Jędrzej Świeżewski

PhD · Theoretical physics

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Education

PhD in Theoretical Physics *Nov. 2016*

Faculty of Physics, University of Warsaw *Oct. 2011 - Nov. 2016*

- thesis title: *Observer's observables. Definition and applications*
- supervisor: prof. Jerzy Lewandowski

MSc in Physics *Jun. 2011*

Inter-Faculty Individual Studies in Mathematics and Natural Sciences, University of Warsaw *Oct. 2006 - Jun. 2011*

- thesis title: *Between General Relativity and Electrodynamics - hamiltonian description of a field theory*
- supervisor: dr hab. Andrzej Okołów
- Summa Cum Laude

Scientific interests

- My research focuses on canonical approaches to gravity, both classical and quantum.
- I proposed geometric Dirac observables for general relativity with applications in loop quantum gravity and in AdS/CFT correspondence.

Grants & Awards

Grants

2014 - 2016   **Principal Investigator**, PRELUDIUM grant funded by Polish National Science Centre

Awards

2012   **Joanna z Gwiżdżów and Jerzy Glazer's prize,** for the best MSc thesis in the Faculty of Physics, University of Warsaw

2012   **Selection of the article,** Class.Quant.Grav. 29 (2012) 045008 to the IOP Select

Scholarship for the best PhD students, academic years 2013/14, 2014/15, 2015/16

Increase of scholarship from subject-specifc subsidy for proquality tasks, academic years 2011/12, 2013/14, 2014/15, 2015/16

Teaching

winter 2014	**Algebra and Geometry,** (in Polish)	*University of Warsaw, Poland*
winter 2012 and 2013	**Mathematics I,** (in Polish)	*University of Warsaw, Poland*
summer 2011	**Classical Mechanics and Special Relativity,** (in Polish)	*University of Warsaw, Poland*

Languages

Polish   native
English   fluent

Hobbies

Skiing and ice-skating are my greatest hobbies (see my website)

Publications

Observer's observables. Residual diffeomorphisms

Class. Quant. Grav. 34 (2017) 125009

Paweł Duch, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1610.03294

- Transformations between observers form a curved Poincaré algebra.

The algebra of observables in Gaußian normal spacetime coordinates

JHEP 1601 (2016) 047

Norbert Bodendorfer, Paweł Duch, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1510.04154

- The holographic gauge is severely nonlocal.

General relativity in the radial gauge: Reduced phase space and canonical structure

Phys.Rev. D92 (2015) 8, 084041

Norbert Bodendorfer, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1506.09164

- Analysis of properties of the radial gauge in general relativity.

Addendum: Observables for General Relativity related to geometry

JHEP 1504 (2015) 075

Paweł Duch, Wojciech Kamiński, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1503.07438

- The "almost canonical" subalgebra is truly canonical, if one looks closely.

A quantum reduction to spherical symmetry in loop quantum gravity

Phys.Lett. B747 (2015) 18-21

Norbert Bodendorfer, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1410.5609

- Spherical symmetry is defined in loop quantum gravity on the quantum level.

Observables for General Relativity related to geometry

JHEP 1405 (2014) 077

Paweł Duch, Wojciech Kamiński, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1403.8062

- A complete family of observables for general relativity is proposed. Their Poisson algebra is provided explicitly.

On the properties of the irrotational dust model

Class.Quant.Grav. 30 (2013) 237001

Jędrzej Świeżewski

arXiv:1307.4687

- The Hamiltonian of the irrotational dust model is not a square root.

Relational Evolution of Observables for Hamiltonian-Constrained Systems

Phys.Rev. D88 (2013) 084007

Andrea Dapor, Wojciech Kamiński, Jerzy Lewandowski, Jędrzej Świeżewski

arXiv:1305.0394

- Definition of time evolution of Dirac observables requires extra care.

Hamiltonian formulation of a simple theory of the teleparallel geometry

Class.Quant.Grav. 29 (2012) 045008

Andrzej Okołów, Jędrzej Świeżewski

arXiv:1111.5490

- A differential-forms-based hamiltonian formalism is established and applied to a toy model.

Conference and seminar presentations

Observables observed by an observer

13/01/2017

Quantum Gravity Seminar, Radboud University

Nijmegen, the Netherlands

Developments on the radial gauge

10/11/2015

International Loop Quantum Gravity Seminar

via Skype

Geometrical diffeomorphism invariant observables for General Relativity and their applications

17/09/2015

Topological Quantum Field Theory Seminar, Instituto Superior Técnico

Lisbon, Portugal

Quantum Reduction to Spherical Symmetry

12-18/07/2015

14th Marcel Grossmann Meeting (MG14)

Rome, Italy

Using radial gauge to define quantum spherical symmetry

6-10/07/2015

Loops 15

Erlangen, Germany

Quantum Spherically Symmetric Gravity or rather Spherically Symmetric Quantum Gravity?

7-12/06/2015

General Relativity and Gravitation: A Centannial Perspective

State College, USA

Radial Gauge – reduced phase space of General Relativity

16-20/02/2015

Third EFI winter conference on Quantum Gravity

Tux, Austria

Observers diffeomorphism-invariant description of a general relativistic system

15-18/07/2014

Frontiers of Fundamental Physics 14 (FFP14)

Marseille, France

Geometrical observables for General Relativity related to distances and angles

27/02-01/03/2014

4th Central European Relativity Seminar (CERS4)

Vienna, Austria

Deparametrising GR with distances and angles

10-14/02/2014

Second EFI Winter Conference on Quantum Gravity

Tux, Austria

Geometrical observables for General Relativity coupled to dust

22-26/07/2013

Loops 13

Waterloo, Canada

Construction of Dirac observables for General Relativity with the use of geometry

07-13/07/2013

20th International Conference on General Relativity and Gravitation (GR20)

Warsaw, Poland

Constructing geometrical Dirac observables for GR

25/02-01/03/2013

EFI Winter Conference on Canonical and Covariant LQG

Tux, Austria

Between General Relativity and Electrodynamics – hamiltonian description of a field theory

01-07/07/2012

13th Marcel Grossmann Meeting (MG13)

Stockholm, Sweden