



# ADVANCES IN SOLID STATE PHYSICS AND NEW MATERIALS

SPRING WORKSHOP 2026

May 25 - 29, 2026

Institute of Physics Belgrade

Belgrade, Serbia

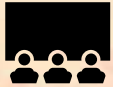




# ADVANCES 2026 SPRING WORKSHOP BY NUMBERS



**40+ SPEAKERS**



**60+ PARTICIPANTS**



**29 WOMEN PARTICIPANTS (43%)**

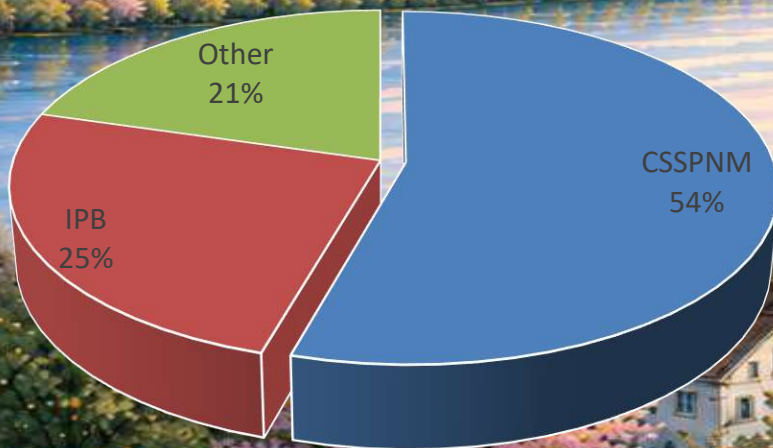


**13 COUNTRIES**

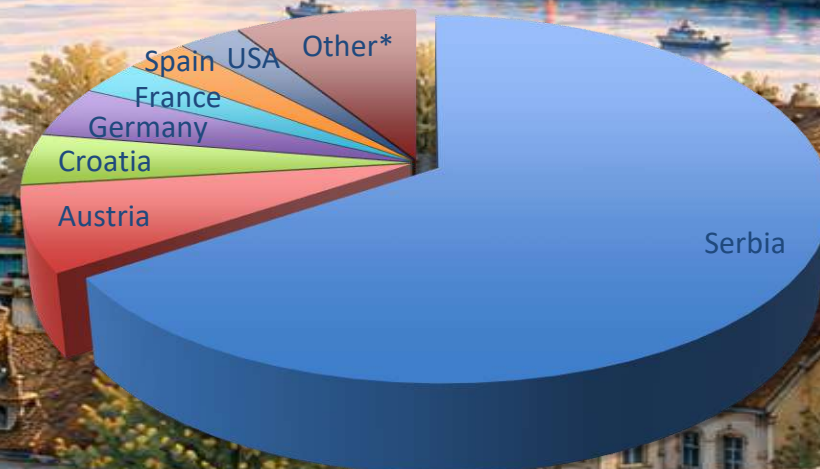


**24 INSTITUTIONS**

**Serbian institutions**



**Countries**

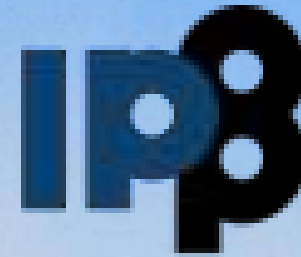


„Other countries” category comprises participants from Belgium, Italy, Slovenia, Switzerland, Türkiye and Nigeria.



# ADVANCES 2026 SPRING WORKSHOP ORGANIZERS

Organized by



***Advances in Solid State Physics and New Materials Spring Workshop 2026*** was organized by the **HIP-2D-QM** Project, which received funding from the European Union's Horizon Europe research and innovation programme under grant agreement **No. 101185375**.

The workshop brought together leading experts and early-career researchers to discuss recent advances in condensed matter physics and materials science.



Funded by the  
European Union



HIP-2D-QM

Conference chair

**Darko Tanasković**, IPB, Serbia

Scientific Committee

**Vladimir Dobrosavljević**,  
Florida State University, USA  
**Vladan Stevanović**, Colorado  
School of Mines, USA  
**Maja Remškar**, Jožef Stefan  
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**Rudi Hackl**, IFW Dresden,  
Germany

**Milorad Milošević**, University  
of Antwerp, Belgium  
**Nenad Lazarević**, IPB, Serbia  
**Jelena Pešić**, IPB, Serbia  
**Bojana Višić**, IPB, Serbia

Organizing Committee Chairs

**Jasmina Lazarević**, IPB, Serbia  
**Andrijana Šolajić**, IPB, Serbia

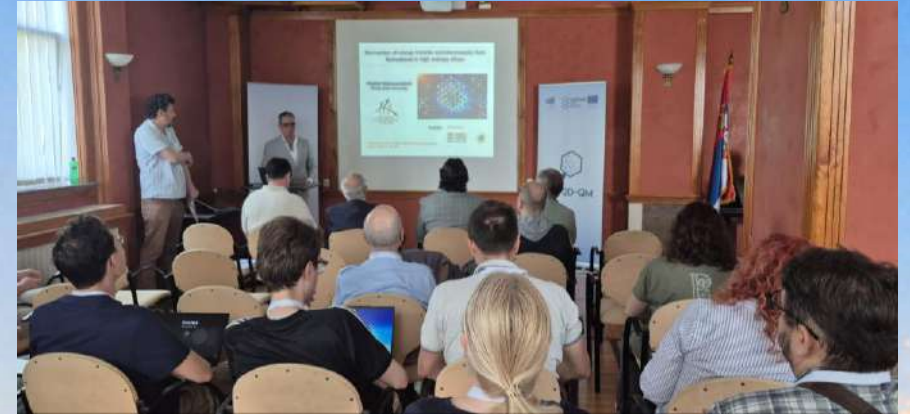


# DAY 1

## Disorder • Raman Spectroscopy • Nematicity in FeSe • Advanced Characterization

The opening day explored how disorder and lattice dynamics shape the properties of quantum materials.

- ❖ Vladimir Dobrosavljević and Vladan Stevanović presented recent insights into charge-transfer fluctuations in high-entropy alloys and the persistence of band-like transport in amorphous solids, demonstrating how disorder can lead to unexpected electronic behaviour.
- ❖ The programme also highlighted spectroscopic studies of correlated materials through lectures by Rudi Hackl, Tea Belojica and Nenad Lazarević, focusing on inelastic light scattering, coherent-like phonon states and the sensitivity of lattice–electronic coupling to symmetry breaking in FeSe.
- ❖ Advanced characterization techniques and theoretical studies were presented by Alexey Minenkov, Bratislav Lukić, Nataša Lazić and Božidar Nikolić, highlighting transmission electron microscopy, neutron imaging, symmetry analysis and electron-phonon phenomena in kagome materials.





# DAY 2

## Hidden Orders • Polarons • Computational Materials Science • Electron-Phonon Coupling

The second day focused on hidden-order phases, spin-orbit-entangled systems and polaron physics.

- ❖ Cesare Franchini and Michele Reticcioli discussed how hidden orders and lattice polarons influence the electronic properties of complex quantum materials.
- ❖ Computational approaches to emergent phenomena were further explored by George Volonakis, Jernej Mravlje, Lorenzo Ciliberti and Mario Novak through presentations on first-principles modelling, machine learning and transport properties.
- ❖ The programme concluded with talks by Emil Božin, Ana Milosavljević and Ana Kanjevac, demonstrating how local structural distortions, strain and electron-phonon coupling govern the behaviour of thermoelectric, charge-density-wave and topological materials.

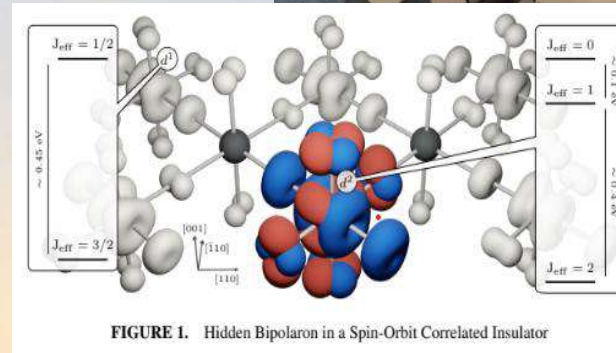
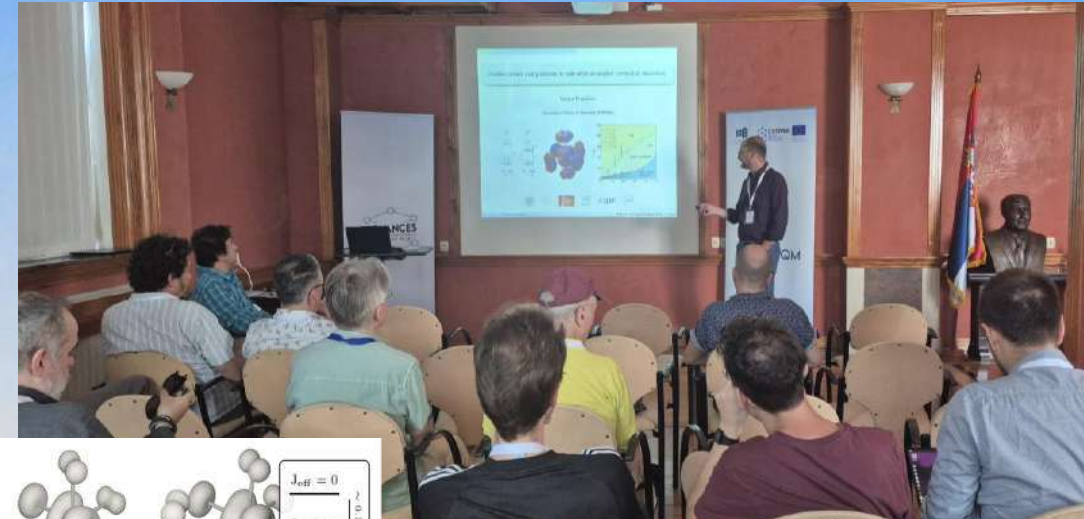


FIGURE 1. Hidden Bipolaron in a Spin-Orbit Correlated Insulator





# DAY 3

## Topological Materials • Correlated Systems • Data-Driven Discovery • Diagrammatic Monte Carlo

The third day highlighted topological phases, correlated electron systems and advanced computational approaches to electron-phonon interactions.

- ❖ Masahiko Isobe and Carl Lehmann explored exotic phase transitions and many-body effects in strongly correlated materials.
- ❖ The programme also featured presentations by Oleg Yazyev, Lenka Filipović and Željko Šljivančanin on the computational discovery of topological materials, layered systems and single-atom stabilization in two-dimensional materials.
- ❖ The day concluded with lectures by Stefano Ragni, Andrey Mishchenko and Samuele De Amicis, showcasing state-of-the-art Diagrammatic Monte Carlo methods for studying polarons and strongly correlated quantum systems.





# DAY 4

## Topological Phenomena • Quantum Transport • Nanoscale Devices • Superconducting Systems

The fourth day focused on topological phenomena, electron-phonon interactions and quantum transport in low-dimensional systems.

- ❖ Armando Consiglio, Sonja Predin and Petar Mitrić presented theoretical insights into excitonic effects, Berry-curvature-driven phenomena and charge transport beyond conventional quasiparticle descriptions.
- ❖ The afternoon programme turned to nanoscale transport and spectral analysis, with presentations by Dejan Đokić, Milena Filipović and Zorica Popović on many-body interactions, magnetic anisotropy and superconducting correlations in molecular and hybrid systems.





# OPEN SCIENCE SESSION

Open Science Policies • FAIR Principles •  
Reproducibility • Research Integrity

The Open Science Session featured the presentations *Open Science in Serbia: Not a Fairy Tale, but a Good Case Study* by Biljana Kosanović (University of Belgrade Computer Centre – RCUB) and *The Serbian Reproducibility Network: Building Reliable and Open Research Practices in Serbia* by Matija Zlatar (University of Belgrade – Institute of Chemistry, Technology and Metallurgy).

The session highlighted Serbia's progress in Open Science policies, repositories and FAIR-supporting infrastructures, while emphasizing the importance of transparency, collaboration and reproducibility in contemporary research.





# DAY 5

## Quantum Photonics • Optoelectronics • Gas Sensing • Biomedical Materials

- ❖ The final day showcased the broad applicability of advanced materials research, from quantum technologies to biomedical materials.
- ❖ Snežana Lazić and Sanja Đurđić Mijin presented scalable approaches to deterministic quantum light emitters and photonic qubits, highlighting their potential for future quantum communication technologies.
- ❖ Borislav Petrović discussed interband cascade lasers for gas-sensing applications, while Jovana Jelić and Jelena Mitrić Otašević presented studies on transition-metal complexes and the optical properties of dental resins.





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