

## PROMOTION AND POPULARIZATION OF ASTRONOMY IN KRUSEVAC 2008 - 2011

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**Abstract.** This paper is an overview of activities related to promotion and popularization of astronomy in Krusevac from 2008th to 2011th year. Special attention is paid to activities in 2009th year during the celebration of International Year of Astronomy and results achieved during this period on the national and international level.

### 1. ASTRONOMY SECTION OF GYMNASIUM IN KRUSEVAC

Astronomy section in Gymnasium in Krusevac was founded in September 2003rd. Students Vladimir Djokic and Ksenija Krsmanovic, the participants of science programs in Petnica, filed an initiative to establish this section in school, supported by subject teachers and other students. Section meetings were every second Saturday in month in the physics cabinet. The professor of physics Milanka Ilic is leading this section, supported by other colleagues Dragan Milicevic, Ivan Zornic, Dragana Savic and Dobrivoje Grcak. The aim of this section is to popularize astronomy among students in school by organizing lectures on interesting topics in astronomy and astrophysics and organizing observations of celestial objects for students. Astronomical equipment of this section consists of telescope Sky Watcher 114/500 on EQ1 mount. In the period until 2008th the members organized a number of interesting lectures about coordinate systems in astronomy, time, Solar system, constellations, astronomical instruments, radio telescopes, deep sky objects, black holes and so on. Members organized a few observations from the hill Bagdala. In 2008th section members decided to take an active part in celebrating the International Year of Astronomy 2009th, and for that occasion they have designed a series of lectures on astronomy. Some of the topics of the lectures are: What is astronomy?, Stephen Hawking, Time, etc. In addition to these astronomical lectures members took part in an international project called "Galilean Nights". This project was implemented in Krusevac, in cooperation with the NGO "Edukativni centar" called "Galilean nights in Krusevac". The project aim was to popularize astronomy by organizing interesting lectures on Galileos achievements, and observation of objects that Galileo observed (Moon, Jupiter and its satellites). The project was implemented on 23rd and 24th October 2009th and was one of two officially notified "Galilean Nights" project activities in Serbia. The project consisted of two parts, lectures and astronomical observation. Lectures were organized in the

evening on both days of the project. Topics of lectures and speakers for this project were: Zoran Tomic - "What is astronomy?" Olgica Lukanovic - "Modern research of the Moon", Bojana Zajic and Milutin Spasic - "Earth's space neighborhood" and Pavle Grkovic - "Someone once said that the Earth still turns". It was planned to organize the observations with the telescope from hill Bagdala every night of project, but due to bad weather conditions this part was replaced with organized on-line observation of Jupiter organized by astrophysicist Gianluca Masi from Virtual Telescope Project. About 50 students attended this project. Bojan Zajic and Milutin Spasic, members of this section, took part in the competition called "Teaching Prizes 2009" organized by MyTelescope.com group. The aim of this competition was to write a project how to implement services offered by this group (renting the telescope time at observatories located in New Mexico and New Brunswick) and their use for educational purposes. The students proposed a project entitled "Determination of the basic characteristics of Jupiter", which they wrote under the mentorship of professor of physics Dragana Milicevic and with the help of Zoran Tomic. The aim of this project was to organize the introductory lectures so that students become more familiar with astronomy as a science, the methods used in research, celestial objects, instruments used in the study, and after that to organize workshops where students will apply their knowledge and determine, with data collected during the observation, the basic characteristics of Jupiter (mass, gravitational acceleration, average density, critical velocity). On 16th January 2010th participants received a notice from the organizers of the competition that they have received one of four first prizes, 100 hours of observing time on telescopes of this group. This observation time members of the section, and later members of the astronomical society "Eureka", used for realization of project, organizing observation sessions, and promoting the concept "Astronomy from the chair" at the Festival of Science 4 in Belgrade in December 2010th, Faculty of Natural Sciences and Mathematics in Nis and the Journal Club at the AOB (Astronomical Observatory Belgrade). For all these activities that members have organized and implemented in Krusevac they received recognition from the National Committee for celebration of the International Year of Astronomy 2009th for contribution to promotion of astronomy during IYA 2009, and Gymnasium in Krusevac received one Galileoscope.

## 2. ASTRONOMICAL SOCIETY "EUREKA"

Astronomical Society "Eureka" was established on 6th March 2010th by Dragana Milicevic - professor of physics in Gymnasium, Dragan Ramdilovic - president of Amateur Astronomers Association of Serbia, Nedeljko Pesterac - local entrepreneur, Bojana Zajic - student of Gymnasium in Krusevac, Milanka Ilic - professor of physics in Gymnasium and Zoran Tomic - student of Faculty of Economics Nis. The headquarters of the Society is in Gymnasium in Krusevac. Astronomical Society "Eureka" is engaged in the popularization of astronomy and related sciences, organizing lectures on various topics of from astronomy, and science, organizing astronomical observations in Krusevac, implementation of projects related to the popularization of astronomy, and takes participation in various astronomical events. Astronomical Society on the day it was founded organized the first public astronomical observation for the citizens of Krusevac, called "Get to know the astronomy and celestial bodies". The observation took place on the hill Bagdala, and the equipment used was a high school

telescope Newton 114/500 and refractor telescope 60/700 owned by Zoran Tomic. On that occasion, public observed Orion Nebula, Saturn and the Pleiades, and also there was talk about constellations, as well as astronomical instruments. About 20 citizens attended observation. On 26th March society hosted professor dr Slobodan Ninkovic who in the Culture Center of Krusevac gave a lecture about stellar systems. The lecture was attended by 150 astronomy lovers from Krusevac. In the evening, Dragan Radmilovic organized observation with his telescope Sky Watcher 200/1000 on EQ6 mount on hill Bagdala. That evening observers observed Moon and Saturn. Until October that year, society has made its web site with which the members and the public were informed about its activities, and other astronomical activities in Serbia. Web site address is [www.eureka.nebjak.net](http://www.eureka.nebjak.net). Astronomical society "Eureka" organized in August observation of Perseid meteors from Bagdala. In addition to observing meteors guest have observed Venus and Jupiter. This event was attended by some 50 fellow citizens. Society supported the activity of the Astronomical magazine called International Observing Uranus Starry Night Party 2010 (IUSNOP-2010). This projects aim was to organize a public observation of Uranus around the former Yugoslavia. Organizers of this project were also Astronomical Society "Vidulin" from Croatia, Astronomical Society "Lira" from Novi Sad, Astronomical Society "Astra" from Bosnia and Herzegovina, Skopje Astronomical Society from Macedonia and Astronomical Society "Orion" from Slovenia. Astronomical Society "Eureka" organized observation of Uranus in Krusevac, and all of 16 members that attended this event received letters of thanks for participation in the project. Also during the observation it was organized a short lecture on Uranus. The most successful project that Astronomical Society "Eureka" has organized is certainly "International Observe the Moon Night in Krusevac" in 2010th. As a introduction to InOMN project society visited primary schools in order to promote astronomy among the youngest population. For this occasion it was prepared a lecture about Pluto called "Poor little Pluto" so that primary school students could understand why Pluto is no longer a planet. A total of ten schools were visited as follows: the school in the suburbs of Krusevac: in Jasika, Veliki iljegovc, Donji Krcin, Varvarin, Zalogovac, Stopanja, Parunovac, Ribnik and schools in Krusevac: Dositej Obradovic and Nada Popovic. The largest attendance was in school in Ribnik where all the students of the school attended this lecture. International Observe the Moon Night project was realized in 18th September 2010th. On this occasion society organized four lectures about the Moon, which was prepared by members, as follows: Sasa Djordjevic - "Generally about the Moon", David Todorov - "Exploration of the Moon", Christine Gvozdenovic - "Myths and Facts about the Moon" and Zoran Tomic - "Interesting facts about our space nearest neighbor". After this lectures it was planned workshop for primary school students "From photography to the data", which was postponed due to the inability of a large number of participants to attend the workshop. For 8 PM in the evening it was planned observation of the Moon on Kosturnica square. For observation the two telescopes were used, both owned by Zoran Tomic. One 60/700 refractor, and the other is Sky Watcher at 150/750 on EQ3 mount. Passers-by and large number of students had the opportunity to observe until 10 PM Jupiter and its moons, and there is a large number of photographs of the Moon made that evening. According to calculations on the observation night there were about 150 observers. The event in Krusevac has been praise by Andrew Shaner, one of the organizers of this

global project. In October Society participated in the organization and realization of two projects. One was a World Space Week in Krusevac from 4th to 9th October. For that period the members prepared lectures for high school students and interested citizens, namely: David Todorov - "Astrobiology", Sasa Djordjevic - "Black holes", Hristina Gvozdenovic - "Ethno-astronomy", Pavle Grkovic - "Time" and Lazar Stefanovic and Stefan Radovanovic - "Cassini Mission". On Saturday, 9th October, was the last day of this project when the association took part in organizing the first Festival of Science in Krusevac called "Days of Eureka". On that day, guest lecturers professor dr Milan Dimitrijevic, who had the honor of his lecture "The secret of the silence of extraterrestrial civilizations" to open the Festival of Science, and dr Luka Popovic with lecture "The exotic objects and phenomena in the Universe" held their lectures. Goran Pavicic from Astronomical Society "Rudjer Boskovic" from Belgrade brought mobile planetarium. In addition to these events lectures in astronomy were organized, including: Zoran Tomic and Milutin Spasic - "Astronomy from the chair" and Dragan Dimitrijevic - "Mars". Society also organized a mini-course in astronomy, which was developed by members and the full text of the course is available to visitors on the website of Society. On that day total of 22 participants took the test and passed mini-course in astronomy. The results are published on the website. Diplomas for participants who passed this mini-course were awarded by Dragan Radmilovic on 25th October at the National Museum in Krusevac, where Dragan Radmilovic organized astrophotography exhibition. This exhibition lasted until 3rd November at which the citizens had the opportunity to see Astrophotos made by amateur astronomers from Serbia and neighboring countries in the previous period. In the period up to June 2011th society was actively involved in the promotion of astronomical activities organized by other associations in Serbia and abroad. Using its website members were able to get information about all the free projections of the Virtual Telescope Project organized for the participants around the world. Society also attended the Science Festival in Belgrade from 3rd to 5th December along with ADNOS from Novi Sad and Amateur Astronomers Association of Serbia with interactive setting "Astronomy from the chair", where festival visitors for three days in period from 10 AM up to 1 PM had opportunity for live observation through telescopes located in New Mexico, while the rest of the time were used to display images that are made during the festival and introducing visitors to the concept. Astrophotos from the festival are made by Zoran Tomic from astronomical society "Eureka" and the Rade Marjanovic from ADNOS. This interactive setting had its presentation at Journal Club at the Astronomical Observatory Belgrade on 28th January 2011th. Unfortunately due to the inability of adequate financing activities of society and financial obligations that entails the Society in May it was decided to remove society from the register of legal entities. The Society now operates as an informal association without legal personality. Astronomical society "Eureka" is still working on the promotion of astronomy in Krusevac in collaboration with other organizations in the city, mainly with the Office for Youth.

### 3. ASTRONOMICAL ACTIVITIES IN KRUSEVAC FROM JUNE 2011.

In August in Krusevac for the second time was organized for citizens observing of the Perseids. The observation was organized in Bagdala and lasted two nights. This event was organized in cooperation with the local Office for Youth. For two nights this observation event was visited by a total of 20 citizens, mostly high school students. The observations lasted from 9 PM to 11 PM on both nights. From observation equipment visitors could observe the Moon, Jupiter, M31 and M13 through binoculars 12 x 50 and 12 x 40. During the activity photos of 4 meteors were made using a Nikon D3100 photo camera mounted on EQ3 motorized mount. After the successful event of observation Perseds astronomical society "Eureka" organized for the first time Star Party on Bagdala called "Mini Bagdala Stellar Party". The event was realized on 30th August and the equipment used by observers were 12 40 binoculars and a telescope Sky Watcher 150/750 on EQ3 mount. Jupiter, Andromeda Galaxy, Algol and Mizar and M13 in Hercules were observed during the event. The event was attended by 15 observers of whom two were visitors from Astronomical Society "Bor" from Bor. For 8th October society planed to realize project "International Observe the Moon Night 2011." In cooperation with 13th astronomical society from Serbia (ADNOS from Novi Sad, AD "Astromitro" Kosovska Mitrovica, AD "Univerzum" Backa Palanka, "Tycho Brahe" Belgrade, Astronomical group of research society "Vladmir Mandic Manda" Valjevo, "Rudjer Boskovic" Belgrade, "Alfa" Nis, GEA Vrsac, "Milutin Milankovic" Zrenjanin, "Milutin Milankovic" Pancevo, "Bor" Bor, "Lira" Novi Sad and astronom-skia section in scout "Pinky" from Sremska Mitrovica) has taken an active part in realization of joint project called "Serbia photographs the Moon". The project objective is to actively involve citizens in photographing the Moon, and based on photos that are received from participants of the competition to create a large mosaic of the Moon. Result of competition are 63 participants with 394 photographs. From Krusevac three author sent their photos of the Moon. Unfortunately due to bad weather conditions InOMN project wasnt realized, and from 6th to 15th October, the society organized three times observation of the Moon, two of which observations have been successful. In Krusevac on 15th October was held the second Science Festival "Days of Eureka". The festival was visited by around 700 visitors and had the opportunity to visit a large number of experiments, lectures, and astronomical observations of the sun. The greatest attention has certainly attracted a mobile planetarium, but there was a great number of observers for the two telescopes that are specially equipped for observing the Sun. During the festival were made 5 images of Sun, one is also available for downloading at web site of society. Around 150 visitors took their photo of the Sun with their cameras and cameras on mobile phone. For 22nd October society has planned collective observation of Cygnus constellation from different locations in the city to determine the extent of light pollution and to submitted data for the project "Great World Wide star Count". Due to poor weather conditions collective observation hasnt been done, but in the period until 28th October three members of the society, Dusan Jocovic, Milos Stankovic and Zoran Tomic measured light pollution from three different locations and send the data. In Serbia, this project has been realized in Bor and Nis. In Nis it was done one measurement and in Bor astronomical society "Bor" done five measurements.

#### 4. FUTURE ACTIVITIES OF SOCIETY

In the future the society plans to organize the above-mentioned observations, to organize interesting lectures and be actively involved in the organization and implementation of new joint projects with other astronomical societies in Serbia. Also society will try solve the problems of financing its activities and again be registered as an official association of citizens and obtain a new astronomical equipment for its further work on promotion of astronomy in Krusevac.

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