excitation cross sections for the $2s-2p$ transitions in O VI and collision strengths for transitions among the fine structure levels belonging to the $1s^2nl$ ($l \leq 5$) configurations.

The atomic structure has been computed using the UCL (University College, London) computer package SUPERSTRUCTURE (SST). This code takes into account configuration interaction, where each individual configuration is an expansion in terms of Slater states built from orthonormal orbitals. Relativistic corrections (spin-orbit, mass, Darwin and one-body) are introduced according to the Breit-Pauli approach as a perturbation to the non-relativistic Hamiltonian. The electron scattering calculation has been performed in the distorted wave approximation using the UCL-DISTORTED WAVE (DW) code. Fine structure collision parameters have been obtained by the UCL-JAJOM code through the transformation of the LS transition matrix elements into LSJ ones using Term Coupling Coeficients given by the SST code.

In our knowledge, there are no results for electron impact excitation cross sections for O VI using the distorted wave method. Our cross sections in the excitation threshold region of the O VI $2s-2p$ transitions have been compared to experimental and to R-matrix ones. Our fine structure collision strengths at energies below 63 Ry have been compared to the Dirac Atomic R-matrix Code (DARC) results.

Poster

STARK BROADENING OF THE 363.9 Pb I LINE

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The Stark profile characteristics , the width (W) and the shift (d) were measured in a pulsed helium discharge of the 363.9568 nm Pb I spectral line. Our W and d values are compared with existing experimental data. In the case of the Stark shift we have found disagreement between our new, and existing data. A linear low-pressure pulsed arc was used as an optically thin plasma source. A pulsed discharge was produced in a pyrex discharge tube. Helium was chosen as the carrier gas. The lead atoms were sputtered from the thin lead cylindrical plates located in the homogeneous axial part of the discharge tube. The helium plasma was operated at electron temperatures up to 23000 K and 1.1×10^{23} m^{-3} electron density.

Poster

MEASURED STARK WIDTHS AND SHIFT OF PROMINENT Pb III SPECTRAL LINES

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Stark broadening parameters, the width (W) and the shifts (d) of the prominent Pb III (doubly ionized lead) spectral lines have been obtained in a helium plasma. They represent the first experimental data. Our data are compared with the calculated W and d values.

Poster

ON THE LEAD SPECTRUM IN THE LASER GENERATED PLASMA

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Lead atoms are ablated from lead (Pb) plates by the Nd:Yag laser operated at the main mode of $\lambda = 1064$ nm. The lead spectra were investigated in helium and oxygen plasmas at various gas pressures. The spectra were recorded by the ICCD camera mounted on the high resolution spectrograph in decaying plasma, typically with delay of 1 μs to 5 μs after the laser pulse. Dependencies of the Pb I lines intensities on the laser power and delay time were established.

Poster

STUDYING OF EXCESSIVELY BROADENED Hα PROFILE IN A DIELECTRIC BARRIER DISCHARGE

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The phenomenon of Excessively Doppler broadened hydrogen lines has been detected in various types of laboratory plasma for over two decades. In this paper excessive broadening of Hα is investigated in a dielectric barrier discharge (DBD) in order to expand the analysis of this phenomenon to the conditions that are specific for this type of low temperature plasma. Investigations were performed at a range of pressures using hydrogen, helium and argon as a working gas. Line profiles were recorded in two orthogonal directions. It is shown that the line shape and width is highly dependent on discharge conditions and direction of observation, similarly to the behavior in a glow discharge. Time evolution of Hα excitation relative to the breakdown instant and discharge development was also examined.

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Poster

INFLUENCE OF BLACK HOLE SPIN ON THE SHAPE OF THE Fe Kα SPECTRAL LINE

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Nowadays it is widely accepted that the Fe Kα spectral line, which is observed in the X-ray spectra of a number of Active Galactic Nuclei (AGN), is probably emitted from a very compact region near their central supermassive black hole. Here we analyze the effects of black hole spin on the shape of the line using numerical simulations of disk emission based on ray-tracing method in Kerr metric. Since the complex profile of the line depends on different parameters and in order to separate contribution of black hole spin, we performed simulations for a grid of input parameters, such as radii of the line emitting region, disk inclination and angular momentum (spin) of central black hole. Obtained results show that the red peak of the Fe Kα line is much brighter in the case of almost maximally rotating black hole, but at the same time it is also more embedded into the blue peak wing, and hence less separable from it. Consequently, angular momentum of the rotating central black hole has significant influence on the line shape, and therefore the corresponding deformations in the observed spectra of some AGN can be used for measuring the spin of their central black holes.

Poster

DIAGNOSTICS OF THE SOLAR X-FLARES IMPACT ON THE LOWER IONOSPHERE THROUGH SEASONS BASED ON VLF-NAA SIGNAL RECORDINGS

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An analysis of four solar flare X-ray irradiance effects on VLF signal amplitude and phase delay variations on the NAA/24.0 kHz signal trace, during period of time from December 2005 to September 2006, was carried out. Solar flare data were taken from GOES12 satellite one-minute listings. For VLF data recordings at the Institute of Physics, Belgrade, Serbia, the AbsPAL system was used. It was found that solar flare events affected VLF wave propagation in the Earth-ionosphere waveguide in way that lower ionosphere electron density height profile changes, according to variation of estimated parameters, sharpness and reflection height, being different for these solar flare events.

Poster

ANALYSIS OF INFRARED AND OPTICAL SPECTRAL PROPERTIES IN AGN SAMPLE

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We analyzed some spectral properties of infrared and optical spectra in type 1 AGN sample, i.e. the broad line AGNs. The infrared and optical spectral properties are compared in order to investigate the possible geometrical and physical connection between the Broad Line Region which produces the broad emission lines in optical spectra and dusty torus which produces part of infrared spectra. Especially, we investigate the characteristics of silicate emission/absorption features observed $\sim$10 μm, and its possible connection with line parameters of the broad emission line component.

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Poster

INTERPLANETARY LANGMUIR WAVES GENERATION DUE TO SOLAR ENERGETIC ELECTRONS

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Energetic electrons represent non-equilibrium distributions of particles that are produced on the Sun and in the heliosphere, notably by flares and the shocks driven by fast coronal mass ejections (CMS). Langmuir waves can be excited in a plasma by a number of mechanisms, but perhaps the best-studied mechanism is the propagation of a suprathermal electron beam with speed of $\sim 0.1 - 0.3\,c$ ($\sim 3 - 20$ keV) in a background plasma (the corona or the inter planetary medium). An electron beam will produce a "bump–on–the–tail" velocity distribution function and the positive gradient will be unstable to the production of a spectrum of Langmuir waves. Then, these electrostatic waves are converted via non-linear wave–wave interactions to transverse electromagnetic waves with a frequency near the electron plasma frequency f_p or its harmonic at $2f_p$ by the plasma radiation mechanism. These electromagnetic waves are responsible for solar radio bursts of type III with distinctive radio spectral signature observed in solar corona, earth and planetary bow shocks and interplanetary space by earth based radio telescopes and spacecraft. Signatures of coronal shock waves are radio type II bursts – a narrow-band radio emission excited at the local plasma frequency by a fast-mode MHD shock. As the shock propagates outwards through the corona, the emission drifts slowly towards lower frequencies due to decreasing ambient density.

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Poster

STATISTICAL ANALYSIS OF LANGMUIR WAVES ASSOCIATED WITH TYPE III RADIO BURSTS: II SIMULATION AND INTERPRETATION OF THE WAVE ENERGY DISTRIBUTIONS

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We have modeled electrostatic Langmuir waves by an electric field, $E(t)$, consisting of superposition of Gaussian wave packets with several probability distributions of amplitudes, $\log(A^2)$, and with several Poisson distributions of number of wave packets in 1 s. The outcome of the model and the simulations is that the plane of WIND observations, specially for low frequency receivers within WAVES experiment, can be covered by a combination of following assumptions: (1) from WIND observations is not possible to conclude whether the input wave amplitudes distributions are closer to log-normal than to Pearsons type I, or uniform; (2) the average number of wave packets in 1 s is between 0.1 and 50. Therefore, there is a clear need to measure Langmuir waves energy distributions directly at the waveform level and not a posteriori in the spectral domain. This is what is planned to be implemented on the RPW (Radio and Plasma Wave Analyzer) instrument on Solar Orbiter.

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Poster

INFERENCES ON QUASAR BROAD LINE REGION STRUCTURE AT LOW- AND HIGH REDSHIFT

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Quasars show a considerable diversity in broad emission line properties. The diversity of quasar spectra at low redshift is however non-random: a principal component analysis applied to large samples customarily identifies two main eigenvectors. In this contribution we show that the diversity in optical spectral properties of quasars observed at low-z and associated to the first eigenvector is preserved up to redshift $z \approx 2$. We also describe some luminosity effects related to the second eigenvector.

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Poster

THE MODELING OF THE CONTINUOUS ABSORPTION OF EM RADIATION IN HYDROGEN PLASMAS WITH ELECTRON DENSITIES ABOUT $5 \cdot 10^{18}$ cm^{-3} - $1.5 \cdot 10^{19}$cm^{-3} AND TEMPERATURES ABOUT $1.6 \cdot 10^4$ K - $2.5 \cdot 10^4$ K

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In this work is examined a new modeling way of describing the continuous absorption of electromagnetic (EM) radiation in a dense partially ionized hydrogen plasma. It is shown that the obtained results give a possibility of calculating spectral absorption coefficients which characterize the relevant absorption processes in partially ionized hydrogen plasmas with electron densities about $5 \cdot 10^{18}$ cm^{-3} - $1.5 \cdot 10^{19}$cm^{-3} and temperatures about $1.6 \cdot 10^4$ K - $2.5 \cdot 10^4$ K. The calculation method is applied to the wavelength region 300 nm $< \lambda <$ 500 nm. The presented results can be of interest for dense laboratory plasmas as well as for partially ionized layers of different hydrogen stellar atmospheres. Namely the plasma of the inner layers of solar atmosphere, as well as the plasmas of partially ionized layers of some other stellar atmospheres, for example some DA and DB white dwarfs.

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Poster

SEARCHING FOR EVIDENCE OF JET-CLOUDS INTERACTION IN RADIOGALAXIES. RESULTS FOR 3C 381 & 3C 284

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We present results of *Hubble Space Telescope (HST)* and *long-slit GMOS-Gemini* observations of the radiogalaxies 3C 381 and 3C 284. HST images show extended regions of ionized gas located away from the galaxy, they are the Extended Narrow-Line Regions (ENLR, or Extended Emission Line Regions, EELR), as is postulated by the unified squemes.

We are working on the identification of the main ionization mechanism that is taking place in the emmiting-gas. The three most accepted theories are being studied. The ionization by the AGN itself, described by the *ionization parameter U* which accounts for the geometrical dilution of the radiation field as the distance from the nucleus increases. The *mixed-medium* ionization, introduced by Binette et al. (1996) in order to explain some discrepances with the observations, in particular, the high values for the HeII/Hβ line ratio. And finally, shock-ionization triggered by the radio jet (Dopita and Sutherland, 1995, 1996, Allen et al., 2008).

The line-ratio diagnostics show that the ionization state of these regions could be explained by the interaction between the radio jet and ENLR's material. This is in agreement with the velocity fields found in both galaxies.

Poster

SPECTRAL MONITORING OF AGNs: PRELIMINARY RESULTS FOR Ark564 AND Arp102B

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In this work, we present preliminary results of the long term spectral monitoring of two objects with different broad line shapes: Ark 564 and Arp 102B. Ark564 is a bright nearby narrow line Syfert 1 (NLS1) galaxy with relatively narrow permitted optical emission lines and a high FeII/Hb ratio, while Arp102B is a broad-line nearby radio galaxy with broad double-peaked Balmer emission lines. The spectra of Ark564 were observed over 7 years (2000-2007)and the spectra of Arp 102B were observed over 9 years (1998-2007), using the SAO 6-m and 1-m telescopes (Russia) and the GHAO 2.1-m telscope (Cananea, Mexico).

Poster

INFLUENCE OF MICROLENSING ON DEFORMATION IN SPECTRA OF LENSED QUASARS

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It is well known that spectrum of an active galactic nuclei (AGNs) is composite spectrum produced by different emission regions. Here we consider the influence of the microlensing on the spectra of quasars (AGNs) taking into account that composite emission is coming from different regions arranged subsequently around the central black hole. In order to explore this influence we assume that we have three regions which have black body emission; first the innermost with highest temperature, second and third with slightly lower temperatures values. Than we made a comparisons of lensed and unlensed composite spectrum. This results show us influence of microlensing on the spectral bahaviour of affected quasars.

Poster

STARK BROADENING OF In III FOR ASTROPHYSICAL AND LABORATORY PLASMA RESEARCH AND FOR STARK-B DATABASE

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Interest in a very extensive set of data on broadening of indium spectral lines has been stimulated by numerous problems in astrophysics, physics, and plasma technology. In hot star atmospheres exist conditions where Stark widths are comparable and even larger than the thermal Doppler widths, so that the corresponding line broadening parameters are of importance for the hot star plasma investigation. Here, we investigated theoretically the influence of collisions with charged particles on heavy element spectral line profiles for In III in spectra of A stars and white dwarfs. We applied semiclassical perturbation theory. We also determined a number of Stark broadening parameters of interest for A stars and white dwarf plasmas investigations. Also, we compared obtained results with existing experimental data. Now, work on their inclusion in STARK-B database and in Virtual Atomic and Molecular Data Center, an FP7 european project, as well as in Serbian Virtual Observatory is in progress.

Poster

PROFILE OF THE 404.6 nm Hg I LINE

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Profile of the 404.6565 nm Hg I spectral line has been measured. The (L.O.T. Oriel LSP035 Hg(Ar)) and (OSRAM Hg-Cd/10) spectral lamps were used as a light sources. The spectrograph (Zeiss PGS 2) with the grating (2100 gr/mm) was used in a double pass connected with the photomultiplier (Hamamatsu R928) as a detection system. We have identified the hyperfine structure components. The found pattern of components and the related intensities agree with the existing published data.

Poster

GAS AND STAR MOTION MAPPING FOR THREE SEYFERT GALAXIES

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We have studied the kinematics of the ionized gas and stellar component in three Seyfert galaxies using methods of 3D spectroscopy. The observations were performed at the prime focus of the SAO RAS 6-m telescope with the integral-field spectrograph MPFS and with a scanning Fabry-Perot interferometer, installed on the multimode device SCORPIO. Based on these data, the monochromatic maps and velocity fields in different emission lines were constructed. Also we have estimated rate of the ionized gas inflow/outflow motions.

Poster

AGN DUSTY TORI AS CLUMPY TWO-PHASE MEDIUM: THE 10-MICRON SILICATE FEATURE

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We analyzed the properties of the spectral energy distribution (SED) of active galactic nuclei (AGN) in the infrared domain emitted from a dusty torus, with a focus on the 10 μm silicate feature. We modeled the AGN dusty torus as a clumpy two-phase medium with high-density clumps and low-density medium filling the space between the clumps. We employed three-dimensional radiative transfer code to obtain SEDs. We calculated a grid of models for different parameters and analyzed the influence of these parameters on the shape of mid-infrared emission. We found that dust distribution, optical depth and random arrangement of clumps in the innermost region, all have an impact on the shape and strength of the silicate feature.

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Poster

STUDY OF THE Mg II REGIONS IN 20 Be-TYPE STARS

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Many hot emission stars present absorption lines with complex profiles. These complex profiles are explained if we consider that they result from a number of Satellite Absorption Components (SACs), which are created in different density regions. Here, we study the complex profiles of the Mg II resonance lines $\lambda\lambda$ 2795.523, 2802.698 Å in the spectra of 20 Be stars, using the Gauss-Rotation model (GR model), with which we also calculate the kinematical parameters of the regions where these lines are created.

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Poster

VLF REMOTE SENSING OF THE LOWER IONOSPHERIC DISTURBANCES PRODUCED BY SOLAR FLARES AND PRECIPITATION OF ENERGETIC ELECTRONS

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Very Low Frequency (VLF) radio signals (3-30 kHz), from both man-made and natural lightning, propagate in the waveguide bounded by the Earth's surface and the D-region of the ionosphere. Disturbances in the D region of ionosphere, which are manifested as electron density and temperature changes, cause significant changes in propagating of VLF waves in the earth-ionosphere waveguide. Simultaneous VLF phase and amplitude measurements made over different paths, are used to determine the enhancements in D region electron densities as a function of solar X-ray flux (measured on the GOES satellites) during a wide variety of solar flares occurred in period 2004 -2011.Lightning-induced electron precipitation (LEP) is a well established means of loss of the trapped belt electrons caused by resonant whistler wave-particle interactions. Ground-based VLF remote sensing yields information about the night-time D region conductivity altered by the enhanced secondary ionization produced by precipitating energetic electrons. Signals from five or eight VLF transmitters were recorded on ELF/VLF receiver systems at Belgrade station during period from 2004. The observed VLF amplitude and phase perturbations are simulated by the software package 'Long-Wavelength Propagation Capability' (LWPC) using Wait's model of the lower ionosphere. With these simulations we can detemined the sharpness and reflection height which are used for calculating of electron density height profile $N_e(h)$ in D-region during disturbances.

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Poster

STATISTICAL ANALYSIS OF LANGMUIR WAVES ASSOCIATED WITH TYPE III RADIO BURSTS: I. WIND OBSERVATIONS

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Radio observations of the waves in a range of 4 - 256 kHz from the WAVES experiment onboard the WIND spacecraft have been statistically analyzed. From the radio observations starting from November 1994 to the beginning of 2010 a subset of 36 events with Langmuir waves and type III bursts occurred at the same time, has been selected. In order to remove the background consisting of thermal noise, type III bursts and Galactic background, we have developed a heuristic algorithm based on numerical techniques with a few parameters only. After background has been removed, the remaining power spectral density has been modeled by Pearsons system of probability distributions. The coefficients of the probability distributions have been calculated by using two methods: method of moments and maximum likelihood estimation method. We have shown that the probability distributions of the power spectral density of the Langmuir waves belong to the three main types of Pearsons probability distributions: type I, type IV and type VI. In order to compare the goodness of the fits, a few statistical tests have been applied, showing for all of the considered events that the Pearsons probability distributions fit the data better than the Gaussian ones. This is in contradiction with the Stochastic Growth Theory (SGT) which predicts log-normal distribution for the power spectral density of the Langmuir waves. The uncertainty analysis that has been performed also goes in favor of the use of Pearsons system of distributions to model the data. This result indicates that the SGT possibly requires additional verifications and examinations.

Special workshop

"Black Holes and Spectral Lines"

in the frame of COST action MP0905

"Black Holes in a Violent Universe"

Invited lecture

BLACK HOLES IN A VIOLENT UNIVERSE

S. Britzen

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Black Holes are fascinating enigmas - the most important engines in our Universe and still barely understood. Our COST action aims at bringing Black Hole scientists from all-over Europe together and provides a platform for joint projects and for participation in a lively exchange of knowledge. In my talk I would like to highlight the opportunities our Action is offering for the promotion of scientific networking with regard to Black Hole science!

Invited lecture

THE Fe Kα SPECTRAL LINE AND SUPERMASSIVE BLACK HOLES

P. Jovanović and L. Č. Popović

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The most prominent feature observed in the X-ray spectra of a number of type 1 Active Galactic Nuclei (AGN) is a broad emission spectral line at 6.4 keV with asymmetric profile - Fe Kα. Nowadays it is widely accepted that this fluorescent/recombination line is an important indicator of accreting flows in vicinity of the central supermassive black holes of AGN, because it is emitted from a very compact region of their accretion disks, ranging from radius of marginally stable orbit up to several dozens of gravitational radii. Therefore, it can provide us some essential information about the plasma conditions and space-time geometry of these regions. Here we present a short overview of some recent investigations of several effects of strong gravity in the vicinity of supermassive black holes, as well as several parameters of the X-ray emitting region, which have the influence on the shapes and intensities of the observed Fe Kα spectral line of AGN.

Invited lecture

SHAPES OF EMISSION LINES AND DETECTION OF BINARY BLACK HOLES

L. Č. Popović

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The shapes of spectral lines emitted from Active Galactic Nucle (AGNs) can be used for investigation of the geometry and physics of emitting regions which can be very close to the super-massive black hole, as e.g. the Broad Line Region (BLR). Especially, there are groups of AGNs which lines show two peaks. Two peaks in the broad line profile in the most cases are caused by emission of an accretion disk, but two peaks in the narrow lines can indicate a binary black hole in the center of an AGN. Here we give a discussion about possibility to use the narrow and broad lines in order to find binary black holes. We also discuss some findings published recently and give several arguments pro and contra of binary black hole presence in some objects.

Invited lecture

SHADOWS AS A TOOL TO EVALUATE BLACK HOLE PARAMETERS AND A DIMENSION OF SPACETIME

A. F. Zakharov

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Measurements of the shadow sizes around the black holes may help to evaluate parameters of black hole metric (Zakharov et al. 2005). Theories with extra dimensions (Randall–Sundrum II braneworld approach, for instance) admit astrophysical objects (supermassive black holes in particular) which are rather different from standard ones. People proposed tests which may help to discover signatures of extra dimensions in supermassive black holes since the gravitational field may be different from the standard one in the GR approach. In particular, gravitational lensing features are different for alternative gravity theories with extra dimensions and general relativity. Therefore, there is an opportunity to find signatures of extra dimensions in supermassive black holes. We show how measurements of the shadow sizes can put constraints on parameters of black hole in spacetime with extra dimensions.

Programme of the 8th SCSLSA

Divčibare, June 06 – 10, 2011

Sunday, June 05, 2011

Arrival of participants

20:00 – 23:00 *Registration and Cocktail*

Monday, June 06, 2011

Chair: L. Č. Popović & D. Jevremović

9:00 – 9:30	*Opening ceremony*	
9:30 – 10:10	Gary Ferland	*The emission lines in Quasars - what they tell us*
10:10 – 10:50	Milan S. Dimitrijević	*Stark broadening and white dwarfs*
10:50 – 11:20	***Coffee break***	

Chair: M. S. Dimitrijević

11:20 – 12:00	Patrick Dufour	*Stark Broadening of Carbon and Oxygen Lines in Hot DQ White Dwarf Stars: Recent Results and Applications*
12:00 – 12:40	Sylvie Sahal-Bréchot	*Comparisons and comments on electron- and ion- impact profiles of spectral lines*
12:40 – 13:20	María Dolores Calzada	*Plasma generated with gas mixtures at atmospheric pressure*
13:20 – 15:20	***Lunch***	

Chair: P. Rafanelli

15:20 – 16:00	Wolfram Kollatschny	*Kinematics and structure of the broad line region in AGN*
16:00 – 16:40	Martin Gaskell	*New Paradigms for the Nature of the Line- and Continuum-Emitting Regions of AGNs*
16:40 – 17:10	***Coffee break***	

Chair: J. Danziger

17:10 – 17:30 Vladimr Srećković, Ljubinko Ignjatović, Anatolij Mihajlov, Milan S. Dimitrijević
Chemi-ionization/recombination processes as factors of the influence on the spectral lines shapes in stellar atmospheres

17:30 – 17:50 Nikola Cvetanović — *Dependence of excessively broadened Hα profile on cathode material and gas pressure in a glow discharge*

17:50 – 18:10 Derek Homeier — *Spectral Synthesis as a Tool for Stellar and Galactic Astronomy - Challenges and Perspectives*

20:30 – 21:30 John Danziger — *Public talk: How SN1987A Energized Supernova Research*

Tuesday, June 07, 2011

Chair: J. Sulentic

9:30 – 10:10 Evencio Mediavilla, Teresa Mediavilla
Microlensing based studies of the unresolved structure of AGN

10:10 – 10:50 Karen Leighly — *The Influence of the Spectral Energy Distribution on Broad-line Region Emission in AGN and Quasars*

10:50 – 11:20 ***Coffee break***

Chair: E. Mediavilla

11:20 – 12:00 Paola Marziani — *A Photoionization Method for Black Hole mass Estimation*

12:00 – 12:40 Jack Sulentic — *Broad Line Profiles of Quasars: Are There Two Quasar Populations?*

12:40 – 13:00 Valia Lyratzi — *A study of the C IV BALs in HiBALQSOs spectra*

13:00 – 15:00 ***Lunch***

Chair: W. Kollatschny

15:00 – 15:40 Piero Rafanelli — *The Starburst - AGN connection: A critical review*

15:40 – 16:20 Alexei Moiseev — *SCORPIO at the 6-m telescope: current state and perspectives for spectroscopy of galactic and extra-galactic objects*

16:20 – 17:00 Petr Skoda — *Optical Spectroscopy with the Technology of Virtual Observatory*

17:00 – 17:30 ***Coffee break***

Chair: G. Peach

17:30 – 18:10 Friedrich Kupka — *VAMDC as a resource for Atomic and Molecular Data and the new release of VALD*

18:10 – 18:50 Roland Stamm — *Stochastic processes applied to line shape calculations*

Wednesday, June 08, 2011

9:00 ***Excursion***

Thursday, June 09, 2011

Chair: S. Sahal-Bréchot

9:30 – 10:10 Gillian Peach — *Recent results for widths of lines important in the spectra of cool stars*

10:10 – 10:50 Igor Iosilevskiy — *Plasma Polarization in Massive Astrophysical Objects*

10:50 – 11:20 ***Coffee break***

Chair: M. Gaskell

11:20 – 12:00 Maarten Baes, Christine Wilson, Suzanne Madden, and the SAG-2 consortium — *The first FIR/submm spectroscopic results from the Herschel Space Observatory*

12:00 – 12:20 Jacopo Fritz — *Equivalent width measurements in optical spectra of local cluster galaxies: hints on the star formation history in clusters*

12:20 – 12:40 Ivan Katkov — *A complex stellar line-of-sight velocity distribution in NGC 524*

12:40 – 13:00 Giovanni La Mura — *Optical emission lines and the X-ray properties of Type 1 Seyfert galaxies*

13:00 – 15:00 ***Lunch***

Chair: A.F. Zakharov

15:00 – 15:40 Helen Flohic — *Variability of double-peaked emission lines in AGNs as probe of the BLR structure*

15:40 – 16:00 Robert Loughnane *Observations of HCN hyperfine line anomalies towards low and high mass star-forming cores*

16:00 – 16:20 Antonis Antoniou *A statistical study of the UV Si IV resonance lines' parameters in 20 Be stars*

16:20 – 16:40 Rafik Hamdi, Nébil Ben Nessib, Milan S. Dimitrijević, Sylvie Sahal-Bréchot *Ab initio determination of atomic structure and Stark broadening parameters: Pb IV and recent results*

16:40 – 17:00 Rocío Rincón, María Dolores Calzada *Plasma Technology as a new Preservation Technique*

Chair: M. Dolores Calzada

17:00 – 18:30 Poster presentations (at the beginning coffee will be served)

20:00 *Conference Dinner*

Friday, June 10, 2011

Special workshop
"Black Holes and Spectral Lines"
in the frame of COST action MP0905 "Black Holes in a Violent Universe"

10:00 – 10:30 Silke Brintzen *Black Holes in a Violent Universe, COST action*

10:30 – 11:00 Predrag Jovanović *The Fe Kα Line and supermassive black holes*

11:30 – 12:00 Alexander Zakharov *Shadows as a tool to evaluate black hole parameters and a dimension of spacetime*

12:00 – 12:30 Jack Sulentic *Estimation of supermassive black hole mases using UV/optical emission lines – a critical overview*

12:30 – 13:00 Luka Č. Popović *Shape of emission lines and detection of binary black holes*

13:00 – 13:10 *Closing of the conference and workshop*

13:10 – 15:00 ***Lunch***

15:00 *Departure to Belgrade*

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CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

52-355.3(048)
533.92:537.228.5(048)
539.184.27(048)

SERBIAN Conference on Spectral Line Shapes in Astrophysics (8 ; 2011 ; Divčibare)
Book of Abstracts / VIII Serbian Conference on Spectral Line Shapes in Astrophysics, 6-10 June 2011, Divčibare, Serbia ; Eds. Luka Č. Popović, Darko Jevremović and Dragana Ilić. - Belgrade : Astronomical Observatory, 2011 (Beograd : Planeta print). - 78 str. ; 22 cm

Tiraž 100. - Registar.

ISBN 978-86-80019-44-4 (AO)
1. Popović, Luka Č. [уредник]
a) Астрофизика - Апстракти b) Плазма - Спектрална анализа - Апстракти c) Штарков ефекат - Апстракти
COBISS.SR-ID 183852556