

LIFE AND SCIENTIFIC ACTIVITY OF PROFESSOR IVAN ATANASIJEVIĆ (1919-1998)

M. S. Dimitrijević

Astronomical Observatory Volgina 7, 11160 Belgrade-74, Yugoslavia

(Received: September 26, 1998)

SUMMARY: The life and scientific, professional and other activities of professor Ivan Atanasijević (1919-1998), the founder of radio astronomy in Serbia, professor of the Belgrade and Nimegen University, are presented, followed by Bibliography of his works.



Ivan Atanasijević

On June 26, 1998 in Nimegen, Holland, passed away Ivan Atanasijević, the founder of the Serbian radio astronomy, professor of the Belgrade and Nimegen Universities. It is he who introduced and instituted the astrophysics as a separate subject at the Belgrade University. He was a fellow of the Belgrade Observatory in the period 1945-1948.

Ivan M. Atanasijević was born on February 22, 1919, in Belgrade. He took an interest in astronomy very early, starting collaboration with the first Serbian journal for popularization of astronomy "Saturn" already as a secondary school pupil. He published his contributions, for the writing of which he had the benefit of the Belgrade Observatory's library, under his full name, but also under the pseudonym St (Atanasijević's written statement in the authors's files) and under the initials I.M.A. and I.A.. In "Saturn" No. 3, 1936, we find on the page 80, in the Section "Society's News", Mr. I. Atanasijević having been elected full member of the Astronomical Society at the session of the Menagerial Board on March 15, 1936.

He completed his elementary and secondary education in Belgrade. On completing the secondary school in 1937 he enrolled in the Faculty of Philosophy, Group for Applied Mathematics. According to Atanasijević's written statement (in author's files)

this Group, with its main subjects Rational Mechanics, Celestial Mechanics and Theoretical Physics, seemed to him to be the closest to the astrophysics.

The Second World War made him break off his studies. He resumed them after the war ended. He graduated from the Group for Applied Mathematics in 1947 with the average mark 9.98. From January 1945 to 1948 he was engaged at the Belgrade Observatory, first as an observer, being promoted to assistant on completing his studies.

In April 1948 he joined the Department of Physics of the Faculty of Sciences. At this time he became interested in radio astronomy, trying to construct a radio-astronomical receiver. The school year 1951/52 was spent by him in the Laboratory for Radio-astronomy of the Institute for Astrophysics in Paris, with the French radio-astronomy pioneer M. Laffineur. Here he took part in the first measurements in France of the radio-emission of the Milky Way (wavelength 117 cm). Besides, he carried out measurements, using Institute's radio-telescope during the partial solar eclipse of February 25, 1952. Having returned to Belgrade he took on constructing a receiver for the solar radio-emission at the wavelength 50 cm, registering successfully in July 1955 for the first time the radio-emission of the Sun. In 1954 he was elected a lecturer for the subject Astrophysics, just introduced at the Department of Physics. In 1956 he defended his doctoral dissertation "Radiation of the Milky Way on the wavelength 117 cm", before the Examination Board with Milutin Milanković, Dragoljub Jovanović and Pavle Savić as its members, following which he was elected assistant professor. On invitation he left for Paris where he worked at the Institute of Astrophysics in the Group for spectrophotometry of continuous stellar spectra. He carried out these observations at the Haute Provence Observatory in the Southern France and at the high altitude observatory on Jungfrauoch in Switzerland. Jointly with Vladimir Kurganoff he participated in the international campaign of photo-electrical measurements of the Beta Lirae radiation, performed at the Lille University Observatory. In his absence the subject Astrophysics was suspended at the Department of Physics and transferred to the Department of Mechanics and Astronomy of the Belgrade Faculty of Sciences where he took it on after having returned to Belgrade. Thanks to his initiative and endeavours a small light construction building was erected within the Belgrade Observatory's grounds serving for the practical works of the students. Next to this building Atanasijević installed a radio telescope and a radio-interferometer, starting therewith measurements of the solar radio-radiation. These measurements and researches were conducted until the end of 1965.

In the meantime Astronomy was detached

from and instituted as a separate Department, Atanasijević being elected in 1964 as its associated professor. In the procedure of his election he submitted the manuscript of the textbooks "Lectures in the Practical Astrophysics" and, together with Jelena Milogradov, "Selected chapters of stellar astronomy". These are the first textbooks of astrophysics with us. The second one has been published in 1968, 1974 and 1997 (Atanasijević, Milogradov 1968, 1974, 1997) but the first one unfortunately remained a manuscript. For reason of its historical interest and its contents, testifying to pedagogic talents of Professor Atanasijević, its contents are given in the Appendix.

On January 1, 1960 Atanasijević got the appointment at the Faculty of Sciences in Nimegen, Holland, and left the country. There he lectured in General Astronomy and Selected Chapters of Astronomy all through until he retired on January 1, 1984. He conceived and organized practical exercises in Astronomy which included observations and photographing of the sky. For the series of exercises "Introduction into Research Work", destined to his students of physics and Astronomy he designed a celostat with the aid of which the distribution of monochromatic light over the solar disc could be monitored. Atanasijević inspired and instituted regular observations of the Sun in white light and in H alpha line, as well as the Service for observing the ionospheric disturbances of other radio waves. These observations are kept on at the present time within the framework of international nets (SIDC, Brussels and RWC, Meudone, France). He was a member of the International Astronomical Union, British Astronomical Society, Italian Astronomical Society and the Dutch Astronomical Club. He died on June 26, 1998 in Nimegen.

Ivan Atanasijević's Bibliography, given here, comprises 91 entries. There are among others the first Serbian scientific papers concerning radio-astronomy. Those of them treating the first measurements of the radio-emission of the Milky Way, executed in France, are pioneering in this field on the international scale. A testimony to Atanasijević's pedagogical talents is the fact that the Science Citation Index, publishing in the USA, registers seven citations in the international scientific literature of his textbook "Selected Exercises in Galactic Astronomy". From the enclosed Bibliography we see Ivan Atanasijević as a great popularizer of Astronomy in our midst, his activity in this field begun in 1936, when he as a secondary school pupil became a collaborator of "Saturn", the first journal dedicated to the popularization of Astronomy in Serbia.

BIBLIOGRAPHY OF IVAN ATANASIJEVIĆ

1936

1. I. M. A. (translated by): Klein Hermann: 1936, Astronomske večeri (VI), *Saturn*, **II**, No. 1, 10-15.
2. I. M. A. (translated by): Klein Hermann: 1936, Astronomske večeri (Nastavak VI večeri; VII), *Saturn*, **II**, No. 2, 35-39.
3. ***: Klein Hermann: 1936, Astronomske večeri (Nastavak VII večeri), (articles in numbers 3, 4 and 5 are without the name of translator and the translator of articles in numbers 6, 7 and 8 is Djordje Nikolić. The author of translation is one of them or both?) *Saturn*, **II**, No. 3, 60-64.
4. ***: Klein Hermann: 1936, Astronomske večeri (Nastavak VII večeri), *Saturn*, **II**, No. 4, 115-117.
5. ***: Klein Hermann: 1936, Astronomske večeri (Nastavak VII večeri, VIII), *Saturn*, **II**, No. 5, 144-146.
6. I. M. A. (translated by): Klein Hermann: 1936, Astronomske večeri (Nastavak VIII večeri), *Saturn*, **II**, No. 9, 208-213.
7. I. M. A. (translated by): Klein Hermann: 1936, Astronomske večeri (Nastavak VIII večeri), *Saturn*, **II**, No. 10, 233-237.

1939

8. St. (translated by): Stroemgren Elis: 1939, Planetarium - Remek delo u Jeni, *Saturn*, **V**, No. 3, 54-60.
9. St.: 1939, 20 godina od smrti E. C. Pickering-a (1919), *Saturn*, **V**, No. 3, 70.
10. ***: 1939, Problem dva tela, *Saturn*, **V**, No. 6-7, 150-154. No. 3, 70.
11. St. (translated by): Leprince-Ringuet Louis: 1939, Napredak u poznavanju kosmičkog zračenja, *Saturn*, **V**, No. 8-9, 169-175. No. 3, 70.
12. St. (translated by): Leprince-Ringuet Louis: 1939, Napredak u poznavanju kosmičkog zračenja (Nastavak), *Saturn*, **V**, No. 10-11, 193-200. No. 3, 70.
13. St. (translated by): Stroemgren Elis: 1939, Problem dva tela (Nastavak), *Saturn*, **V**, No. 10-11, 209-213. No. 3, 70.
14. St. (translated by): Leprince-Ringuet Louis: 1939, Napredak u poznavanju kosmičkog zračenja (Svršetak), *Saturn*, **V**, No. 12, 225-233. No. 3, 70.

1940

15. St.: 1940, Nova Monocerotis 1940, *Saturn*, **VI**, No. 1, 31-32.
16. Atanasijević, I.: 1940, Jedan amaterski astrograf, *Saturn*, **VI**, No. 4-5, 113-116.
17. I. A.: 1940, Prividni položaji komete Parasevopulos 1941 c., *Saturn*, **VI**, No. 12, 272.

1945

18. I. M. A.: 1945, Opservatorija Simeis, *Astronomska i meteorološka saopštenja*, No. 2, 31 december, 19.
19. I. M. A.: 1945, Opservatorija u Iklu, No. 2, 31 december, 20.
20. Atanasijević, I. M.: 1945, Promene intenziteta Sunčevog sjaja u toku pomračenja, *Astronomska i meteorološka saopštenja*, No. 1, 8-9.

1946

21. I. M. A.: 1946, Astronomija i radio, *Astronomska i meteorološka saopštenja*, No. 3, 15 april, 22.

1947

22. I. M. A.: 1947, Posmatranje Drakonida, *Astronomska i meteorološka saopštenja*, No. 5, 20 october, 25-26.
23. I. M. A.: 1947, Promenljiva R Coronae Borealis, *Astronomska i meteorološka saopštenja*, No. 5, 20 october, 26.
24. I. M. A.: 1947, Foelektrično registrovanje meridijanskih prolaza zvezda, *Astronomska i meteorološka saopštenja*, No. 5, 20 october, 32.
25. I. M. A.: 1947, Naučni sastanci u SSSR, *Astronomska i meteorološka saopštenja*, No. 5, 20 october, 37.

1948

26. Atanasijević Ivan: 1948, Posmatranje meteorskog roja Drakonida u SSSR, *Nauka i priroda*, **1**, No. 1, 53.
27. Atanasijević Ivan: 1948, Zračenje Sunca u domenu kratkih radio-talasa, *Nauka i priroda*, **1**, No. 1, 53.

28. I. A.: 1948, Osnivanje društva matematičara i fizičara N. R. Srbije, *Nauka i priroda*, **1**, No. 2, 71.
 29. I. M. A.: 1948, Fotoelektrično registrovanje meridijanskih prolaza zvezda, *Nauka i priroda*, **1**, No. 3, 55-57.

1949

30. Atanasijević, I. (translated by): Masevič, A. G.: 1949, Konstitucija zvezda i izvori njihove energije, *Nauka i priroda*, **II**, No. 1, 55-64.
 31. Atanasijević, I. (translated by): Gurjev, G. A.: 1949, Kopernikovo učenje, *Nauka i priroda*, **II**, No. 3, 162-170.
 32. I. M. A.: 1949, Izotopi ugljenika u zvezdanim atmosferama, *Nauka i priroda*, **II**, No. 3, 185-186.
 33. Atanasijević Ivan: 1949, Saturn i njegovi prstenovi, *Nauka i priroda*, **II**, No. 4, 199-202.
 34. I. M. A. (translated by): Žabotinski, M. F.: 1949, Kombinaiono rasturanje svetlosti (govor molekula), *Nauka i priroda*, **II**, No. 4, 203-208.
 35. Atanasijević Ivan: 1949, Jupiter - najveća planeta našeg planetnog sistema, *Nauka i priroda*, **II**, No. 6, 312-317.
 36. Atanasijević, I. (translated by): Krat, V. A.: 1949, Savremena kosmogonija i astrofizika, *Nauka i priroda*, **II**, No. 8, 451-451.
 37. Atanasijević, I.: 1949, Pomračenje Meseca, *Nauka i priroda*, **II**, No. 8, 491-492.
 38. Atanasijević Ivan: 1949, Zračenje Sunca i galaksije u domenu kratkih radio-talasa, *Vesnik Društva matematičara i fizičara Narodne republike Srbije*, No 2, 23-39.

1950

39. Atanasijević Ivan M.: 1950, Pojave na našem nebu 1950 godine, *Nauka i priroda*, **III**, No. 1, 59.
 40. I. M. A.: 1950, Novi sateliti Urana i Neptuna, *Nauka i priroda*, **III**, No. 2, 102.
 41. I. M. A.: 1950, Sa zasedanja Oteška fiziko - matematičkih nauka A.N. S.S.S.R., *Nauka i priroda*, **III**, No. 2, 110-111.
 42. Atanasijević Ivan M.: 1950, Kako se ispituje zračenje zvezda (fotometrija i kolorimetrija), *Nauka i priroda*, **III**, No. 3, 133-142.
 43. Atanasijević Ivan M.: 1950, Kako se ispituje zračenje zvezda (spektralne metode), *Nauka i priroda*, **III**, No. 4, 200-211.
 44. Atanasijević Ivan: 1950, Spiralne magline, *Nauka i priroda*, **III**, No. 5, 308-312.
 45. I. M. A. (translated by): Gimeljarb, V. N.: 1950, Najbliže zvezde, (fotometrija i kolorimetrija), *Nauka i priroda*, **III**, No. 5, 313-315.
 46. Atanasijević Ivan: 1950, Kosmičko zračenje na kratkim radiotalasima, *Nauka i priroda*, **III**, No. 9, 539-547.
 47. I. M. A. (translated by): 1950, Brzina rotacije kod zvezda, *Nauka i priroda*, **III**, No. 10, 691.
 48. I. M. A. (translated by): 1950, Metan u Zemljinoj atmosferi, *Nauka i priroda*, **III**, No. 10, 691-692.

1951

49. I. M. A.: 1951, Za posmatrača neba, *Nauka i priroda*, **IV**, No. 3, 131-133.
 50. Atanasijević Ivan M.: 1951, Pojave na našem nebu 1951 godine, *Nauka i priroda*, **IV**, No. 1, 33-39.
 51. I. M. A.: 1951, Za posmatrača neba, *Nauka i priroda*, **IV**, No. 3, 131-133.
 52. Atanasijević Ivan M.: 1951, Klasifikacija zvezdanih spektara i Hertzsprung-Russel-ov dijagram, *Nauka i priroda*, **IV**, No. 4-5, 153-161.
 53. Atanasijević I. M.: 1951, Promenljiva Beta u sazveždju Lire, *Nauka i priroda*, **IV**, No. 4-5, 182-183.
 54. I. M. A.: 1951, Putanja jednog meteorskog roja posmatranog radarom, *Nauka i priroda*, **IV**, No. 4-5, 186-187.
 55. I. M. A.: 1951, Ikar - novi planetoid sa neobičnom putanjom, *Nauka i priroda*, **IV**, No. 4-5, 192-193.

1952

56. Laffineur, M., Michard, R., Pecker, J.C., D'Azanbuja, M., Dollfus, A., Atanasijević, I.: 1952, Observations combinées de l'éclipse totale du Soleil du 25 février 1952 à Khartoum (Soudan) et de l'éclipse partielle au radiotélescope de l'Observatoire de Meudon, *Comptes Rendus de l'Académie des Sciences*, 7 Avril 1952, i Contributions de l'Institut d'Astrophysique de Paris, No. 108.
 57. Atanasijević, I.: 1952, Le rayonnement de la Voie Lactée sur 255Mc/s, *Comptes Rendus de l'Académie des Sciences*, 16 Juillet 1952, **235**, 130 and Contributions de l'Institut d'Astrophysique de Paris, No. 122.

This article is cited in:

1. Ko, H. C.: 1958, The distribution of cosmic radio background radiation, Proceedings of the Institute of the Radio Engineers, **46**, 208.

58. Atanasijević, Ivan: 1952, O Suncu (kratak pregled osnovnih činjenica i posmatračkih metoda), *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1952*, 254-278.

1953

59. Atanasijević Ivan: 1953, O vezi između nekih pojava na Suncu i Zemlji (Hromosferske erupcije), *Nauka i priroda*, **VI**, No. 5, 183-191.
60. Ševarlić, B. M., Atanasijević, I.: 1953, O potrebi obnavljanja nastave astronomije u srednjoj školi i mogućnostima njena unapređenja, *Nastava matematike i fizike u srednjoj školi*, **II**, No 2, 133-137.

1954

61. I. M. A.: 1954, Mesečevo i Sunčevo pomračenje u toku leta, *Nauka i priroda*, **VII**, No. 5, 227-228.
62. Atanasijević Ivan: 1954, Medjugalaktička materija, *Nauka i priroda*, **VII**, No. 7, 298-301.
63. Atanasijević, Ivan: 1954, O Sunčevom radiofrekventnom zračenju, *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1954*, 151-193.

1955

64. Atanasijević, Ivan: 1955, Kosmičko radiofrekventno zračenje, *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1955*, 133-167.

1956

65. Atanasijević, Ivan: 1956, Zračenje Mlečnog puta na talasnoj dužini od 117cm, Doktorska disertacija, Prirodno - Matematički fakultet, Beograd. (Ph.D. Thesis, Faculty of Sciences, Belgrade).
66. Atanasijević Ivan: 1956, Jedna konstruktivna metoda za određivanje heliografskih koordinata Sunčevih pega, *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1956*, 109-112.
67. Atanasijević Ivan: 1956, Simpozijum o radioastronomiji Medjunarodne astronomske unije (Jordell Bank 25-27 avgusta 1955), *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1956*, 147-161.
68. Atanasijević Ivan: 1956, Rad komisije za radioastronomiju na kongresu u Dublinu, *Bošković, Almanah Hrvatskog prirodoslovnog društva za godinu 1956*, 185-187.
69. Atanasijević Ivan: 1956, Fotoelektrična fotometrija Mesečevih pomračenja polusenkom, *Vesnik Društva matematičara i fizičara Narodne republike Srbije*, **VIII**, No 3-4, 211-214.

1958

70. Atanasijević, I., Chalonge, D.: 1958, Classification de quelques étoiles dans NGC 2264 et dans les Pléiades, *Journal des Observateurs*, **41**, No.6.
71. Atanasijević Ivan: 1958, Izgradnja jednog radioastronomskog prijemnika za talasnu dužinu od 50 cm, *Vesnik Društva matematičara i fizičara Narodne republike Srbije*, **X**, 149.

1960

72. Atanasijević, I.: 1960, O nekim osnovnim pitanjima univerzitetske nastave astronomije (Referat na III Kongresu matematičara i fizičara FNRJ, astronomska sekcija), *Nastava matematike i fizike*, No. 3-4, 27-30.
73. Wood, D. B., Walker, M. F.: 1960, Photoelectric observations of Beta Lyrae, *Astrophysical Journal*, **131**, 363 (Na str. 363 pominje da su u programu fotoelektričnih posmatranja učestvovali... V. Kourganoff i Y. Atanacievic, Lille; On 363 page is mentioned that in the photoelectric observation programme took part ... V. Kourganoff and Y. Atanacievic, Lille).

1963

74. ***: 1963, Katedra za astronomiju, U: Sto godina Filozofskog fakulteta, redakcija Dr T. Andjelić, D. Vučenov, R. Samardžić odgovorni urednik (u prilogu O ovoj knjizi, na str. 883 piše da je autor I. Atanasijević; on page 883 is mentioned that the author is I. Atanasijević), Narodna knjiga, Beograd, 519-528.
75. Atanasijević Ivan: 1963, Radioteleskop i radiointerferometar astrofizičke laboratorije i njegova primena na merenje Sunčevog zračenja na talasnoj dužini od 50 cm, *Vesnik Društva matematičara i fizičara Narodne republike Srbije*, **XV**, No 1-4, 151.
76. Atanasijević Ivan, Milogradov Jelena: 1963, Sunčeva korona prilikom potpunog Sunčevog pomračenja od 15 februara 1961. godine, *Vesnik Društva matematičara i fizičara Narodne republike Srbije*, **XV**, No 1-4, 161-169.

77. Atanasijević, I.: 1963, Nastava astrofizike na Prirodno - Matematičkom fakultetu u Beogradu, *Nastava matematike i fizike*, No 3-4, 69-73.
- 1964**
78. ***: 1964, Astronomske nauke i njihov savremeni značaj (po izjavi J. Milogradov-Turin autor je I. Atanasijević; according to the statement of J. Milogradov-Turin, the author is I. Atanasijević), Prirodno-matematički fakultet, Katedra astronomije, Beograd, 1-16.
79. Atanasijević, I.: 1964, Travaux pratiques d'Astronomie en laboratoire, Proceedings of the XII General Assembly of the Int. Astronomical Union, Hamburg 1964, *Transactions of the IAU*, **XII B**, 641.
80. Atanasijević, I.: Predavanja iz praktične astrofizike, skripta.
- 1964-1965**
81. Атанасијевић, И.: 1964-1965, О студентским практичним радовима из астрономије, *Настава математике и физике*, **XIII-XIV**, 29-34.
- 1968**
82. Atanasijević, I., Milogradov, J.: Izabrana poglavlja zvezdane astronomije, skripta.
83. Atanasijević, I.: 1968, O prvim radioastronomskim radovima u našoj zemlji, *Publ. Obs. Astron. Belgrade*, No **12**, 187-192.
84. Atanasijević, I., Milogradov, J.: 1968, Struktura Sunčeve korone 15 februara 1961 godine, *Publ. Obs. Astron. Belgrade*, No **12**, 143-156.
- 1971**
85. Atanasijević, I.: 1971, Selected Exercises in Galactic Astronomy, D. Reidel Publ. Co., Dordrecht, 1-144.
- Prethodni rad se citira u; This article is cited in:
1. Fischel, D., Feibelman, W. A.: 1973, Kinematics of the Huyghenian Region of the Orion Nebula, *Astrophysical Journal*, **180**, 801.
 2. Upgren, A. R.: 1978, The motions of K and M dwarf stars of different ages, *Astronomical Journal*, **83**, 626.
 3. Oja, H.: 1975, Perihelion Distribution of Near - parabolic - comets, *Astronomy and Astrophysics*, **43**, 317.
 4. Bord, D. J.: 1976, Instructional use of the computer: Stellar orbits in the galactic plane, *American Journal of Physics*, **44**, 589.
 5. Khanna, M., Sharma, S. D.: 1983, Perihelion distribution of long-period comets and Solar apex, *Publications of the Astronomical Society of Japan*, **35**, 559.
 6. Oblak, E.: 1983, The gradients of the velocity ellipsoid for nearby stars, *Astronomy and Astrophysics*, **123**, 238.
 7. Sharma, S. D., Khanna, M., Chhabra, J. G.: 1988, Perihelion distribution of long period "new" comets, *Monthly Notices of the Royal Astronomical Society*, **235**, 1467.
- 1974**
86. Atanasijević, I., Milogradov, J.: Izabrana poglavlja zvezdane astronomije, skripta, drugo izdanje (second edition).
- 1987**
87. Atanasijević, I.: 1987, Photospheric and H-Alpha observations of the region 4474 in the period between 20 April and 4 May 1984 at Nijmegen, U: World Data Center A for Solar-Terrestrial Physics, Solar Geophysical Activity Reports for Strip Interval XV, National Geophysical Data Center, U.S. Department of Commerce, July 1987, NOAA, 24.
88. Atanasijević, I., Balster, H. A. M.: 1987, Sudden Ionospheric Disturbances associated with the region 4474 as recorded at Nijmegen, U: World Data Center A for Solar-Terrestrial Physics, Solar Geophysical Activity Reports for Strip Interval XV, National Geophysical Data Center, U.S. Department of Commerce, July 1987, NOAA, 303.
89. Atanasijević, I.: 1987, Milankovićeva astronomska teorija klimatskih promena, *Dijalektika*, **XXII**, 41-72
- 1989**
90. Atanasijević, I., Balster, H.A.M., Hoovers, H.F.C.: 1989, De verhoogde Zonneaktiviteit in maart 1989, *Zenit*, **9**, 326.
- 1997**
91. Atanasijević, I., Milogradov, J.: 1997, Izabrana poglavlja zvezdane astronomije, Skripta, treće izdanje (third edition).

APPENDIX

PREDAVANJA IZ PRAKTIČNE ASTROFIZIKE

Sadržaj

Beograd, 1964, rukopis

Predgovor	1
Uvod	5
I. Oko i vidjenje	
I.1 Uvod	9
I.2 Sklop oka	9
I.3 Akomodacija i adaptacija	10
I.4 Ekstrafovealno vidjenje; paralaktička greška	11
I.5 Razdvojna moć oka; iradijacija	13
I.6 Spektralna osetljivost oka; Purkinje-ov efekat	14
I.7 Pojam skale prividnih veličina	16
II. Astronomski durbini	
II.1 Istorijski podaci	19
II.2 Osnovne funkcije durbina	21
II.3 Povećanje durbina	21
II.4 Razdvojna moć durbina	23
II.5 Granična prividna veličina	25
II.6 Posmatranje difuznih izvora	27
II.7 Refraktori i reflektori	28
II.8 Glavni tipovi okulara	30
II.9 Numeričke karakteristike durbina	32
II.10 Paralaktički način postavljanja	33
II.11 Gubici svetlosti u durbinima	34
II.12 Aberacija optičkih sistema	35
III. Astrofotografija	
III.1 Istorijski podaci	39
III.2 Odlike fotografske metode	42
III.3 Fotografska emulzija; fotografski proces	43
III.4 Struktura fotografske slike dotfill 44	
III.5 Spektralna osetljivost fotografske emulzije	45
III.6 Fotometrijska svojstva fotografske emulzije	46
III.7 Astrografi	49
III.8 Nedostaci astrografskih objektivna	51
III.9 Svetlosna moć objektivna	52
III.10 Numerički podaci	53
III.11 Schmidt-ov i Maksutovljev teleskop	55
III.12 Fotografske karte neba	56
III.13 Pretvarači slike; elektronski teleskop	58

IV. Astrofotometrija	
IV.1 Istorijski podaci	62
IV.2 Uvod: apsolutna i diferencijalna merenja; subjektivne i objektivne metode	67
Vizualna fotometrija	
IV.3 Argelanderova metoda	68
IV.4 Fotometar sa klinom	72
IV.5 Zöllner-ov fotometar	76
IV.6 Katalozi vizualnih prividnih veličina	78
IV.7 Veze između astrofizičkih i fizičkih fotometrijskih jedinica	80
Fotoelektrična fotometrija	
IV.8 Objektivne fotometrijske metode uopšte	84
IV.9 Fotoelektrične pojave primenjene u fotometriji	85
IV.10 Osnovne karakteristike fotoelektričnih ćelija	86
IV.11 Proračun primarne fotostruje	90
IV.12 Pojačavanje primarne fotostruje; gasne ćelije i fotomultiplikatori	92
IV.13 Merenje fotostruja; pojačavači	97
IV.14 Optički deo fotoelektričnog fotometra	103
IV.15 Izvodjenje i svodjenje fotoelektričnih merenja; Pitanje granične osetljivosti fotoelektričnih fotometara	105
IV.16 Uporedna analiza fotometra sa gasnom ćelijom i fotometra sa fotomultiplikatorom	108
IV.17 Električne fluktuacije pri fotoelektričnim merenjima; odnos signal/šum	113
IV.18 Granična osetljivost fotomultiplikatora	121
Fotografska fotometrija	
IV.19 Opšte osnove fotografske fotometrije; fotografsko dejstvo; fotometrijska greška polja	123
IV.20 Tehnika fotografske fotometrije; snimanje u žiži i van nje: Schwarzschild-ova kasetna	127
IV.21 Subjektivno određivanje fotografskog dejstva; ocenjivanje; metoda poredne skale	128
IV.22 Objektivne metode određivanja fotografskog dejstva; mikrofotometri	132
IV.23 Apsolutna merenja u fotografskoj fotometriji	140
V. Opšte osnove fotometrijskih metoda	
V.1 Uvod; prijemnik zračenja i njegova reakcija	144
V.2 Energetska osvetljenost	145
V.3 Uticaji atmosfere i optike instrumenta	146
V.4 Analitički izraz za reakciju prijemnika	147
V.5 Pojam fotometrijskog sistema	150
V.6 Izofotna talasna dužina	152
V.7 Odnos raznih fotometrijskih sistema; indeks boje	154
V.8 Veza između indeksa boje i temperature zvezde	156
V.9 Svodjenje sa jednog fotometrijskog sistema na drugi; standardi prividnih veličina	159
VI Astrospektroskopija	
VI.1 Istorijski podaci	163
VI.2 Sklop spektrografa; osnovni tipovi spektrografa	168
VI.3 Uglovna i linearna disperzija	171
VI.4 Razdvojna moć spektrografa	174

VI.5 Astronomski spektrografi; tehnika snimanja.....	176
VI.6 Objektiv-prizma; spektrograf bez proreza	179
Spektrofotometrijske metode	
VI.7 Uvod	183
VI.8 Spektrofotometrijsko odredjivanje zvezdanih temperatura; temperatura po boji.....	184
VI.9 Relativni i apsolutni spektrofotometrijski gradijenti.....	186
VI.10 Fotoelektrični spektrofotometar	190
VI.11 Fotografaska spektrofotometrija; registrujući mikrofotometar	193
VI.12 Širi značaj spektrofotometrijskih merenja; spektrofotometrijski gradijenti zvezda	197
Spektralna klasifikacija zvezda	
VI.13 Uvod	199
VI.14 Harvardska klasifikacija; opis tipičnih spektara.....	200
VI.15 Proširena Harvardska klasifikacija; efekat apsolutnog sjaja	204
VI.16 Jerkska dvodimenzionalna spektralna klasifikacija (Morgan, Keenan).....	207
VI.17 Kvantitativne spektralne klasifikacije	210
VII Uticaj atmosfere na fotometrijska i spektrofotometrijska merenja	
VII.1 Jednačina problema i njeno rešavanje; atmosferska masa	212
VII.2 Koeficijenti transmisije i ekstinkcije; Bouger-ova prava	215
VII.3 Svodjenje spektrofotometrijskih merenja	220
VIII Opšte radioastronomske metode	
VIII.1 Istorijski podaci	222
VIII.2 Osnovne jedinice i veličine	226
VIII.3 Glavni zadaci praktične radioastronomije; radioteleskopi	230
VIII.4 Parabolički reflektori radioteleskopa; načini postavljanja	232
VIII.5 Glavne karakteristike Hercovog dipola	236
VIII.6 Glavne karakteristike polutalasnog dipola.....	241
VIII.7 Antenski sistemi sa paraboličkim reflektorom	246
VIII.8 Veza izmedju fluksa, sjaja i raspoložive snage u anteni	249
VIII.9 Visokofrekventni vod u sklopu radioteleskopa	253
VIII.10 Prijemnički deo radioteleskopa.....	255
VIII.11 Šum prijemnika; faktor šuma; pitanje granične osetljivosti.....	262
VIII.12 Kalibrisanje prijemnika; generatori šuma.....	267
VIII.13 Odredjivanje fluksa i sjaja izvora	271
VIII.14 Permutacioni i Dikeov prijemnik.....	272
VIII.15 Prosti interferometri; Merenja sfernih koordinata radioizvora; merenja cirkularne polarizacije radiozračenja; odredjivanje prečnika radioizvora.....	273
VIII.16 Merenje talasnih dužina i odredjivanja profila linija u spektru radiozračenja	283
VIII.17 Noviji antenski sistemi i prijemnici	286

**ЖИВОТ И НАУЧНА АКТИВНОСТ ПРОФЕСОРА ИВАНА АТАНАСИЈЕВИЋА
(1919-1998)**

М. С. Димитријевић

Астрономска опсерваторија, Волгина 7, 11160 Београд-74, Југославија

УДК 929(497,11)''19/19'' А.:52(092)
Стручни рад

У раду су приказани живот, научни и стручни рад, као и друге активности професора Ивана Атанасијевића (1919-1998), оснивача радио-астрономије у Србији, професора Универзитета у Београду и Нимегену. На крају је дата библиографија његових радова.