



SSM 2021

SOL-SKYMAG 2021

June 21 – June 24, 2021

San Sebastian (Gipuzkoa), Spain

ONLINE

PROGRAM

Sol-SkyMag 2021

The 5th International Conference on "Nanomagnetism and Spintronics" (Sol-SkyMag 2021) will be held online on **June 21 - June 24, 2021**.

The Sol-SkyMag is an abbreviation from Solitons and Skyrmion Magnetism, but the scope of the conference is essentially wider. The Sol-SkyMag conference serves to assess the status, recent progress, and development in the field of nanomagnetism and spintronics. The conference provides an international forum to discuss recent progress and trends in the field and to identify potential future collaborations. We aim at bringing together the community of leading researchers working the area of nanomagnetism, spin dynamics, spin-transport, etc., and their applications.

The program of the Sol-SkyMag 2021 includes about of 25 invited talks presented by leading experts in the field, regular oral talks and short oral talks.

Welcome to Sol-SkyMag 2021!

Sol-SkyMag 2021 Chairmen,

Kostyantyn Gusliyenko

Julian Maria Gonzalez Estevez

Organizing Committee

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- A. Zvezdin, Prokhorov General Physics Institute, Moscow, Russia

PROGRAM AT GLANCE 2021 (CET)

| <u>21.06.2021</u> | <u>22.06.2021</u> | <u>23.06.2021</u> | <u>24.06.2021</u> |
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| Connection and Welcome 9.00 – 9.15 | Invited, Oral and Short Oral talks 9.00 – 11.10 | Invited and Oral talks 9.00 – 11.15 | Invited talk 10.00 – 10.30 |
| Invited and Oral talks 9.15 – 11.30 | Coffee break 11.10 – 11.20 | | |
| Coffee break 11.30 – 11.45 | Invited talks 11.20 – 12.20 | Coffee break 11.15 – 11.30 | Oral talks 10.30 – 12.30 |
| Oral and Short Oral talks 11.45 – 13.40 | Oral talks 12.20 – 13.20 | Invited talks 11.30 – 13.00 | Lunch 12.30 – 16.15 |
| Lunch 13.40 – 15.30 | Lunch 13.20 – 15.30 | Short Oral talks 13.00 – 13.30 | Invited and Oral talks 16.15 – 18.15 |
| Invited and Oral talks 15.30 – 18.15 | Invited talks 15.30 – 16.30 | Lunch 13.30 – 16.00 | Conference closing 18.15 – 18.20 |
| | Oral and Short Oral talks 16.30 – 18.00 | Invited and Oral talks 16.00 – 18.00 | |
| Request of Receipts, Invoices and Certificates of Participation by e-mail | | | |

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| | <u>Monday, June 21, 2021</u> |
| 9:00 - 9:15 | Connection and Welcome / Kostyantyn Gusliyenko / Julian Gonzalez |
| 9:15 - 13:50 | Session 1. Magnetic skyrmions I Chairs: Christian Back / Christoforos Moutafis |
| 9:15 - 9:45 | Invited talk: Christopher Marrows , University of Leeds, United Kingdom: "SKYRMIONS IN CHIRAL MAGNETIC MULTILAYERS" |
| 9:45 - 10:15 | Invited talk: Marcus Garst , Institute for Theoretical Solid-State Physics / Karlsruhe Institute of Technology, Germany: "SKYRMION DYNAMICS IN CUBIC CHIRAL MAGNETS IN THE PRESENCE OF MAGNETOCRYSTALLINE ANISOTROPIES" |
| 10:15 - 10:30 | Oral talk: Hector Corte-Leon , National Physical Laboratory, United Kingdom: "Head-on skyrmion collisions using magnetic force microscopy" |
| 10:30 - 10:45 | Oral talk: Dimitris Kechrakos , School of Pedagogical and Technological Education (ASPETE), Greece: "Magnetic skyrmions on nanotubes: formation and electrical detection" |
| 10:45 - 11:00 | Oral talk: Iuliia Vetrova , Slovak Academy of Sciences, Slovakia: "INVESTIGATION OF THE SELF-NUCLEATED SKYRMION STATES INSIDE THE FERROMAGNETIC/NON-MAGNETIC MULTILAYER DOT" |
| 11:00 - 11:15 | Oral talk: Timo Knispel , University of Cologne, Germany: "BLOCH-TYPE SPIN HELIX IN BILAYER IRON ISLANDS ON IRIDIUM (110) BY SPIN POLARIZED STM" |
| 11:15 - 11:30 | Oral talk: Alexander Mook , University of Bazel, Switzerland: "QUANTUM DAMPING OF SKYRMION CRYSTAL EIGENMODES DUE TO SPONTANEOUS QUASIPARTICLE DECAY" |
| 11:30 - 11:45 | <u>Coffee break</u> |
| 11:45 - 12:00 | Oral talk: Börge Göbel , Martin Luther Univ. Halle-Wittenberg, Germany: "Chiral spin textures in Heusler materials" |
| 12:00 - 12:15 | Oral talk: Krisztián Palotás , Wigner Research Center for Physics, Hungary: "Magnetic skyrmions probed by SP-STM: topology imprinted on the charge current and spin transfer torque" |
| 12:15 - 12:30 | Oral talk: Leonardo González-Gómez , Autonomous University of Barcelona, Spain: "Mutual Interaction between superconductor-chiral ferromagnet in confined geometries" |

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| 12:30 - 12:45 | Oral talk: Vanessa Nehruji , University of Southampton, United Kingdom: “The effects of disorder on hysteresis loops in chiral magnets” |
| 12:45 - 13:00 | Oral talk: Jantje Schommartz , Physikalisch-Technische Bundesanstalt, Braunschweig / Berlin, Germany: “Optically excited collective spin dynamics of skyrmions in $\text{Fe}_{1-x}\text{Co}_x\text{Si}$ ” |
| 13:00 - 13:15 | Oral talk: Roberto Lo Conte , University of Hamburg, Germany: “Tuning the properties of zero-field room temperature ferromagnetic skyrmions by interlayer exchange coupling” |
| 13:15 - 13:30 | Oral talk: Levente Rózsa , University of Hamburg, Germany: “Skyrmions as quasiparticles: free energy and entropy” |
| 13:30 - 13:40 | Short Oral talk: Luis Flacke , Bavarian Academy of Science and Humanities, Garching, Germany: “ROBUST FORMATION OF NANOSCALE MAGNETIC SKYRMIONS IN EASY-PLANE THIN FILM MULTILAYERS WITH LOW DAMPING” |
| 13:40 - 15:30 | <u>Lunch break</u> |
| 15:30 - 18:00 | Session 2. 3D magnetization textures: Bloch points and hopfions Chair: Kostyantyn Guslienko |
| 15:30 - 16:00 | Invited talk: Christoforos Moutafis , Univ. of Manchester, United Kingdom: “TUNEABLE TERAHERTZ OSCILLATIONS ARISING FROM BLOCH-POINT DYNAMICS IN CHIRAL MAGNETS” |
| 16:00 - 16:15 | Oral talk: Marijan Beg , University of Southampton, United Kingdom: “STABILITY AND FIELD MANIPULATION OF BLOCH POINTS IN HELIMAGNETIC NANOSTRUCTURES” |
| 16:15 - 16:30 | Oral talk: Michael Heigl , University of Augsburg, Germany: “Dipolar-stabilized first and second-order antiskyrmions in ferrimagnetic multilayers” |
| 16:30 - 17:00 | Invited talk: Jiadong Zang , University of New Hampshire, Durham, USA: “Structure and dynamics of magnetic hopfions” |
| 17:00 - 17:30 | Invited talk: Ivan Smalyukh , University of Colorado at Boulder, USA: “Isolated Hopf Solitons and their clusters in Helical and Conical Backgrounds of Magnetic Solids” |
| 17:30 - 18:00 | Invited talk: Peter Fischer , Lawrence Berkeley National Laboratory, USA: “Hopfions and other topological 3D magnetic structures” |
| 18:00 - 18:15 | Oral talk: Martin Lonsky , University of Illinois at Urbana-Champaign, USA: “COUPLED SKYRMION BREATHING MODES IN SYNTHETIC ANTIFERROMAGNETS” |

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| | <u>Tuesday, June 22, 2021</u> |
| 9:00 - 11:10 | Session 3. Ferrimagnets and Antiferromagnets Chair: Oleg Tretiakov |
| 9:00 - 9:30 | Invited talk: Teruo Ono , Kyoto University, Japan: “DYNAMICS OF DOMAIN WALL AND SKYRMION IN FERRIMAGNET” |
| 9:30 - 10:00 | Invited talk: Boris Ivanov , Institute of Magnetism, NASU & MESU, Ukraine: “ULTRAFAST SPINRONICS WITH FERRIMAGNETS” |
| 10:00 - 10:30 | Invited talk: Andrei Kirilyuk , Radboud University, The Netherlands: “Ultrafast phononic switching of magnetization” |
| 10:30 - 10:45 | Oral talk: Alexander Chernov , Russian Quantum Center, Moscow, Russia: “Optical excitation of the exchange spin waves in All-dielectric nanostructured iron-garnet film” |
| 10:45 - 11:00 | Oral talk: Tomoki Hirose , University of Tokyo, Japan: “Laser-controlled real and reciprocal space topology in multiferroic insulators” |
| 11:00 - 11:10 | Short Oral talk: Sambit Mohapatra , University of Strasbourg, France: “ORGANIC FERROELECTRIC BASED COMPOSITE THIN FILMS FOR SPINTRONIC APPLICATIONS” |
| 11:10 - 11:20 | <u>Coffee break</u> |
| 11:20 - 13:20 | Session 4. Magnetic skyrmions II Chair: Markus Garst |
| 11:20 - 11:50 | Invited talk: Christian Back , Technical University of Munich / Munich Center for Quantum Science and Technology, Germany: “MICROWAVE SPECTROSCOPY OF THE LOW-TEMPERATURE SKYRMION STATE IN Cu ₂ OSeO ₃ ” |
| 11:50 - 12:20 | Invited talk: Oleg Tretiakov , University of New South Wales, Australia: “BIMERONS IN FERROMAGNETS AND ANTIFERROMAGNETS” |
| 12:20 - 12:35 | Oral talk: Mariya Trukhanova , Lomonosov Moscow State Univ., Russia: “New magneto-dipolar skyrmion hall effect in the multiferroic materials” |
| 12:35 - 12:50 | Oral talk: Ping Che , École Polytechnique Federale de Lausanne, Switzerland: “X-RAY TRANSMISSION IMAGING OF DIPOLAR SKYRMION DYNAMICS” |
| 12:50 - 13:05 | Oral talk: Josep Castell Queralt , Autonomous Univ. of Barcelona, Spain: “Deterministic approach for skyrmionics dynamics at non-zero temperatures” |

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| 13:05 - 13:20 | Oral talk: Roberto Zivieri, University of Messina, Italy (recorded): "STATISTICAL THERMODYNAMICS OF MAGNETIC SKYRMIONS" |
| 13:20 - 15:30 | <u><i>Lunch break</i></u> |
| 15:30 - 18:00 | Session 5. Magnetic vortices and domain walls Chair: Dmitry Berkov |
| 15:30 - 16:00 | Invited talk: Oksana Chubykalo-Fesenko, Instituto de Ciencia de Materiales de Madrid (CSIC), Spain: "DOMAIN WALL DYNAMICS IN CYLINDRICAL MAGNETIC NANOWIRES" |
| 16:00 - 16:30 | Invited talk: Dieter Suess, University of Vienna, Austria: "STABILITY AND NOISE OF MAGNETIC VORTICES AND SKYRMIONS FOR SPINTRONIC APPLICATIONS" |
| 16:30 - 16:45 | Oral talk: Artem Bondarenko, University of Porto, Portugal: "DETECTING A SHADOW OF THE MAGNETIC VORTEX CORE" |
| 16:45 - 17:00 | Oral talk: Ricardo Rama-Eiroa, University of the Basque Country, Spain: "SPIN-ORBIT FIELD-INDUCED DOMAIN WALL DYNAMICS IN THE COMPLEX ANTIFERROMAGNET Mn ₂ Au" |
| 17:00 - 17:15 | Oral talk: Ricardo Rama-Eiroa, University of the Basque Country, Spain: "RELATIVISTIC TOPOLOGICALLY-MEDIATED ENERGY RELEASE BY ANTIFERROMAGNETIC SOLITONS" |
| 17:15 - 17:25 | Short Oral talk: Petr Skirdkov, Prokhorov General Physics Institute of the Russian Academy of Sciences, Russia: "Domain wall dynamics in nanostripe with perpendicular magnetic anisotropy induced by perpendicular current injection" |
| 17:25 - 17:40 | Oral talk: Evgenii Barts, University of Groningen, Netherlands: "NOVEL TOPOLOGICAL DEFECTS IN IRON LANGANITES" |
| 17:40 - 17:50 | Short Oral talk: Vladimir Skidanov, Institute for Design Problems in Microelectronics RAS, Russia: "Magnetization reversal of two exchange coupled 3D-metal nanolayers with different parameters of in-plane anisotropy" |
| 17:50 - 18:00 | Short Oral talk: Olga Borovkova, Russian Quantum Center, Russia: "LAYER-SELECTIVE ULTRAFast MAGNETIZATION REVERSAL IN PLASMONIC MULTILAYERED STRUCTURES WITH GdFeCo" |

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| | <u>Wednesday, June 23, 2021</u> |
| 9:00 - 11:15 | Session 6. Magnetization dynamics, spin waves and magnonics I Chair: Farkhad Aliev |
| 9:00 - 9:30 | Invited talk: Dirk Grundler , Ecole Polytechnique Fédérale de Lausanne, Switzerland: "Coherent spin waves in artificial two-dimensional quasicrystals" |
| 9:30 - 10:00 | Invited talk: Giovanni Carlotti , University of Perugia, Italy: "MEASUREMENT OF THE DMI CONSTANT BY DETECTION OF NON-RECIPROCAL SPIN WAVES IN MAGNETIC FILMS, NANOSTRUCTURES AND MAGNONIC CRYSTALS" |
| 10:00 - 10:30 | Invited talk: Gleb Kakazei , University of Porto, Portugal: "Probing spin waves in individual ferromagnetic nanoelements" |
| 10:30 - 10:45 | Oral talk: Krzysztof Szulc , Adam Mickiewicz University, Poland: "Spin-wave devices based on Dzyaloshinskii-Moriya interaction" |
| 10:45 - 11:00 | Oral talk: Olga Borovkova , Russian Quantum Center, Russia: "INTENSITY MAGNETO-OPTICAL EFFECT IN TRANSMISSION IN THE NANOSTRUCTURE WITH MAGNETIZATION MODULATION" |
| 11:00 - 11:15 | Oral talk: Sebastian Diaz , University of Basel, Switzerland: "Topological phase transition controls magnon spin currents" |
| 11:15 - 11:30 | <u>Coffee break</u> |
| 11:30 - 13:30 | Session 7. Magnetotransport, spin transport and spin-orbit effects Chair: Gleb Kakazei |
| 11:30 - 12:00 | Invited talk: Farkhad Aliev , Autonomous University of Madrid, Spain: "Interfacial spin-orbit coupling: a platform for superconducting spintronics" |
| 12:00 - 12:30 | Invited talk: Giovanni Finocchio , University of Messina, Italy: "Perspective of spintronic diodes" |
| 12:30 - 13:00 | Invited talk: Johan Akerman , University of Gothenburg, Sweden: "2D mutual synchronization in spin hall nano-oscillator networks" |
| 13:00 - 13:10 | Short Oral talk: Anna Krzyżewska , Adam Mickiewicz University, Poland: "Bilinear magnetoresistance in a two-dimensional electron gas" |
| 13:10 - 13:20 | Short Oral talk: Polina Shilina , National Research University Higher School of Economics, Russia: "LASER HEATING SPIN CURRENT GENERATION IN PHOTONIC CRYSTAL-BASED NANOSTRUCTURES" |

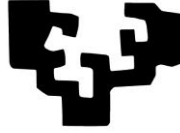
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| 13:20 - 13:30 | Short Oral talk: Amir Nasser Zarezad, Adam Mickiewicz Univ., Poland: “BILINEAR MAGNETORESISTANCE IN TOPOLOGICAL INSULATORS: ROLE OF MAGNETIC IMPURITIES” |
| 13:30 - 16:00 | <u><i>Lunch break</i></u> |
| 16:00 - 18:00 | Session 8. Magnetization dynamics, spin waves and magnonics II Chair: Oksana Chubykalo-Fesenko |
| 16:00 - 16:30 | Invited talk: Axel Hoffmann, University of Illinois at Urbana-Champaign, USA: “HYBRIDIZED MAGNONS IN THIN FILM SYSTEMS” |
| 16:30 - 16:45 | Oral talk: Carlos Gonzalez-Ballester, Institute for Quantum Optics and Quantum Information, Austria: “Spin-steered magnonics” |
| 16:45 - 17:00 | Oral talk: Petr Skirdkov, Prokhorov General Physics Institute of the Russian Academy of Sciences, Russia: “SPIN-TORQUE DIODE MICROWAVE PROPERTIES ENGINEERING BY PERPENDICULAR MAGNETIC ANISOTROPY TUNING” |
| 17:00 - 17:15 | Oral talk: Sergiy Bunyayev, University of Porto, Portugal: “Eddy-currents-induced spin-wave relaxation in YIG-Pt bilayers” |
| 17:15 - 17:45 | Invited talk: Robert Stamps, University of Manitoba, Canada: “LEVEL REPULSION AND ATTRACTION IN CAVITY MAGNONICS” |
| 17:45 - 18:00 | Oral talk: Christina Psaroudaki, California Institute of Technology, USA: “SPIN WAVE RADIATION BY A TOPOLOGICAL CHARGE DIPOLE” |

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| | <u>Thursday, June 24, 2021</u> |
| 10:00 - 18:15 | Session 9. Fundamentals of magnetism and nanoscale systems Chairs: Dieter Suess / Jiadong Zang |
| 10:00 - 10:30 | Invited talk: Dmitry Berkov , General Numerics Research Lab., Germany: "TOWARDS THE OPTIMAL NUMERICAL METHOD FOR COMPUTING SWITCHING TIMES OF MAGNETIC NANOELEMENTS" |
| 10:30 - 10:45 | Oral talk: Sagar Paul , Indian Institute of Technology Kanpur, India: "MAGNETIC SWITCHING STATISTICS THROUGH SERIAL OR PARALLEL BARRIERS IN A SINGLE NANO-MAGNET" |
| 10:45 - 11:00 | Oral talk: Reinoud Lavrijsen , Eindhoven University of Technology, Netherlands: "MAGNETIC CHIRALITY CONTROLLED BY THE INTERLAYER EXCHANGE INTERACTION" |
| 11:00 - 11:15 | Oral talk: Mark de Jong , Eindhoven University of Technology, Netherlands: "MANIPULATING INTERFACIAL DMI IN MAGNETIC MULTILAYERS USING GA + IRRADIATION" |
| 11:15 - 11:30 | Oral talk: Shin Miyahara , Fukuoka University, Japan: "ANOMALOUS SPIN EXCITATION IN TWO-DIMENSIONAL FRUSTRATED HEISENBERG MODEL" |
| 11:30 - 11:45 | Oral talk: Joshua Levinsky , University of Groningen, Netherlands: "A MAGNETOSTRUCTURAL INVESTIGATION OF FRUSTRATED HELIMAGNETIC VAN DER WAALS MATERIAL FeCl ₃ " |
| 11:45 - 12:00 | Oral talk: Taras Zavertanyi , Taras Shevchenko National University of Kyiv, Ukraine: "TOPOLOGICAL BINDING OF SKYRMIONS IN SPIN-3/2 ANTIFERROMAGNET NEAR SU (4) POINT" |
| 12:00 - 12:15 | Oral talk: Mikhail Dorokhin , Lobachevsky State University of Nizhny Novgorod, Russia: "CIRCULARLY-POLARIZED EMISSION OF InGaAs/GaAs LIGHT-EMITTING DIODES WITH A Mn DELTA LAYER" |
| 12:15 - 12:30 | Oral talk: Hai Zhong , Qnami AG, Muttenz, Switzerland: "QUANTITATIVE IMAGING OF ANTIFERROMAGNETIC SPIN CYCLOIDAL TEXTURES ON STRAIN ENGINEERED BiFeO ₃ THIN FILMS WITH A SCANNING NITROGEN-VACANCY MAGNETOMETER" |
| 12:30 - 16:15 | <u>Lunch break</u> |

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| 16:15 - 16:30 | Oral talk: Igor Rozhansky, Ioffe Institute, Russia: "CHIRAL ORDERING OF ELECTRON GAS" |
| 16:30 - 16:45 | Oral talk: Xuan Hu, The University of Texas at Dallas, USA: "Reversible skyrmion logic system" |
| 16:45 - 17:00 | Oral talk: Benjamin Walker, The University of Texas at Dallas, USA: "Voltage Controlled-Clocked Skyrmion Logic Synchronizers" |
| 17:00 - 17:30 | Invited talk: Kirill Belashchenko, University of Nebraska, USA: "SPIN-ORBIT TORQUE AND MAGNETORESISTANCE IN METALLIC BI-LAYERS FROM FIRST PRINCIPLES" |
| 17:30 - 18:00 | Invited talk: Ilya Krivorotov, University of California, USA: "MAGNETIZATION REVERSAL DRIVEN BY CHAOS" |
| 18:00 - 18:15 | Oral talk: Pnina Ari-Gur, Western Michigan University, USA: "Melt-Spun Ni-Mn-Ga Magnetocaloric Heusler Alloys – Effect of Processing Parameters" |
| 18:15 - 18:20 | <u><i>Conference closing</i></u> |

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