Svatopluk Krýsl

born 1978, February 28
in Klatovy (Czechia)
Citizen of Czechia ,

postal address
Mathematical Institute, MFF UK
Sokolovská 49/83
186 75 Praha VIII - Karlin
Czech Republic

e-mail address
svatopluk.krysl@mff.cuni.cz

Employment

2018 – associate professor, Faculty of Mathematics and Physics, Charles University (CU)
2016 – 2017 scientific researcher, Faculty of Mathematics and Physics, CU
2005 – 2016 assistant professor, Faculty of Mathematics and Physics, CU
Oct 2006 – Jan 2007 post-doc at Faculty of Mathematics and Natural Sciences, Humboldt University in Berlin (Germany)
Oct 2004 – Dec 2004 post-doc at Eduard Čech Centre for Algebra and Geometry (Prague, Czechia, EU)

Education and Qualifications

- 2017 Habilitation (qualification for associate professorship) in Geometry and Topology, at Fac. Math. Phys. CU, defence of habilitation thesis „Symplectic Spinors and Hodge Theory“
- 2004 Ph. D. in Mathematics, sepcialization Geometry, Global Analysis and General strtcures Representation Theory at Charles University and, partly, at Vienna University, dissertation thesis „Invariant differential operators for contact projective geometry“
- study of Cartan geometry, general geometry, complex manifolds, LG rep. theory – invariants and combinatorics and super-symmetry
- 2001 MSc. in Theoretical Physics (spec. Math. Phys. and Gravitation), CU
– 1996 – 2001 study of Physics, 1999 – 2001 specialisation at Chair of Theoretical Physics of CU, diploma thesis: „Resolution of twistors for zero mass particles of spin 3/2“, exams: theoretical and math. physics (gravity – cosmological models with dust and cosmological constant, QT: spin and statistics, MP: heat equation, boundary value problems for classical PDE's)

Stages and Studies abroad

2007 – 2017 short stages at University of Marburg
2005 – 2012 short stages at Erwin Schrödinger Institute for Mathematical Physics in Vienna (ESI)
Jan – Feb 2004 visitor at ESI, Sept. 2022 visitor at ESI
summer semester 2003 post-graduate study of Mathematics at Vienna University
summer semester 2000 graduate study of Mathematics at University of Konstanz

Journal articles

Twistor operators in symplectic geometry, Adv. Appl. Cliff. Algebr., 32 (2022), no.1, Paper No. 14
Induced C-complexes in metaplectic geometry. Zbl 07005135,* Commun. Math. Phys., 365, No. 1, 61-91 (2019). **IF 2.338**
Elliptic complexes over C-algebras of compact operators, Zbl 1334.58010,* Journal of Geometry and Physics, Vol. 101, 27-37 (2016). **IF 0.819**
Hodge theory for complexes over C-algebras with an application to A-ellipticity.* Zbl 1328.58002, Ann. Global Anal. Geom. 47, No. 4, 359-372 (2015). **IF 0.684**
Analysis over C-algebras and the oscillatory representation.* Zbl 1311.81159, J. Geom. Symmetry Phys. 33, 1-25 (2014).
Hodge theory for elliptic complexes over unital C-algebras.* Zbl 1316.58017, Ann. Global Anal. Geom. 45, No. 3, 197-210 (2014). **IF 0.684**
Cohomology of the de Rham complex twisted by the oscillatory representation. Zbl 1294.58001, Differ. Geom. Appl. 33, Suppl., 290-297 (2014). **IF 0.691**
Howe duality for the metaplectic group acting on symplectic spinor valued forms. Zbl 1275.17015, J. Lie Theory 22, No. 4, 1049-1063 (2012). **IF 0.455**
Symplectic Killing spinors. Zbl 1249.53093, Commentat. Math. Univ. Carol. 53, No. 1, 19-35 (2012).
Ellipticity of the symplectic twistor complex. Zbl 1249.22009, Arch. Math., Brno 47, No. 4, 309-327 (2011).
Complex of twistor operators in symplectic spin geometry. Zbl 1203.53024, Monatsh. Math. 161, No. 4, 381-398 (2010). **IF 0.647**
Structure of the curvature tensor on symplectic spinors. Zbl 05736308, J. Geom. Phys. 60, No. 9, 1251-1261 (2010). **IF 0.652**
Symplectic Dirac operator and its generalization. Zbl 1181.81079, Adv. Appl. Clifford Algebr. 18, No. 3-4, 853-863 (2008). **IF 0.396**
Classification of 1st order symplectic spinor operators over contact projective geometries. Zbl 1155.58017, Differ. Geom. Appl. 26, No. 5, 553-565 (2008). **IF 0.533**
Symplectic Dirac operator and its higher spin analogues. Zbl 1166.58305 Simos, Theodore E. (ed.) et al., American Institute of Physics (AIP) (ISBN 978-0-7354-0576-9/hbk). AIP Conference Proceedings 1048, 674-677 (2008).
Relation of the spectra of symplectic Rarita-Schwinger and Dirac operators on flat symplectic manifolds. Zbl 1199.58011, Arch. Math., Brno 43, No. 5, 467-484 (2007).
Decomposition of a tensor product of a higher symplectic spinor module and the defining representation of sp(2n, C). Zbl 1120.17006, J. Lie Theory 17, No. 1, 63-72 (2007).**IF 0.367**
Classification of p-homomorphisms between higher symplectic spinors. Zbl 1193.53171, Čadek, Martin (ed.), The proceedings of the 25th winter school “Geometry and physics”, Srní, Czech Republic, January 15–22, 2006. Palermo: Circolo Matemático di Palermo. Supplemento ai Rendiconti del Circolo Matemático di Palermo. Serie II 79, 117-127 (2006).
Symplectic spinor valued forms and invariant operators acting between them. Zbl 164.58320 Arch. Math., Brno 42, No. 5, 279-290 (2006).
On a distinguished class of infinite dimensional representations of sp(2n, C*).* Zbl 1100.15014, Slovák, Jan (ed.) et al., The proceedings of the 24th winter school “Geometry and physics”, Srní, Czech Republic, January 17–24, 2004. Palermo: Circolo Matemático di Palermo. Supplemento ai Rendiconti del Circolo Matemático di Palermo. Serie II 75, 269-277 (2005).
A description of p*-homomorphisms between harmonic modules in projective contact geometry.* Zbl 1149.17300, Bureš, Jarolím (ed.) et al., Differential geometry and its applications. Proceedings, Matfyzpress (ISBN 80-86732-63-0/pbk), 333-340 (2005).
BGG diagrams for contact graded odd dimensional orthogonal geometries. Zbl 1083.17011, Acta Univ. Carol., Math. Phys. 45, No. 1, 67-77 (2004). Acta Univ. Carol., Math. Phys. 45, No. 1, 67-77 (2004).

Textbook

Pavel Čihák et al., *Matematická analýza pro fyziky V.*, Matfyzpress, Praha, (2003), 320 pp. (ISBN 8086732126), (authors M. Rokyta, J. Gřondilová, S. Krýsl, D. Ondřich, T. Ostatnický, D. Šmíd, K. Výborný)

Theses

Habilitation thesis – *Symplectic spinors and Hodge theory, Charles University, Prague, 2016, submitted by faculty in 2017*
Dissertation thesis – *Invariant Operators for Contact projective geometries, Mathematical Institute of CU, Faculty of Mathematics and Physics, Prague, 2004*
Diploma thesis – *Resolution of twistors for zero-mass particles of spin 3/2 (in Czech), Faculty of Mathematics and Physics, Prague, 2001*

Reviews for journals (excerptum)

Annals of Global Analysis and Geometry; Journal of Geometric Analysis; Journal of Geometry and Physics; Symmetry, Integrability and Geometry: Methods and Applications; Archivum Mathematicum (Brno); Comment. Math. Univ. Carolinae; Journal of Geometry and Symmetry in Physics; Mathematica Bohemica

Current-contents review for

Zentralblatt für Mathematik (from 2004), EMS newsletter (2003–2008), Journal of Geometry and Symmetry in Physics

Foundation, Scholarships and Prizes

2020 – 2022 Czech Science Foundation (research team member)
2017 – 2019 Czech Science Foundation (17-01171S, research team member)
2006 – 2008 Czech Science Foundation (GP201/P6/223, principal researcher, postdoc foundation)
2004 – 2006 Foundation of Charles University (447/2004/B-MAT/MFF, researcher)
2003 Austrian Academic Exchange Office (OaAD, research at ESI)
2002 McKinsey foundation (study scholarship used for study at Vienna University)
2000 Herbert Quandt foundation (study scholarship for study in Univ. Konstanz, Germany)
1996 Prize of the Minister of Education, Youth and Sport of Czech Republic for a result in competitions in mathematics for high school students

Talks at Conferences, Workshops and Seminars (excerptum)

Winter School (school, conference and workshop) Geometry and Physics, *Schur—Weyl—Howe-type duality and ellipticity of the symplectic twistor complex* (JČMF, Masaryk U. in Brno, MFF UK), Srní (Pilsen region), Jan 14-21, 2023.
Conference "Spaces, Structures, Symmetries", *Complexes of symplectic twistor operators* , University of Bari, Bari (Puglia), Aug 28-Sept 2, 2022.

Program (conference & workshop & courses) of I-ESI-MaP "Geometry for Higher Spin Gravity: Conformal Structures, PDEs, and Q-manifolds", *Differential operators invariant with respect to compact operators,* International Erwin Schroedinger Institute for Mathematics and Physics (former ESI), Vienna, 2021
Meeting of the Expro Centre on the topic "Homotopical and homological methods and tools related to mathematical physics", *Elliptic operators on homogeneous bundles over compact spaces,* Masaryk University, Charles University, Telc (Jihlava region), 2019.
Conference "Dirac operators in differential geometry and global analysis, In memory of Thomas Friedrich (1949-2018)", *Elliptic operators on homogeneous bundles over compact spaces,* Mathematical Institute of Polish Academy of Sciences, University Marburg, University of Warmia and Mazury, conference center in Bedlewo by Poznan (Greater Poland), October 2019.
International conference "Differential Geometry and its Applications", *Elliptic operators and Homogeneous spaces,* University Hradec Kralove, Dept. Mathematics and Statistics of Masaryk University, Hradec Kralove, September 2019
Dirac operators in differential geometry and global analysis, In memory of Thomas Firedrich, MI Polish Acad. Sciences, University Marburg, University Warmia and Mazury, Bedlewo, 2019
International conference "Differential Geometry and its Applications" (University Hradec Kralove, 2019)
International Conference on Topology and Application (Nafpaktos, 2018)
Annual Congress of Austrian Mathematical Society and German Mathematical Union (Salzburg, 2017)
Classical and Quantum Symmetry in Mathematics a Physics (University Jena, 2016)
seminar talk (Institute of Theoretical Physics, CU, 2016)
Workshop on Almost Hermitian and Contact Geometry (Będlewo, 2015)
International Conference on Differential Geometry and Application (Brno, 2015)
seminar talk (Phillips University Marburg, 2014)
Cartan Connection, Geometry of Homogeneous Spaces and Dynamics (Vienna University, 2011)
Workshop and Conference on Lie theory a Complex Geometry (Univ. Marburg, 2010)
Conference on Geometry, Integrability and Quantization (St. Konstantin a St. Helena, 2010)
International Conference on Numerical Analysis and Applied Mathematics – section on Dirac operators and Representation theory (Kos, 2008)
Special Geometry in Mathematical Physics (Kühlungsborn, 2008)
seminar talk (Humboldt University, 2007)
International Conference on Differential Geometry and Application (Olomouc, 2007)
honour seminar DG - Smoczyk (Leibniz university Hannover, 2006)
seminar talk DGGAI (Humboldt University, 2006)
International Conference on Differential Geometry and Application (Praha, 2004)
Winter School of Geometry and Physics (Srní, Czech republic, repeatedly during 2004–2023)

Academic administrative

2003 – 2004 a 2008 – 2014 member of Academic senate of Faculty of Mathematics and Physics of Charles University (Study and Economic commissions)

Theses advisory

dissertation thesis
M. Holíková (born Dostalová), Symplectic spin geometry, CU, Prague, 2016

diploma theses
S. Hudeček, Spectrum of Dirac operator on symplectic Grassmannian Gr(2,4), 2022
M. Dostálová, Twistorový operátor v symplektické spinorové geometrii (Twistor operator in symplectic spin geometry), 2011
K. Pazourek, Kontaktní geometrie typu F_4 (Contact geometry of type F_4), 2007

bachelor theses
D. Stejskal, Moufangove rovina (Moufang plane), 2022 (among others completed proof of a thm. in Harvey's 'Spinors and Calibrations'; coherent presentation of the Moufang plane)
Š. Hudeček, Symetrie a separace Laplaceova operátoru v nízkých dimenzích (Symmetry and separation of Laplace operator in low dimensions), 2019
D. Kokoška, Integrabilita Hamiltonovy mechaniky (Integrability of Hamilton mechanics), 2019
M. Poppr, Prostorové formy (Space forms), 2018
J. Kuchařík, Variační počet ve fyzice a geometrii (Calculus of variation in Physics and Geometry), 2016
J. Nárožný, Diferenciální geometrie a dynamika (Differential geometry and Dynamics), 2015
L. Peksová, Kvantová logika a projektivní geometrie (Quantum logic and Projective geometry), 2013
M. Vaňkát (in that times), Spinory v Minkowského časoprostoru (Spinors in Minkowski space time), 2011
P. Hájek, Setrvačníky v R^4 (Spinning tops in R^4), 2011
M. Dostálová, Projektivní oktonionová rovina (Projective octonion plane), 2009

Teaching - excerpted years

2022

summer semester
Noncommutative harmonic analysis 3/1
Advanced topics on groups for physicists 2/1

winter semester
Prnciples of harmonic analysis 3/1

2021

summer semester
Noncommutative harmonic analysis 3/1
Advanced topics on groups for physicists 2/1
Exc. Linear Algebra 2 (math.)

winter semester
Principles of harmonic analysis 3/1
Exc. Math. analysis for physicists 1
Exc. Linaer algebra 1 (math.)

2020

summer semester

winter semester

2019

summer semester
Harmonic analysis 2 3/1
Advanced topics in group theory for physicists 2/0

winter semester
Linear algebra I 2/0
Harmonic analysis 1 3/1

2018

summer semester
Advanced topics in group theory for physicists 2/0
exercise Mathematical analysis II 0/3

winter semester
Riemannian geometry 1 2/0
exercise Riemannian geometry 1 0/2
Riemann surfaces 2/0

2017

summer semester
Harmonic analysis 2 3/0
exercise Harmonic analysis 2 0/1
exercise Linear algebra II 0/2
exercise Linear algebra II 0/2
Advanced topics from group theory for physicists *2/0*

winter semester
exercise Linear algebra I 0/2
exercise Linear algebra I 0/2
exercise Linear algebra I 0/2
seminar in Philosophy problems of Computer sciences 0/1
Harmonic analysis 1 3/0
exercise Harmonic analysis 1 0/1

2016

summer semester
Harmonic analysis 2 3/0
exercise Harmonic analysis 2 0/1
exercise Linear algebra and geometry II 0/2
exercise Linear algebra and geometry II 0/2
seminar Philosophy problems of Computer science 0/1

winter semester
Harmonic analysis 1 3/0

exercise Harmonic analysis 1 0/1
exercise Linear algebra and geometry I 0/2
exercise Linear algebra and geometry I 0/2
seminar Philosophy problems of Computer science 0/1

2015

summer semester
Theory of invariants 2/0
exercise Theory of invariants 0/2
exercise Linear algebra II 0/2
exercise Linear algebra II 0/2
seminar Philosophy problems of Computer science 0/1

winter semester
Mathematics for Physicists III 4/0
exercise Mathematics for physicists III 0/2
exercise Linear algebra I 0/2
seminar Philosophy problems of Computer science 0/1

2014

summer semester
Mathematics for Physicists II 3/0
exercise Mathematics for physicists II 0/2
Theory of Invariants 2/0
exercise Theory of invariants 0/2
seminar Philosophy problems of Computer science 0/1

winter semester
Mathematics for Physicists I 4/0
exercise Mathematics for physicists I 0/2
seminar on Philosophy problems of computer science 0/1

Taught lectures, seminars and proseminars – summary

Mathematical analysis 1 (repeatadly), 2 and Mathematics for Physicists I, II a III (five semester course for students of physics)
Riemannian geometry 1
Riemann surfaces
Differential geometry of curves and surfaces
Proseminar to differential geometry of curves and surfaces (repeatadly)
Proseminar to geometric methods of Hamiltonian mechanics (in winter semester 1999/2000)
Representation theory of Lie groups 1, 2, 3, 4 (four semester course, repeatedly 1 and 3)
Theory of invariants (repeatadly)
Harmonic analysis 1, 2 (repeatadly)
Advanced topics from group theory for physicists (repeatadly)
Linear algebra I (first part of the two semester course for students of physics, repeatadly)
Seminar Philosophy problems of Computer science (with a colleague 2013–2016)
Students seminars on topics of current mathematical physics of strings and conformal field theory (2005 – 2011), not paid

Taught exercises – summary

Linear algebra I, II (students of physics) - repeatedly
Linear algebra and geometry I, II (students of mathematics) - repeatedly
Mathematical analysis I, II (students of physics), Mathematics for physicists 1, 2 a 3 - repeatedly
Representation Theory of Lie groups 1 – 4 – parts of them more times
Harmonic analysis 1, 2
Riemannian geometry 1
Theory of Invariants - repeatadly