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# CONFERENCE PROCEEDINGS CSPM 2022

Proceedings of the 14<sup>th</sup> Conference  
of the Society of Physicists of Macedonia

15-18 September 2022, Ohrid

**Editors:**

**Irina Petreska (Editor-in-Chief)**  
**Margareta Pecovska-Gjorgjevikj**  
**Suzana Topuzoski**  
**Boce Mitrevski**  
**Aleksandar Skeparovski**  
**Lambe Barandovski**



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Proceedings of the 14<sup>th</sup> Conference of the Society of Physicists of Macedonia

co-organized by

Institute of Physics  
Faculty of Natural Sciences and Mathematics  
Ss. Cyril and Methodius University in Skopje

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**Editor-in-Chief:** Irina Petreska

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# Acknowledgements

- The Society of Physicists of Macedonia expresses sincere gratitude to the **Institute of Physics, Faculty of Natural Sciences and Mathematics - Skopje** for the successful co-organization of CSPM 2022, and acknowledges the financial support from "**Ss. Cyril and Methodius**" **University in Skopje** and the **Ministry of Education and Science**.





# Preface

The edition "CONFERENCE PROCEEDINGS CSPM 2022" is a collection of selected articles from the 14<sup>th</sup> Conference of the Society of Physicists of Macedonia (CSPM 2022), held in the Congress Centre – Ohrid in the period 15 – 18 September 2022. CSPM is one of the most important and traditional meetings of physicists in Macedonia, with biennial periodicity since 1996. The conference aims are to bring together academicians, researchers and experts for knowledge exchange and start or strengthen international collaboration projects.

The program of CSPM 2022 was consisted of a main scientific session and one parallel session, dedicated to physics education. Concerning the main session, the scope of the conference was rather broad, so various research areas, such as Mathematical and Theoretical Physics, Condensed Matter Physics, Medical Physics, Seismology and Geophysics, Applied Physics, are covered by the authors' contributions in the present Proceedings.

The contributions from the parallel session are included in the Proceedings, as a separate Physics education section, comprising contributions from physics education experts and physics teachers, aiming to serve the physics teaching community. Primary and high school level teaching fall within the scope of this section, including knowledge updates in physics and educational research, as well as curriculum and teaching strategies developments.

Prior to publication, all the submitted manuscripts were subjected to a rigorous peer-review process and in this occasion, we would like to thank all the referees for their dedicated work and insightful evaluation. We extend our sincere appreciation to the international scientific committee, that contributed substantially in the initial selection of the contributions.

Finally, we sincerely thank all the authors for submitting their manuscripts for publication in this Conference Proceedings.

The Editors

*Irina Petreska*

*Margareta Pecovska-Gjrogjevikj*

*Suzana Topuzoski*

*Boce Mitrevski*

*Aleksandar Skeparovski*

*Lambe Barandovski*





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**Conference Program**

<b>15 September 2022 – Thursday</b>	
10:00-12:00	<b>REGISTRATION</b> (Registration desk will be also opened during the breaks)
12:15-12:30	<b>Conference Opening</b>
	CHAIRMAN Irina Petreska
12:30-13:15	<b>PT-01: Ralf Metzler</b> , <i>BEYOND BROWNIAN MOTION: FROM DATA TO MODELS</i>
13:15	<b>LUNCH BREAK</b>
	CHAIRMAN Trifce Sandev
14:45-15:15	<b>IT-01: Aleksei Chechkin</b> , <i>GAUSSIAN LONG-MEMORY RANDOM PROCESSES 80 YEARS AFTER KOLMOGOROV'S "WIENERSCHES SPIRALEN"</i>
15:15-15:35	<b>CT-01: Timo J. Doerries</b> , Aleksei V. Chechkin and Ralf Metzler, <i>APPARENT ANOMALOUS DIFFUSION AND NON-GAUSSIAN DISTRIBUTIONS IN A SIMPLE MOBILE-IMMOBILE TRANSPORT MODEL WITH POISSONIAN SWITCHING</i>
15:35-15:55	<b>CT-02: Costantino Di Bello</b> , Satya Majumdar, Alexander Hartmann, <i>MANY-PARTICLES DIFFUSING WITH RESETTING: STUDY OF THE LARGE-DEVIATION PROPERTIES OF THE FLUX DISTRIBUTION</i>
15:55-16:15	<b>CT-03: Marcus Dahlenburg</b> , Gianni Pagnini, <i>EXACT CALCULATION OF THE MEAN FIRST-PASSAGE TIME OF CONTINUOUS-TIME RANDOM WALKS BY NONHOMOGENOUS WIENER-HOPF INTEGRAL EQUATIONS</i>
16:15-16:35	<b>CT-04: R. K. Singh</b> and Stanislav Burov, <i>DESCRIBING A CTRW: ONE BIG JUMP VS MANY SMALL JUMPS</i>
16:35	<b>COFFEE BREAK</b>
	CHAIRMAN Aleksei Chechkin
17:10-17:40	<b>IT-02: Francesco Mainardi</b> , <i>A MODEL IN LINEAR VISCOELASTICITY BASED ON THE EXTENDED JEFFREYS-LOMNITZ CREEP LAW</i>
17:40-18:00	<b>CT-05: Dušan Zorica</b> , Ljubica Oparnica, <i>ENERGY BALANCE FOR FRACTIONAL WAVE EQUATIONS</i>
18:00-18:20	<b>CT-06: Stevan Cvetičanin</b> , Dušan Zorica, <i>DISSIPATIVE AND GENERATIVE FRACTIONAL ELECTRIC ELEMENTS IN RLC CIRCUITS MODELING</i>
18:20-18:40	<b>CT-07: Yingjie Liang</b> , Wei Wang, Ralf Metzler, <i>SUBORDINATED FRACTIONAL BROWNIAN MOTION WITH DRIFT</i>
18:40-19:00	<b>CT-08: Guillermo Chacón-Acosta</b> , Mayra Núñez-López, <i>PATTERN FORMATION AND DIFFUSION-DRIVEN INSTABILITY IN NARROW ENVIRONMENTS</i>



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<b>16 September 2022 – Friday</b>	
	CHAIRMAN Aleksandar Skeparovski
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10:00-10:30	<b>IT-03: Dijana Žilić</b> , <i>UNUSUAL MAGNETISM AND THERMOCHROMISM OF MONONUCLEAR IRON(III) COMPLEX</i>
10:30-10:50	<b>CT-09: Mimoza Naseska</b> , A. Bavec, E. Goreshnik, Z. Jagličić, D. Mihailović and T. Mertelj, <i>ULTRAFAST DYNAMICS OF THE DIFFERENT MAGNETIC PHASES IN CeSb</i>
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	CHAIRMAN Gertrud Zwicknagl
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<b>15:30-19:00 GUIDED TOUR</b>	
<b>20:00-00:00 GALA DINNER (Congress Centre - Ohrid)</b>	



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<b>17 September 2022 – Saturday</b>		
	CHAIRMAN Suzana Topuzoski	
9:15-10:00	<b>PT-03: Clemens Heitzinger</b> , <i>REINFORCEMENT LEARNING FOR HIGHLY SENSITIVE DETECTORS FOR LIGHT DARK MATTER</i> (online)	<b>Parallel session - EDU</b> , CHAIRMAN Lambe Barandovski <b>9:15-9:35 EDU-01: Barbara Rovšek</b> , <i>EXPERIMENTAL PROBLEMS AT SLOVENIAN NATIONAL PHYSICS COMPETITION</i>
10:00-10:30	<b>IT-07: Angels Ramos</b> , <i>STRANGENESS NUCLEAR PHYSICS: FROM HYPERNUCLEI TO NEUTRON STARS</i>	<b>9:35-9:55 EDU-02: Jurij Bajc</b> , Brina Posinek, Saša Zihlerl, <i>COMBINING THE RESULTS OF PHYSICS COMPETITIONS AND NATIONAL ASSESSMENTS OF KNOWLEDGE OF PHYSICS IN SLOVENIA</i>
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10:30-10:50	<b>CT-14: Sara Gjorgievska, Hristijan Kochankovski</b> , <i>THERMODYNAMIC PROPERTIES OF HOT NUCLEAR MATTER</i>	<b>10:15-10:35 EDU-04: Boce Mitrevski</b> , Fehmi Skender, Vera Zoroska and Igor Nikolovski, <i>ASSESSMENT FOR LEARNING PHYSICS</i>
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**PP-03: Zoran S. Marković, Dejan Milenković, Dušica Simijonović, Dušan Dimić, Edina Avdović, SPECTROSCOPIC CHARACTERIZATION (NUCLEAR MAGNETIC RESONANCE AND INFRARED) AND QUANTUM MECHANICAL STUDIES OF 5-(4-HYDROXY-3-METHOXYBENZYLIDENE)PYRIMIDINE-2,4,6(1H,3H,5H)-TRIONE**

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**PP-06: Žiko Milanović, Marko Antonijević, Edina Avdović, Dejan Milenković, Zoran Marković, TIME DEPENDENT DENSITY FUNCTIONAL THEORY SIMULATION OF THE UV-VIS ABSORPTION SPECTRA OF 4,7-DIHYDROXYCOUMARIN DERIVATIVES**

**PP-07: Pece Trajanovski, Trifce Sandev, Ljupco Kocarev, GENERALIZED FOKKER-PLANCK EQUATION: RANDOM SEARCH AND STOCHASTIC RESETTING**

**PP-08: Pece Trajanovski, Petar Jolakoski, Kiril Zelenkovski, Trifce Sandev, Alexander Iomin, Ljupco Kocarev, ORNSTEIN-UHLENBECK PROCESS AND ITS GENERALIZATIONS**

**PP-09: Kiril Zelenkovski, Trifce Sandev, Ljupco Kocarev, Lasko Basnarkov, RANDOM WALK ON NETWORKS WITH POSITION-BASED STOCHASTIC RESETTING**

**PP-10: Petar Jolakoski, Viktor Stojkoski, Arnab Pal, Trifce Sandev, Ljupco Kocarev, Ralf Metzler, NON-ERGODICITY AND FIRST PASSAGE DYNAMICS IN ECONOMICS**

**PP-11: Alexander Dubkov, Nikolay Agudov, CONSTRUCTION OF CORRECT LANGEVIN EQUATION FOR ELECTRIC CIRCUIT WITH MEMRISTOR, TAKING INTO ACCOUNT THERMAL NOISE (cancelled)**

**PP-12: Quing Wei, FRACTIONAL ANOMALOUS DIFFUSION AND NON-DARCIAN FLOW IN GEOLOGICAL SYSTEM (cancelled)**





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**PP-14: Stefan T. Todorov**, Lidia T. Popova, APPLICATION OF THE ENERGY SPECTRUM METHOD IN RESEARCH WATER RESOURCES FROM THE RILA MOUNTAIN

**PP-15: Mimoza Ristova**, VISUAL SPECTROSCOPY AS A TOOL FOR INK IDENTIFICATION FROM A QUESTIONED DOCUMENT

**PP-16: Riste Popeski-Dimovski**, Verica Mitreva, Nedjat Murikj, 3D PRINTED MATRICES AS STRUCTURES FOR BALLISTICS PROTECTION

**PP-17: Ljubcho Jovanov**, Katerina Drogreshka, Dragan Radivojević, Vera Zoroska, INTERPRETATION OF AN EARTHQUAKE AS FREE OSCILLATION

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**PP-EDU-02: Lazar Radenković**, Ljubiša Nesić, FIRST STEPS IN DEVELOPING FRICTION CONCEPT INVENTORY

**PP-EDU-03: Jovica Milisavljević, Sladjana Nikolić**, DENDROCLIMATOLOGY– AN EXAMPLE OF PROJECT-BASED LEARNING IN HIGH SCHOOLS (GLOBAL WARMING AND LOCAL EVIDENCE)

**PP-EDU-04: Ivana Krulj**, AN APPROACH TO STUDYING RESISTANCE IN AN ALTERNATING CURRENT CIRCUIT

**PP-EDU-05: Karolina Dvojković**, Vedran Žadanj, THE PHYSICAL NATURE OF MUSIC AND MUSICAL INSTRUMENTS

**PP-EDU-06: Mihail Naumovski**, Viktorija Marcevska, Mihaela Neshkoska, Elena Markovska, THE IMPACT OF ECO-INSULATION MATERIALS ON THE ENVIRONMENT AT ITS SUSTAINABLE POINT