

SPECTROSCOPICAL INVESTIGATIONS OF EXTRAGALACTIC OBJECTS AT ASTRONOMICAL OBSERVATORY (PERIOD 2006 – 2007)

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Abstract. Here we give an overview of the activities on the project P146002 (Astrophysical Spectroscopy of Extragalactic Objects) financed by the Ministry of Science of Serbia. Scientific and other activities of researchers on the project are described. Also, we give a list of references which are published by participants of the project in the 2006/2007 period.

1. INTRODUCTION

The scientific research at the Astronomical Observatory has been variously organized in the different time periods. It was mainly done in the scientific groups that were working on one specific subject. In the nineties of the previous century, there was only one project that covered all the research that was performed at Belgrade Astronomical Observatory (AOB). However, after 2001 the Ministry of Science of the Republic of Serbia has made a call for proposals, where it has put in favor small and well defined projects. At that time from the AOB 9 projects were accepted. One of these project is "Astrophysical Spectroscopy of Extragalactic Objects" which was discussed in a previous paper (Popović and Ilić, 2006) where we gave results of the project in the period of 2002-2005.

Here we would like to present work on the astrophysical spectroscopy of extragalactic objects in the period of 2006-2007, since a new call for project proposals from the Ministry was published in 2005, and we granted to continue this project in the next four years (2006-2010). Note here that for this period the Observatory was granted with 7 projects. First evaluation of the project was at the beginning of 2008, and the project was highly ranged on the range list in a branch of Geoastronomical sciences projects (second, with 93.35 points from 100 points). As our Ministry proposed to evaluate the project in this period, here we would like to give a review of activity on this project. Note here that participants of this project have very close collaboration with the project led by M. S. Dimitrijević (see the pa-

per in these proceedings) and the participants of these two project are non-formally organized in a group so called 'Group for Astrophysical Spectroscopy'.

Researchers on the project

In the period from 2006 to 2007, 9 researchers were working on this project from three institutions: Astronomical Observatory in Belgrade (AOB), Faculty of Mathematics (FMB) in Belgrade and Faculty of Sciences in Kragujevac (FSK). The project leader was L. Č. Popović, and the researchers are:

1. Edi Bon (born 1970), PhD student from AOB, total 24 Research Months (RM)
2. Miodrag Dačić (born 1946), associate professor from AOB, total 4 RM
3. Nataša Gavrilović (born 1979) MSc student from AOB, total 24 RM
4. Dragana Ilić (born 1978), PhD student from FMB, total 16 RM
5. Jelena Kovačević (born 1981), MSc student from AOB, total 20 RM
6. Predrag Jovanović (born 1968), Postdoc from AOB, total 24 RM
7. Tihomir Petrović (born 1981), MSc student granted for a young research position from the Ministry, total 8 RM
8. Luka Č Popović (born 1964), research professor from AOB, total 24 RM
9. Saša Simić (born 1971), PhD student from FSK, total 16 RM

It is interesting to make a small statistical analysis of the participants in this project. For the total of 2 years, 9 researchers worked for 168 research months, thus 13.8 years. Mainly young researchers were engaged, therefore the average age was around 37 years (or year of birth 1971).

Scientific and other activities

Mainly within the frame of this project we have investigated the activity in galaxies, especially Active Galactic Nuclei (AGN). These objects are strong emitters within a wide range of energies – from gamma to the radio emission. Spectroscopical investigation of these objects can provide us new knowledge about several very important questions in modern astrophysics, e.g. realization of the energy around super-massive black holes, formation and collimation of a relativistic jet, cosmological distribution of matter, etc. AGN, as powerfull sources of radiation can be seen from different epochs of the Universe, consequently they are important for cosmological investigations. Within the mentioned period we investigated:

- The physics and kinematics of the central part of AGN (in the X-ray, UV and optical part, also connecting these with the radio emission)
- Spectroscopy of lensed quasars and influence of microlensing effects on quasar spectra
- Connection between stellar population and activity in galaxies
- Gamma ray burst, as violent processes in the Universe

With the aim to achieve mentioned (project) objectives, within the considered period the following activities were performed:

1. Scientific theoretical and experimental research with the education of young researchers (MSc and PhD students), in three fields: a) investigation of the kinematical and physical properties of active galactic nuclei and stellar systems in other galaxies; b) investigation of the influence of the microlensing effect on the spectra of quasars; c) explaining (modeling) phenomena of the gamma ray burst;
2. Performing observations;
3. Research visits to international institutions and participation in international Conferences;
4. Popularization of science (through seminars and public lectures);
5. International cooperation - visits of foreign scientists to AOB and viceversa, planning and writing proposals for future bilateral and multilateral projects;
6. Organizing Conferences;
7. Systematizing and publishing research results.

The main results of all these activities in the period 2006/2007 are:

- Published 72 bibliographic units (14 papers in refereed journals);
- Performed radio observations with VLBI network;
- Performed spectroscopical observations (in optical band) with the 6 m telescope of Special Astrophysical Observatory (Nizhniy Arkhiz, Russia) and with the 2m telescope at Rozhen Observatory (Bulgaria);
- International project "Virtual Observatory for investigation of the galaxy origin" between Serbia and France, Program "Pavle Savić", approved for the period 2006-2007;
- Participation in 16 international and national conferences and workshops;
- 11 Research visits
- Organization of the three scientific events (two Conferences and one School, see Appendix)
- Established wide international cooperation (Bulgaria, Russia, Germany, Spain, Italy, Mexico, France, USA).

Financing the project

As it was mentioned previously this project was approved by the Ministry of Science of the Republic of Serbia, therefore it was financed by that institution. The detailed financial structure of this project was the same as it is given in the Table

1 in Popović and Ilić (2006). The obtained financial support was for salary of the researchers, and other expenses (covering for travels, materials, equipment (see Popović and Ilić, 2006). In total for these two years we get from the Ministry 15021704 RSD (for 2006, total 6519972 RSD and for 2007, total 8501728 RSD), that is around 183000 euro.

Note here that almost all financial support from the Ministry was spent on the researcher's salaries, 40 % were spent (similar as it is given in Popović and Ilić, 2006, Table 1) on administrative expenses, and only a small part was spent on travels, materials, supplies and equipment.

Conclusions

In principle, we can be satisfied with results which we obtained in last two years, but also we will try to give better results in forecoming period. Let us use statistic again (as in previous paper) to analyze our work on this project. As we already mentioned, the average age of the researcher was 37 year, that is a usual age for a senior post-doc. For the work of 13.8 years of researchers, the Ministry has supported the project with 183,000 EUR, this is approx. 13,000 EUR per year per a researcher. In comparison with the previous period (2002-2005, see Popović and Ilić, 2006), when the support was around 8000 per year per researcher, one can conclude that investement in science in Serbia is improved, beeing 60 % higher then before. But, we note here that in the same time, the researcher in the European Union would have yearly incomes of around 30,000 EUR, i.e. around three times more than in Serbia. On the other hand, the average researcher on the considered project, published 5 bibliographic units per year, what is comparable with the results of his colleagues from the European Institutes.

Appendix

A1. Missions/observations

Luka Č. Popović; University of Athens, Faculty of Physics, Department for Astronomy and Athens Observatory (11 - 17. 02. 2007)

Luka Č. Popović; Special Astrophysical Observatory, Nizhniy Arkhiz, Russia (observations and collaboration, 06 - 20. May 2007 and 26.08 - 02.09. 2007)

Luka Č. Popović, CRAL – L'Observatoire de Lyon, Lyon, France (17.11 - 23. 11. 2007, within the frame of the program "Pavle Savić")

Luka Č. Popović, Astrophisikalisches Institut Potsdam (26.11 - 29.11. 2007)

Dragana Ilić; Max Planck Institute for Radioastronomy, Bonn (five months at the end of 2007, supported by the Alexander von Humboldt fondation)

Luka Popović, Max Planck Institute for Radioastronomy, Bonn (three months at the end of 2007, supported by the Alexander von Humboldt fondation)

Nataša Gavrilović, CRAL – L'Observatoire de Lyon, Lyon, France (1.10 - 1.11.2006, 1.04 -1.06.2007, 1.11 - 1.12.2007)

- Edi Bon, CRAL – L'Observatoire de Lyon, Lyon, France (14.05 - 1.07.2007)
Luka Č. Popović; Max Planck Institute for Radio Astronomy, Bonn, Germany,
(28.05 - 05.06.2006, short visit)
Luka Č. Popović; Special Astrophysical Observatory, Russia (06. 06 - 21.06.2006.
short visit and observations)
Luka Č. Popović; Lyon Observatory, France (16. 07.- 22. 07. 2006. Short visit in
the frame of the program "Pavle Savić")

A2. Conferences

A2.1 Organized conference

- 6th Serbian Conference of Spectral Line Shapes in Astrophysics, Sremski Karlovci, 11-15. June 2007 (Co-chair L. Č. Popović, all from the project were in the Local Organizing Committee)
- 1st Summer School in Astronomy and Geophysics, Belgrade, August 6-11, 2007.
- 5th Bulgarian-Serbian Conference on Astronomy and Space Science, 9 - 12 May 2006 (co-organized with Bulgarian Colleagues)

A2.3 Participation in Conference

1. 5th Bulgarian-Serbian Conference on "Astronomy and Space Science", 9.05 - 12.05.2006, Sophia, Bulgaria.
Participants: Luka Č. Popović, Predrag Jovanović, Edi Bon, Nataša Gavrilović, Jelena Kovačević, Dragana Ilić, Tihomir Petrović, Saša Simić, Miodrag Dačić.
2. Razvoj astronomije kod Srba IV, 22.04 - 26. 04.2006, Belgrade, Serbia.
Participants: Miodrag Dačić, Luka Č. Popović, Dragana Ilić.
3. VI Serbian-Belarusian Symposium on Physics and Diagnostic of Lab. & Astrophys. Plasma, 22.08 – 25.08. 2006, Belgrade, Serbia.
Participants: Miodrag Dačić, Luka Č. Popović, Predrag Jovanović.
4. Variable and Broad Iron Lines around Black Holes, 26 - 28 June, 2006, Madrid, Spain
Participants: Luka Č. Popović
5. The Multi-Messenger Approach to High Energy Gamma Ray Sources, 4.07 - 7.07.2006, Barcelona, Spain.
Participants: Saša Simić
6. 2nd International Workshop and Summer School on Plasma Physics, 03-09 July 2006, Kiten Bulgaria
Participants: Luka Č. Popović
7. 26th IAU General assembly, 21-25 August, 2006 in Prague, Czech Republic.
Participants: Nataša Gavrilović, Edi Bon, Luka Č. Popović, Dragana Ilić.

8. The Physics of the Ionized Gases: 23rd Summer School and International Symposium on the Physics of Ionized Gases, 28.08 -1.09.2006, Kopaonik, Serbia.
Participants: Luka Č. Popović, Miodrag Dačić, Tihomir Petrović, Jelena Kovačević, Dragana Ilić.
9. XVIII Canary Islands Winter School of Astrophysics: "The Emission Line Universe", 20.11 - 1.12.2006, Puerto de la Cruz (Tenerife), Spain.
Participants: Jelena Kovačević, Dragana Ilić.
10. The First Byurakan international school of young astronomers, Byurakan, Armenia, August, 2006.
Participants: Edi Bon, Nataša Gavrilović.
11. The Role of Black Holes in Galaxy Formation and Evolution, 10-13 September, 2006, Potsdam – Germany.
Participants: Luka Č. Popović.
12. The Central Engines of Active Galactic Nuclei, 16-20.10.2006, Xi'an, China.
Participants: Luka Č. Popović.
13. The Nuclear Region, Host Galaxy and Environment of Active Galactic Nuclei, Oaxaca, Mexico, 18 - 20.04.2007.
Participants: Luka Č. Popović
14. JENAM 2007 - Our Non Stable Universe, Yerevan, Armenia
Participants: Luka Č. Popović,
15. VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA), 11 - 15.06.2007, Sremski Karlovci, Serbia.
Participants: Luka Č. Popović, Edi Bon, Nataša Gavrilović, Jelena Kovačević, Dragana Ilić, Saša Simić, Miodrag Dačić, Predrag Jovanović.
16. Studying Nature through Centuries, Conference on the occasion of jubilees of Astronomical Observatory, (150, 120, 75 years), 16-20.11.2007.
Participants: Miodrag Dačić, Edi Bon.

A3. Published papers

A3.1 Papers in the leading international journals

1. Popović, L. Č., Jovanović, P., Mediavilla, E., Zakharov, A. F., Abajas, C., Munoz, J. A., Chartas, G.: 2006, "A study of the correlation between the amplification of the FeK alpha line and the x-ray continuum of quasars due to microlensing", *Astrophysical Journal*, **637** (2), 620 -630.
2. Popović, L. Č., Jovanović, P., Petrović, T., Shalyapin, V. N.: 2006, "Amplification and variability of the AGN X-ray emission due to microlensing", *Astronomische Nachrichten*, **327** (10), 981-984.
3. Simić, S., Popović, L. Č., Andersen, M. I., Christensen, L.: 2007, "Mechanism of light curve variability in the gamma ray bursts", *Astrophysics and Space Science*, **309** (1-4), 173-177.

4. Simić, Z., Dimitrijević, M. S., Popović, L. Č., Dačić, M.: 2006, "Stark broadening parameters for Cu III, Zn III and Se III lines in laboratory and stellar plasma", *New Astronomy*, **12** (3), 187-191.
5. Smirnova, A. A., Gavrilović, N., Moiseev, A. V., Popović, L. Č., Afanasiev, V. L., Jovanović, P., Dačić, M.: 2007, "The gas kinematics in the Mrk 533 nucleus and circumnuclear region: a gaseous outflow", *Monthly Notices of The Royal Astronomical Society*, **377** (2), 480-490.
6. Bon, E., Popović, L. Č., Ilić, D., Mediavilla, E.: 2006, "Stratification in the broad line region of AGN: The two-component model", *New Astronomy Reviews*, **50** (9-10), 716-719.
7. Danezis, E., Nikolaidis, D., Lyratzi, E., Popović, L. Č., Dimitrijević, M. S., Antoniou, A., Theodosiou, E.: 2007, "A new model for the structure of the DACs and SACs regions in the Oe and Be stellar atmospheres", *Publications of The Astronomical Society of Japan*, **59** (4), 827-834.
8. Dimitrijević, M. S., Popović, L. Č., Kovačević, J., Dačić, M., Ilić, D.: 2007, "The flux ratio of the [O III] $\lambda\lambda$ 5007, 4959 Å lines in AGN: comparison with theoretical calculations", *Monthly Notices of The Royal Astronomical Society*, **374** (3), 1181-1184.
9. Dimitrijević, M. S., Ryabchikova, T, Simić, Z., Popović, L. Č., Dačić, M.: 2007, "The influence of Stark broadening on CrII spectral line shapes in stellar atmospheres", *Astronomy & Astrophysics*, **469** (2), 681-686.
10. Ilić, D., Popović, L. Č., Bon, E., Mediavilla, E. G., Chavushyan, V. H.: 2006, "Complex emission line region of Mrk 817", *Monthly Notices of The Royal Astronomical Society*, **371** (4): 1610-1616.
11. Jovanović, P.: 2006, "Influence of Gravitational Microlensing on X-Ray Radiation from Accretion Disks of Active Galaxies", *The Publications of the Astronomical Society of the Pacific*, **118** (842), 656-657.
12. La Mura, G., Popović, L. Č., Ciroi, S., Rafanelli, P., Ilić, D.: 2007, "Detailed Analysis of Balmer Lines in a Selected Sample of 90 Broad Line AGN", *Astrophysical Journal*, **671**, 104-117.
13. Lyratzi, E., Danezis, E., Popović, L. Č., Dimitrijević, M. S., Nikolaidis, D., Antoniou, A.: 2007, "The complex structure of the Mg II $\lambda\lambda$ 2795.523, 2802.698 Å regions of 64 Be stars", *Publications of The Astronomical Society of Japan*, **59** (2), 357-371.
14. Popović, L. Č.: 2006, Erratum: "Balmer Lines as Diagnostics of Physical Conditions in Active Galactic Nuclei Broad Emission Line Regions" (*Astrophysical Journal*, **599**, 140 [2003]), *The Astrophysical Journal*, **650** (2), 1217-1218.

A3.2 Other published papers

1. Popović, L. Č.: 2006, "The broad line region of AGN: Kinematics and physics", *Serbian Astronomical Journal*, **173**, 1-11.
2. Jovanović, P.; Popović, L. Č, "Microlensing of the X-ray emitting region in active galactic nuclei": 2006, Publications of the Astronomical Observatory of Belgrade, **80**, 85-89.
3. Popović, L. Č., Jovanović, P.: 2007, "The Shape of Fe K α Line Emitted by Active Galactic Nuclei: Microlensing Effects", *Publications of the Astronomical Observatory of Belgrade*, **82**, 157.
4. Urošević, D., Vukotić, B., Arbutina, B., Ilić, D.: 2007, "The D relation for planetary nebulae: Preliminary analysis", *Serbian Astronomical Journal*, **174**, 73-77.
5. Ilić, D.: 2007, "Cloudy simulations of Broad Line Region of NGC 5548: Temperature Determination", *Serbian Astronomical Journal*, **175**, 15.

A3.3 Papers published in Conference Proceedings:

1. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č.; Dimitrijević, M. S.: 2007, "Investigation of the Post-Coronal Density Regions of Oe Stars, with the N V UV Resonance Lines", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 210-213.
2. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č.; Dimitrijević, M. S.: 2007, "The N IV Density Regions in the Spectra of 20 Oe Stars", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 206-209.
3. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č., Dimitrijević, M. S.: 2007, "Long Term Variability of the Coronal and Post-Coronal Regions of the Oe Star HD 149757 (zeta Oph)", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 198-201.
4. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č.; Dimitrijević, M. S.: 2007, "A Statistical Study of Physical Parameters of the C IV Density Regions in 20 Oe Stars", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 194-197.

5. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č., Dimitrijević, M. S.: 2006, "Hyper Ionization Phenomena In The N V Region Of 20 Oe Stars", *The Ultraviolet Universe: Stars from Birth to Death, 26th meeting of the IAU, Joint Discussion 4, 16-17 August 2006, Prague, Czech Republic, JD04, #7*
6. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č., Dimitrijević, M. S.: 2006, "Hyper Ionization Phenomena In The N IV Region Of 20 Oe Stars", *The Ultraviolet Universe: Stars from Birth to Death, 26th meeting of the IAU, Joint Discussion 4, 16-17 August 2006, Prague, Czech Republic, JD04, #6*
7. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č., Dimitrijević, M. S.: 2006, "Hyper Ionization Phenomena In The C IV Region Of 20 Oe Stars", *The Ultraviolet Universe: Stars from Birth to Death, 26th meeting of the IAU, Joint Discussion 4, 16-17 August 2006, Prague, Czech Republic, JD04, #5*
8. Antoniou, A., Danezis, E., Lyratzi, E., Nikolaidis, D., Popović, L. Č., Dimitrijević, M. S.: 2006, "Long Term Variability Of The Coronal and Post - Coronal Regions Of The Oe Star HD 93521", *The Ultraviolet Universe: Stars from Birth to Death, 26th meeting of the IAU, Joint Discussion 4, 16-17 August 2006, Prague, Czech Republic, JD04, #4*
9. Bon, E., Ilić, D., Popović, L. Č.: 2006, "Possible Disk Emission in the BLR of AGN", *Proceedings of The 5th Bulgarian-Serbian Conference on Astronomy and Space Science edited by M.K. Tsvetkov, L.G. Filipov, Dimitrijević, M. S., Popović, L. Č., Heron Press Ltd, Sofia 2007, Supplement to Bulgarian Journal of Physics, 34 (2), 223.*
10. Bon, E., Popović, L. Č., Gavrilović, N.: 2007, "The Hidden Disk Emission in the Single Peaked Sy1 Balmer Emission Lines", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings, 938, 59-64.*
11. Bon, E., Popović, L. Č., Ilić, D.: 2007, "Accretion in the broad line region of active galactic nuclei", *Black Holes from Stars to Galaxies – Across the Range of Masses. Edited by V. Karas and G. Matt. Proceedings of IAU Symposium #238, held 21-25 August, 2006 in Prague, Czech Republic. Cambridge, UK: Cambridge University Press 2007, 329-330.*
12. Chatzichristou, E. T., Danezis, E., Popović, L. Č., Lyratzi, E., Dimitrijević, M. S.: 2007, "Studying the Complex Absorption and Emission Lines in AGN Spectra", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings, 938, 65-69.*

13. Ciroi, S., La Mura, G., Popović, L. Č., Ilić, D., Rafanelli, P.: 2006, "Plasma diagnostics in the Active Galactic Nuclei environment", *THE PHYSICS OF IONIZED GASES: 23rd Summer School and International Symposium on the Physics of Ionized Gases, Invited Lectures, Topical Invited Lectures and Progress Reports. AIP Conference Proceedings*, **876**, 385-394.
14. Danezis, E., Antoniou, A., Lyratzi, E., Popović, L. Č., Dimitrijević, M. S., Nikolaidis, D.: 2007, "The DACs and SACs Effects From Stars to Quasars. Some First General Notices", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 119-126.
15. Danezis, E., Nikolaidis, D., Lyratzi, E., Popović, L. Č., Dimitrijević, M. S., Theodossiou, E., Antoniou, A.: 2006, "A New Modeling Approach For DACs And SACs Regions In The Atmospheres Of Hot Emissions Stars", *RECENT ADVANCES IN ASTRONOMY AND ASTROPHYSICS: 7th International Conference of the Hellenic Astronomical Society. AIP Conference Proceedings*, **848**, 380-384.
16. Danezis, E., Popović, L. Č., Lyratzi, E., Dimitrijević, M. S.: 2006, "The Peculiar Absorption And Emission Phenomena From Stars To Quasars", *THE PHYSICS OF IONIZED GASES: 23rd Summer School and International Symposium on the Physics of Ionized Gases, Invited Lectures, Topical Invited Lectures and Progress Reports. AIP Conference Proceedings*, **876**, 373-384.
17. Dimitrijević, M. S., Kovačević, J., Popović, L. Č., Dačić, M., Ilić, D.: 2007, "The flux ratio of the [OIII]λλ 4959, 5007 A lines in AGN", *FIFTY YEARS OF ROMANIAN ASTROPHYSICS. AIP Conference Proceedings*, **895**, 313-316.
18. Dimitrijević, M. S., Ryabchikova, T., Simić, Z., Popović, L. Č., Dačić, M.: 2007, "Stark Broadening of Cr II Spectral Lines in Stellar Atmospheres", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 164-169.
19. Gavrilović, N., Bon, E., Popović, L. Č., Prugniel, P.: 2007, "Determination of Accretion Disc Parameters in the Case of Five AGN with Double-peaked Lines", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 94-97.
20. Gavrilović, N., Mickaelian, A., Petit, C., Popović, L. Č., Prugniel, P.: 2007, "Activity type of galaxies in HyperLeda", *Black Holes from Stars to Galaxies – Across the Range of Masses. Edited by V. Karas and G. Matt. Proceedings of IAU Symposium #238, held 21-25 August, 2006 in Prague, Czech Republic. Cambridge, UK: Cambridge University Press, 2007.*, 371-372.

21. Gavrilović, N., Popović, L. Č., Kollatschny, W.: 2007, "The gravitational redshift in the broad line region of the active galactic nucleus Mrk 110", *Black Holes from Stars to Galaxies – Across the Range of Masses. Edited by V. Karas and G. Matt. Proceedings of IAU Symposium #238, held 21-25 August, 2006 in Prague, Czech Republic. Cambridge, UK: Cambridge University Press, 2007*, 369-370.
22. Gavrilović, N., Smirnova, A. A., Popović, L. Č., Moiseev, A.V., Afanasiev, V. L., Jovanović, P., Dačić, M.: 2007, "The Shape of the Mrk 533 [OIII] Lines: Indication of an Outflow in NLR", *Proceedings of The 5th Bulgarian-Serbian Conference on Astronomy and Space Science edited by M.K. Tsvetkov, L.G. Filipov, Dimitrijević, M. S., Popović, L. Č. Heron Press Ltd, Sofia 2007, Supplement to Bulgarian Journal of Physics*, **34** (2), 315-319.
23. Ilić, D., Popović, L. Č., Ciroi, S., La Mura, G., Rafanelli, P.: 2007, "Physical Properties of the BLR of AGN: Boltzmann-Plot vs. CLOUDY Models", *SPECTRAL LINE SHAPES IN ASTROPHYSICS: VI Serbian Conference on Spectral Line Shapes in Astrophysics (VI SCSLSA). AIP Conference Proceedings*, **938**, 70-75.
24. Ilić, D., Mura, G. La, Popović, L. Č., Shapovalova, A. I., Ciroi, S., Chavushyan, V. H., Rafanelli, P., Burenkov, A. N., Mercado, A.: 2007, "Physical properties of emitting plasma near massive black holes: the Broad Line Region", *Black Holes from Stars to Galaxies – Across the Range of Masses. Edited by V. Karas and G. Matt. Proceedings of IAU Symposium #238, held 21-25 August, 2006 in Prague, Czech Republic. Cambridge, UK: Cambridge University Press, 2007*, 383-384.
25. Ilić, D., La Mura, G., Popović, L. Č., Shapovalova, A. I., Ciroi, S., Chavushyan, V. H., Rafanelli, P., Burenkov, A. N., Mercado, A.: 2007, "Physical Properties of the Broad-line Region", *Astron. Soc. Pacific Conf Series (ASP Conference Series)*, **373**, 405-406.
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