

Harold ERBIN

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Nationality: French

Birth date: 5th October 1989 (France)



Education and Academic Degrees

November 2015–June 2016 Visiting advanced graduate student

Indo-French grant, CEFIPRA

ICTS, Bangalore, India (local contact: [Suvrat Raju](#))

HRI, Allahabad, India (local contact: [Ashoke Sen](#))

September 2012–October 2015 PhD in theoretical physics

Black holes in $N = 2$ supergravity

Advisor: [Nick Halmagyi](#)

Committee: [Iosif Bena](#), [Geoffrey Compère](#), [Atish Dabholkar](#), [Giuseppe Policastro](#),
[Henning Samtleben](#), [Antoine Van Proeyen](#)

LPTHE, Université Pierre et Marie Curie–Paris 6, France

January–February 2012 PSI (Perimeter Scholars International) program lectures

Perimeter Institute for Theoretical Physics, Waterloo, Canada

2009–2012 Magistère de physique fondamentale with honors

Université Denis Diderot–Paris 7, France

2011–2012 Second year of MSc in theoretical physics (Concepts Fondamentaux, parcours physique théorique) with highest honors

École Normale Supérieure, Paris, France

(Diploma from Université Denis Diderot–Paris 7, France)

2010–2011 First year of MSc in theoretical physics with highest honors

Université Denis Diderot–Paris 7, France

2009–2010 BSc in theoretical physics with honors

Magistère de physique fondamentale

Université Denis Diderot–Paris 7, France

2007–2009 Classes préparatoires aux grandes écoles in physics, mathematics and chemistry¹

Lycée Roosevelt, Reims, France

2007 French baccalauréat with high honors, science major

Lycée Jules Verne, Château-Thierry

¹Classes to prepare competitive exams for engineering schools) with a 2-year University level in physics, chemistry and mathematics.

Scientific projects

January–February 2012 Internship

Critical behaviors of random tensor models in the large N limit

Advisor: [Valentin Bonzom](#)

Perimeter Institute for Theoretical Physics, Waterloo, Canada

May–August 2011 Internship

Classical supersymmetry and supergravity

Advisors: [Francesco Nitti](#), [Jihad Mourad](#)

APC, Université Denis Diderot–Paris 7, France

June 2010 Internship

Magnetohydrodynamics, jets and stellar winds

Advisor: [Nektarios Vlahakis](#)

Department of Astrophysics, Astronomy and Mechanics, Faculty of Physics, University of Athens, Greece

Schools and conferences

September 2015

[The String Theory Universe](#) (Leuven, Belgium)

August 2013–2015

[Institut d'été](#) (LPTENS, Paris, France)

June 2015

[De Sitter and Microstate Landscapes in String Theory](#) (IPHT, Saclay, France)

March 2012–2014, April 2015

[Quantum gravity in Paris](#) (France)

June 2014

[Cargèse Summer School: String Theory and Holography](#) (Cargèse, France)

September 2013

[Modave Summer School in Mathematical Physics IX](#) (Modave, Belgium)

August 2013

[Arnold Sommerfeld School: Gauge-gravity duality and condensed matter physics](#) (Munich, Germany)

October–december 2012

[Amsterdam–Brussels–Paris Doctoral School](#)

Seminars and posters

- *2d gravity with conformal and non-conformal matter*
LPTHE, Université Paris 6 (student seminar, October 2015)
- *Liouville theory as a toy model for inflation*
LPTHE–LPTENS (journal club, October 2015)
- *NUT Black Holes in $N = 2$ Gauged Supergravity*
Théorie des cordes en France (workshop), Université Paris 6 (May 2015)
The String Theory Universe (workshop), Leuven (gong show and poster, September 2015)
AEI, Potsdam (September 2015)
Università Milano–Bicocca (October 2015)
Fields and Strings, ASC, Munich (October 2015)
- Research visit
ICTP, Trieste (January 2015)
- *Abelian hypermultiplet gaugings and BPS vacua in $N = 2$ supergravity*
ULB, Brussels (October 2014)
Università degli Studi di Milano (November 2014)
Politecnico di Torino / Università degli Studi di Torino (November 2014)
Utrecht (November 2014)
- *Introduction to supergravity, abelian gaugings and BPS vacua*
LPTHE, Université Paris 6 (student seminar, October 2014)

Teaching background

2012–2015 Teaching assistant in physics

- *Numerical methods and scientific computation* (first year MSc): tutorials (2012–2015), lectures (2013–2015)
- *Classical mechanics II: system dynamics* (first year BSc): tutorials (2012–2013)
- *Optics and thermodynamics for biology* (second year BSc): tutorials (2013–2014)

Université Paris 6, France

2010–2012 Teaching assistant in physics

- Academic tutoring (2010–2012)
- Oral examinations (2011)

Université Paris 7, France

October 2010–October 2011 [Teaching assistant in sciences](#) (part-time job, 803h)
Lycée Jean Macé, Vitry-sur-Seine, France

2009–2010 [In-home tutoring](#) (mathematics and physics) for middle and high school students

2009 Introduction to LaTeX (3rd year BSc students)

Computer science

- Programming languages:² **Python**, Bash, PHP, C, Fortran, Racket, Scala
- Markup languages: LaTeX, HTML, CSS
- Network and system administration (Linux, Windows)
- Notions of project management, software development and webdesign
- Numerical and symbolic methods: **Mathematica**, Matlab, Blas/Lapack, SymPy, NumPy/SciPy
- Tools: web frameworks (mainly Django), (D)VCS (Mercurial, Git, SVN), SQL and graph databases (MySQL, SQLite, Neo4j), Sphinx, Inkscape...

Languages skills

- **French**: native speaker
- **English**: fluent
- **German**: fluent
- Beginner: Hindi
- Old notions: Latin, Ancient Greek, Esperanto, Modern Greek

²[Codingame](#) contest (01/2013): rank 12/349, 86%, 1h45.

Misc

- Referee: [European Physical Journal C](#)
- Member of LPTHE administration board (2014–2015)
- First aid training (PSC1, June 2012)

Projects

- Participation to the SymPy project (computer algebra system in Python)
- Management software for writers: *Azur*
- Exercise database software
- Multidisciplinary web journal: *Hibou'k*
- Manuals on mathematics (middle school) and Python
- Writing: novels (fantasy), poems, theatre, etc. (several awards)

Other interests

- Natural sciences: neuroscience, chemistry, biology, geoscience, astrophysics...
- Social and human sciences: philosophy, epistemology, political philosophy, geopolitics, military strategy, history, psychology...
- Reading: poetry, fantasy, science-fiction, mythologies
- Linguistics, rhetoric, typography, languages
- Renaissance and traditional dances (since 2009), Viennese waltz (one year), tin whistle
- Badminton (2001–2006, 2011–2012), medieval (since 2011, instructor for 2014–2015) and Japanese (since 2012) fencing, yoga (since 2013)
- Model building, leathercraft
- Coursera: 25+ courses validated
- Associations: Synescent (founding president), Mensa, MinD-Hochschul-Netzwerk (MHN), Étudiants de physique de Paris 7 (webmaster, founder), April, Greenpeace, Protection mondiale des animaux de ferme (PMAF), Action contre la faim, Chapitre des armes

Publications

- [1] H. Erbin. “Janis–Newman algorithm for supergravity black holes”. *Proceedings: The String Theory Universe, Leuven, September 7-11, 2015*. To appear in: *Fortschritte der Physik*, 2015.
- [2] C. De Lacroix, H. Erbin, and E. E. Svanes. “Mabuchi spectrum and degrees of freedom in 2d gravity with non-conformal matter” (Nov. 2015).
arXiv: 1511.xxxxx.
- [3] H. Erbin and N. Halmagyi. “Quarter-BPS Black Holes in AdS₄-NUT from $N = 2$ Gauged Supergravity”. *Journal of High Energy Physics* 2015.10 (Oct. 2015).
DOI: 10.1007/JHEP10(2015)081.
arXiv: 1503.04686.
- [4] H. Erbin and L. Heurtier. “Five-dimensional Janis-Newman algorithm”. *Classical and Quantum Gravity* 32.16 (Aug. 2015), p. 165004.
DOI: 10.1088/0264-9381/32/16/165004.
arXiv: 1411.2030.
- [5] H. Erbin and L. Heurtier. “Supergravity, complex parameters and the Janis-Newman algorithm”. *Classical and Quantum Gravity* 32.16 (Aug. 2015), p. 165005.
DOI: 10.1088/0264-9381/32/16/165005.
arXiv: 1501.02188.
- [6] H. Erbin and N. Halmagyi. “Abelian Hypermultiplet Gaugings and BPS Vacua in $N = 2$ Supergravity”. *Journal of High Energy Physics* 2015.5 (May 2015).
DOI: 10.1007/JHEP05(2015)122.
arXiv: 1409.6310.
- [7] H. Erbin. “Janis-Newman algorithm: simplifications and gauge field transformation”. *General Relativity and Gravitation* 47.3 (Mar. 2015).
DOI: 10.1007/s10714-015-1860-1.
arXiv: 1410.2602.
- [8] H. Erbin. “Deciphering and generalizing Demiański-Janis-Newman algorithm”. *Submitted to Class. Quantum Grav.* (Nov. 2014).
arXiv: 1411.2909.
- [9] V. Bonzom and H. Erbin. “Coupling of hard dimers to dynamical lattices via random tensors”. *Journal of Statistical Mechanics: Theory and Experiment* 2012.09 (Sept. 2012), P09009.
DOI: 10.1088/1742-5468/2012/09/P09009.
arXiv: 1204.3798.

Public notes³:

- Supergravity and Kähler geometries (189 pages).
- 2d quantum gravity and Liouville theory (97 pages).

³<http://www.lpthe.jussieu.fr/~erbin>

- Demiański–Janis–Newman algorithm (75 pages).
- Scalar propagators on adS space (35 pages).
- Tenseurs aléatoires : application à un modèle de dimères (french, 34 pages).
- Supersymétrie classique (french, 115 pages).
- Draft⁴ for a book on Python (french, 150 pages).

⁴Available at <http://python.melsophia.org/>. Used by several institutions (Université de la Réunion, group LLR from the IN2P3 (french institute for nuclear and particle physics)...