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Post-doctoral researcher

Jérémie Joudioux

Curriculum Vitae

Research Field

Fields of research: geometric analysis, hyperbolic partial differential equations, differential geometry, mathematical relativity

Keywords: asymptotic behavior, linear and nonlinear wave equation, transport equation, Maxwell fields and their higher spin generalisations, asymptotically flat spaces, vector-field methods

Research Themes
- Stability problem of the flat spacetime as a solution to Einstein equations coupled with a transport equation, modeling collisionless matter. The purpose of this work is to develop tools (in the form of symmetry operators for the transport equation) to handle the Einstein-Vlasov system, and prove stability of Minkowski spacetime, as a trivial solution to this system.
- Asymptotic behavior of higher spin fields. The purpose of this work is to develop method based on symmetry operators of the space of solutions to understand the structure of these hyperbolic system, and derive their asymptotic behavior.

PhD thesis

Title *Problème de Cauchy caractéristique et scattering conforme en relativité générale*

Thesis advisor Jean-Philippe Nicolas, Laboratoire de Mathématiques de Bretagne Atlantique - Université de Brest

Grade Magna cum laude (très honorable)

Defended 2 juin 2010

Previous positions and education

Employment history

10/17-09/18 **Post-doctoral researcher**, Mathematics departement of the Radboud university.

10/13-09/17 **Post-doctoral researcher, university assistant of Piotr T. Chruściel**, Faculty of physics of the University of Vienna .

09/10-09/13 **Post-doctoral researcher, under the supervision of L. Andersson**, Max Planck institute for gravitational physics – Albert Einstein Institute, Potsdam, Germany, position renewed until august 2014.

09/07-08/10 **Allocataire moniteur normalien (teaching assistant and Phd Student on a grant of the École Normale Supérieure de Cachan)**, University of Brest, France.

Education

09/06-08/10 **Thèse de doctorat ès science, spécialité mathématiques (PhD in Mathematics)**, Laboratoire de Mathématiques de Bretagne Atlantique, Brest, Magna cum Laude (très honorable).
under the supervision of Jean-Philippe Nicolas, defended on june 2nd 2010

09/05-09/06 **Agrégation de Mathématiques (civil servant teaching competitive examination, highest academic level)**, ENS Cachan – University Rennes 1 .

09/04-09/05 **Master in Science, (option: pure mathematics)**, University Montpellier 2 , Magna cum Laude (Bien).

03/04-09/04 **Maîtrise de Mathématiques (Master 1st year)**, University Paris 7 , Summa cum Laude (très bien).

09/04-08/07 **Magistère de mathématiques**, École Normale Supérieure de Cachan – University Paris 7 , Magna cum Laude.

Presentation in international conferences

07/19 EquaDiff 19, International conference on differential equations, relativity session, Leiden, The Netherlands

05/18 Conference on Mathematical General Relativity, Nonlinear Wave Equations, and related topics, Institut Henri Poincaré, Paris, France

03/18 Conference "Field equations on Lorentzian space-times", Hamburg, Germany

08/17 Research seminar in the Erwin Schrödinger institute program "Geometry and Relativity", Vienna, Austria

10/16 Third meeting of the ANR grant "Asymptotic Analysis in General relativity", Roscoff, France

07/16 21st International Conference on General Gravity and Gravitation (session: Mathematical relativity and classical gravitation), New York

02/16 Central European Relativity Seminar, Prague

07/15 AMS-EMS-SPM meeting, Porto (mathematical relativity session), Portugal

02/15 Central European Relativity Seminar, Budapest

07/14 Second meeting of the ANR grant "Asymptotic Analysis in General relativity", University Grenoble 1

06/13 First meeting of the ANR grant "Asymptotic analysis in General relativity", University of Cergy-Pontoise

12/12 Erwin Schrödinger institute program "Dynamics of general relativity", Vienna

01/12 Fourth meeting in quantum dynamics, Toulouse

03/11 Meeting " Resonances and scattering in general relativity", Dijon

10/10 Conference " Black hole, General Relativity, Waves", Roscoff

local seminars Brest ('12, '15), Grenoble ('11,'14,'15), Berlin ('16), Bordeaux ('11, '14 ,'15), Nottingham ('16), Edinburgh ('17), Amsterdam ('17), Goteborg ('18).

Invitations to meetings and schools

Invitation to research programs

- 07/16: Invitation to the the Erwin Schrödinger institute's program "Geometry and Relativity".
- 07/15: Invitation to the Oberwolfach workshop "Mathematical aspects of General Relativity".
- 12/12: Invitation to the Erwin Schrödinger institute's program "Dynamics of General relativity".
- 07/11: Invitation to the Erwin Schrödinger institute's program "Dynamics of General relativity".

Teaching experience and qualification

06/06	Agrégation de Mathématiques (High school teacher competitive exam)
Spring 07	Responsible for the calculus in semester 4 in preparatory school for engineers, University Bordeaux 1.
09/07-06/10	Teaching assistant (64h/year) at the University of Brest; problems classes in Mathematics, at a bachelor level, mathematics, physics and economy curriculum.
10/13-today	University assistant (ca. 100h/year) at the University of Vienna; problem classes in mathematics in the physics curriculum.
03/12, 03/13, 03/16	Lecturer (course and tutorials, ca. 10h) for the spring school in General relativity of the Albert-Einstein-Institute (Jürgen Ehlers spring school) - course in General Relativity and Differential Geometry.
Award	Teaching award at the faculty of Physics of the University of Vienna in June 17.

Supervision and evaluation of (under)-graduate students

Bachelor	J. Möller (2016, on Euler equations)
Master	C. Paganini (2013 - with L. Andersson; wave equation on Kerr spacetimes), P. Eigenschink (2017 - with D. Fajman; massive massless Einstein-Vlasov system in spherical symmetry)
Thesis committee	M. Mokdad (supervised by J.-P. Nicolas, on *Champs de Maxwell en espace-temps de Reissner - Nordström- De Sitter : décroissance et scattering conforme*), C. Paganini (supervised by L. Andersson, on *The role of trapping on black holes spacetimes*)

Conference organisation

Conference organization Grant (ca. 22000 Euros in total) from the Erwin Schrödinger institute of Vienna for the organization of a workshop in feb. 2017 on the geometric transport equation in general relativity with H. Andréasson (Chalmers) and D. Fajman (Vienna).

Administrative responsibilities

Representation of students Ph.D. representative in the scientific board of the faculty of Science of the University of Brest, and in the math. department of the university of Brest

Miscellaneous

Research groups	Associate member of the ANR research grant AARG "Asymptotic Analysis in General Relativity", coordinated Jean-Philippe Nicolas.
Service to the community	Referee for *Commun. Math. Phys.*, *Ann. Institut Fourier*, *Class. Quantum Grav.*, *Gen. Relativ. Grav.*.