

Space Weather activities in Serbia

Nikola Veselinović

(on behalf of the Serbian Space Weather Community)

Email: veselinovic@ipb.ac.rs

ISWI Steering Committee Annual Meeting

Vienna, 2024.



Space weather related institutions and references

- Astronomical observatory
 - [New Research Unit for Solar Activity Monitoring, Climate Change and Light Pollution](#) was formed in September 2023
- Faculty of Mathematics, University of Belgrade,
 - [Department of astronomy](#)
 - Solar magnetic field
- Institute of Physics, Belgrade
 - [Laboratory for astrophysics and physics of ionospheric –VLF station](#)
 - *lower ionospheric monitoring using VLF radio signals and modeling* Solar forcing of the Earth's ionosphere system
 - [Low-background laboratory for nuclear physics – Muon station](#)
 - Correlation analysis of solar energetic particles and secondary cosmic ray flux
 - Production of the cosmogenic radionuclides in soil



- Analyzing solar activity with Belgrade muon station: case study of 2021 November 4th Forbush decrease, Veselinović et al., <https://doi.org/10.31577%2Fcaosp.2023.53.3.148>
- Impacts of Extreme Space Weather Events on September 6th, 2017 on Ionosphere and Primary Cosmic Rays, Kolarski et al., <https://doi.org/10.3390%2FRS15051403>
- New insights from cross-correlation studies between solar activity indices and cosmic-ray flux during Forbush decrease events, Savić et al., <https://doi.org/10.1016%2Fj.asr.2022.09.057>
- Application of Geant4 simulation in measurement of cosmic-ray muon flux and studies of muon-induced background, Joković, et al., <https://doi.org/10.1140%2Fepjp%2Fs13360-023-04639-1>
- Forbush decrease events associated with coronal mass ejections: Classification using machine learning, Savić et al., <https://doi.org/10.31577%2Fcaosp.2023.53.3.156>
- Low intensity solar flares' impact: numerical modeling, Kolarski et al., <https://doi.org/10.31577%2Fcaosp.2023.53.3.176>
- Ionospheric Response on Solar Flares through Machine Learning Modeling, Arnaut et al., <https://doi.org/10.3390%2Funiverse9110474>
- Random Forest Classification and Ionospheric Response to Solar Flares: Analysis and Validation, Arnaut et al., <https://doi.org/10.3390%2Funiverse9100436>
- Energetic solar flare events in relation with subionospheric impact on 6-10 September 2017: data and modeling, Kolarski et al., <https://doi.org/10.31577%2Fcaosp.2023.53.3.138>

Locally organized international conference in 2023



The poster for the XX Serbian Astronomical Conference features a dark blue background with a starry sky. At the top left are the logos of the Serbian Academy of Sciences and Arts (SASA) and the Astronomical Observatory of Belgrade (AOB). The text 'sac20.aob.rs' is in the top right. The main title 'XX SERBIAN ASTRONOMICAL CONFERENCE' is in large white letters, followed by the dates '16-20 October 2023, Belgrade, Serbia' and the venue 'Venue: Serbian Academy of Sciences and Arts, Knez Mihajlova 35, Belgrade'. The 'TOPICS' section lists: Stellar physics and physics of the interstellar medium; Astrophysical spectroscopy and interferometry; Stellar and galactic systems; Extragalactic astronomy and cosmology; Astrometry, dynamical astronomy and planetology; Interdisciplinary studies; History, philosophy and teaching of astronomy; and a special session on Neutrino astrophysics. The 'SOC' (Scientific Organizing Committee) lists 14 members from various international institutions. The 'LOC' (Local Organizing Committee) lists 7 members from the AOB. The 'SPONSORS' section at the bottom includes logos for the Ministry of Education, Science and Technological Development of the Republic of Serbia, the AOB, and Telekom Srbija.

XX SERBIAN ASTRONOMICAL CONFERENCE
16-20 October 2023, Belgrade, Serbia
Venue: Serbian Academy of Sciences and Arts, Knez Mihajlova 35, Belgrade

TOPICS

- Stellar physics and physics of the interstellar medium
- Astrophysical spectroscopy and interferometry
- Stellar and galactic systems
- Extragalactic astronomy and cosmology
- Astrometry, dynamical astronomy and planetology
- Interdisciplinary studies
- History, philosophy and teaching of astronomy
- Special session: Neutrino astrophysics

SOC

- Jelena Petrović (co-chair, AOB, Serbia)
- Dušan Marčeta (co-chair, MATH, Serbia)
- Srđan Samurović (AOB, Serbia)
- Jelena Kovačević Dojčinović (AOB, Serbia)
- Oliver Vince (AOB Serbia)
- Dušan Onić (MATH, Serbia)
- Milica Vučetić (MATH, Belgrade, Serbia)
- Vladimir Zeković (MATH, Serbia)
- Miroslav Filipović (Western Sidney University, Australia)
- Samir Salim (Indiana University, USA)
- Milan Bogosavljević (NYU Abu Dhabi, UAE)
- Ivana Damjanov (Saint Mary's University, Canada)
- Mirjana Pović (ESSTI, Ethiopia)
- Brankica Kubatova (AS CR, Czech Republic)
- Maja Vučković (Universidad de Valparaíso, Chile)

LOC

- Ana Lalović (chair, AOB)
- Rade Pavlović (AOB)
- Milan Stojanović (AOB)
- Majda Smole (AOB)
- Ana Mitrašinić (AOB)
- Miljana Jovanović (AOB)
- Jasmina Horvat (MATH)
- Nataša Pavlov (MATH)

SPONSORS



The poster for the V meeting on Astrophysical Spectroscopy features a dark background with a bright sun or star in the upper center, casting a long, straight path of light down to the bottom. The text 'A&M DATA' and 'AsSpectro23' is at the top. The main title 'V meeting on Astrophysical Spectroscopy - Astronomy and Earth Observations' is in large white letters. Below the title, it says 'September 12-15 2023, Hotel "Prezident", Palić'. At the bottom are logos for IPB, the Republic of Serbia, and the journal 'universe'.

A&M DATA *AsSpectro23*

V meeting on Astrophysical Spectroscopy -
Astronomy and Earth Observations

September 12-15 2023, Hotel "Prezident", Palić

IPB Republic of Serbia universe

Special Session: "Astronomy and Earth Observations: multi-instrumental approach and theory" dedicated to influence of space weather on Earth.

<http://aspectro2023.ipb.ac.rs/>
<https://sac20.aob.rs/>

Upcoming scientific events

2nd International Workshop on Applications of Cosmic Ray Measurements, **11. – 14. March 2024, Atlanta, USA**

The workshop is intended as an opportunity to share the knowledge and the most recent progress with the cosmic ray measurements and analysis within the community and with other interested scientists, policy makers, and industry representatives. The goal is building a **Global Network of Cosmic Ray Detectors for Space and Terrestrial Weather Observation (gLOWCOST)**

<https://sites.google.com/view/wacr24/>

Symposium and Summer School on Physics of Ionized Gases (SPIG), **26.-30. August, 2024, Belgrade, Serbia**

SPIG was initiated almost 60 years ago as an international conference in the fields of:

- **General Plasmas - Fusion Plasmas, Astrophysical Plasmas and Collective Phenomena.**
- Atomic Collision Processes
- Particle and Laser Beam Interactions with Solids
- Low Temperature Plasmas

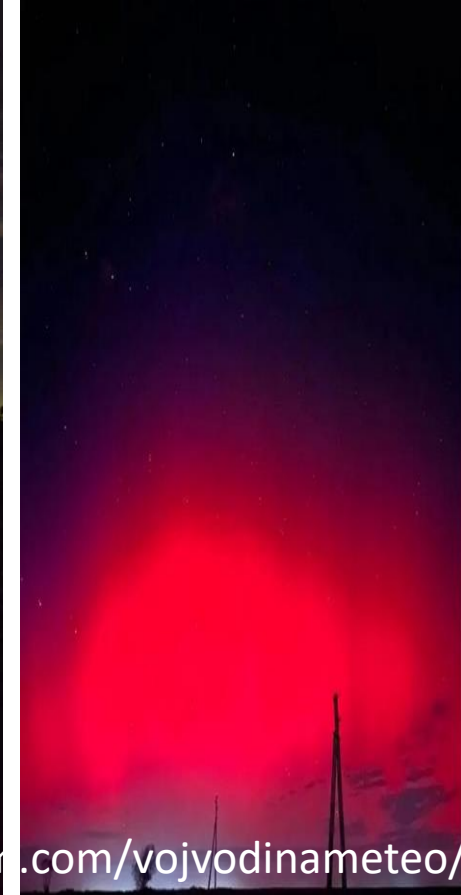
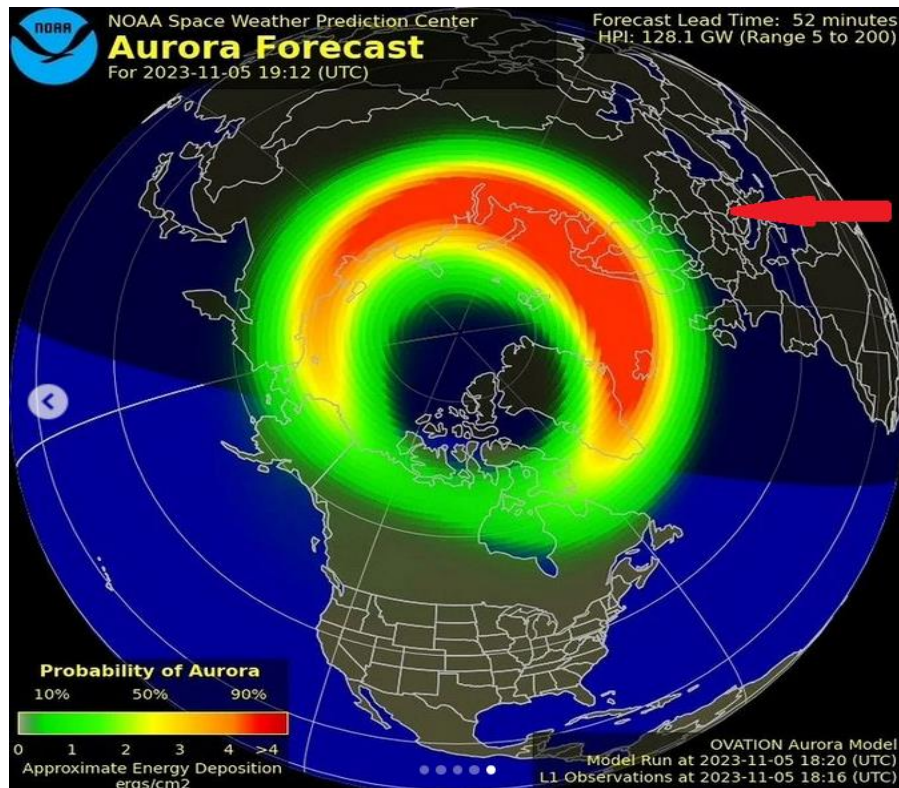
<https://www.spig2024.ipb.ac.rs/index.html>



Aurora Borealis over Serbia 2023

People in northern parts of Serbia reported seeing an **aurora borealis** on the night of 5. November 2023.

The polar lights phenomenon is extremely rare in the skies over Serbia. The aurora borealis was also visible in parts of Croatia and Bosnia-Herzegovina.



<https://www.instagram.com/vojvodinameteo/>