# Francesca Vidotto

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# Profile

I'm a researcher in Theoretical Physics with interests in Quantum Gravity, Quantum Cosmology, and Foundations of Physics.

# **Positions**

- 2017/19 Postdoc at the University of the Basque Country, Bilbao, Spain. Research-group leader: Prof. José Senovilla
- 2014/17 NWO Veni fellow at Radboud University, Nijmegen, the Netherlands. Research-group leader: Prof. Klaas Landsman
- 2012/14 NWO Rubicon fellow at Radboud University, Nijmegen, the Netherlands. Research-group leader: Prof. Renate Loll
- 2011/12 Researcher at Laboratoire de Physique Subatomique et de Cosmologie and teaching assistant at Université J. Fourier in Grenoble, France (ATER). Research-group leader: Prof. Aurélien Barrau

# **Visiting Position**

- 2019 4-month ERC Visiting Fellow in Gravitational Physics, at the Center for Astrophysics and Gravitation in Técnico (GRIT), Lisbon, Portugal.
- 2008 4-month Undergraduate Summer Research Position at Perimeter Institute, Canada. Project: "Early Universe in a Quantum Cosmos".

# Habilitations

- 2014 Habilitation as associate professor in Italy, Sec 02 Theoretical Physics
- 2013 Qualification (Maître de Conf.) for teaching positions in France, Sec 29

# Education

- 16/02/12 PhD in Physics, University of Pavia, Italy; adjoint supervision with the University of Aix-Marseille, France. Title: General covariant transition amplitudes in quantum cosmology Advisors: Prof. Carlo Rovelli and Prof. Mauro Carfora
- 17/10/08 "Laurea" (M. Sc.) in Physics, University of Padova, Italy; Title: Closed models and Inhomogeneities in Loop Quantum Cosmology Advisors: Prof. Carlo Rovelli and Prof. Sabino Matarrese

Subjects studied:

Quantum Field Theory, Theory of Fundamental Interactions, General Relativity, Cosmology.

# Languages

English, fluent; French, fluent; Spanish, basic; Italian, mother language.

#### Publication summary:

(Google Scholar - updated at 14/09/18)

HEP papers: 30 and 1 monograph

h index: 15  $h_{\text{HEP}}$  index: 13 i10-index: 20

Total number of citations: 1215 i10-inde

List of scientific publications at: http://inspirehep.net/author/profile/F.Vidotto.1 Talks at international conferences: ~70 of which ~35 invited talks Full list of presentations at loopy.space/vidotto/curriculum/vidotto-curriculum.pdf



#### Grants

- 2019 "Tenure Track Pilot Programme" (1.000.000 €) awarded by the Croatian Science Foundation (HRZZ) for the research project: "Exploring the Quantum Universe" (5 years) *currently on hold*.
- 2014 "Veni fellowship" (250.000 €) awarded by the Netherlands Organization for Scientific Research (NWO) for the research project: "Investigating the early universe with quantum gravity" (3 years).
- 2012 "Rubicon fellowship" (118.000 €) awarded by the Netherlands Organization for Scientific Research (NWO) for the research project: "Exploring the early universe with quantum gravity" (2 years).
- 2009 "Fondazione A. Della Riccia" scholarship (11.000 €) (1 year).
- 2007 Erasmus scholarship (1 year) at Aix-Marseille University, France.

# Awards

- Scharzschild-Springer Prize for the best junior (less than 8 year from the PhD defense) presentation at the Karl Schwarzschild Meeting 2015.
- 2015 NVH Jubilee Prize (1.000€) awarded by the Network of Female Professors to the most talented young female scientist at Radboud University Nijmegen.
- Honorable mention at the gravity essay contest by Gravity Research Foundation, USA, for "Planck Stars" by Carlo Rovelli, Francesca Vidotto. Int. J. Mod. Phys. D 23, 1442026, 2014.
- "Many-nodes/many-links spinfoam: the homogeneous and isotropic case" by Francesca Vidotto. Class.Quant.Grav.28:245005,2011. Selected by the editors of Class.Quant.Grav. for inclusion in the 'Highlights of 2011-2012'.
- James B. Hartle Award for the best student presentation at the19th International Conference on General Relativity and Gravitation (GR19), Mexico City.
- Honorable mention at the gravity essay contest by Gravity Research Foundation, USA, for "Single particle in quantum gravity and BGS entropy of a spin network " by Carlo Rovelli, Francesca Vidotto. Phys.Rev.D81:044038,2010

#### Referees for (selected)

Physical Review Letters (PRL), Physical Review D (PRD), Journal of High Energy Physics (JHEP), Classical and Quantum Gravity, General Relativity and Gravitation, Foundations of Physics, Studies in History and Philosophy of Modern Physics.

Founding Editor of Quantum, arXiv overlay journal for quant-ph.

# Referees for Funding Agencies

Natural Sciences and Engineering Research Council of Canada, National Science Centre of Poland.

#### Scientific Committee of International conferences

- 2019 Twistors Meet Loops, CIRM, Marseille, France
- 2018 International Foundations of Physics Conference, Utrecht
- 2014 Conference "Frontiers in Fundamental Physics", Marseille, France, July

#### Institutional Responsibilities

- 2016/17 Board member Halkes Women Network, Radboud University, Nijmegen;
- 2002/04 Elected member of the Faculty Council, University of Padova;
- 2002/04 Elected member of the Equal Opportunity Committee, University of Padova;
  - 2001/02 Member of the Faculty Didactic Commission, University of Padova.

#### Courses

- 2019 The Physics of Spacetime (appointed professor)
- for Master students at African Institute for Mathematical Sciences, Ghana.
- 2018 Relativity for high school students at the ESO AstroCamp, Portugal.
- 2018 Doctoral course on quantum gravity at the University of the Basque Country, Spain.
- 2017 Summer School on the philosophy of Quantum Gravity at the University of Urbino, Italy.
- 2016 Foundations of Quantum Mechanics (appointed professor) for Master students at Radboud University Nijmegen, the Netherlands.
- 2016 Quantum Mechanics (appointed professor) for Master students at African Institute for Mathematical Sciences, Senegal.
- 2012 Quantum Mechanics, Special Relativity and Physic Laboratory 1 (assistant) for undergraduates at Université J.Fourier in Grenoble, France.

# Mentoring

Supervision of bachelor research internship (Francesco Pisani) Title: "Entanglement properties of LQG states" Period: Summer 2018 Co-supervision of Master research internship (Gabriel Carral) Title: "Entanglement properties of LQG states" Period: academic year 2017/18 Supervision of Master research internship (Francesco Gozzini) Title: "Entangled states in the primordial universe" Period: academic year 2017/18 Co-supervision of Master research internship (Marrit Schutten) Title: "Phenomenology of quantum black holes" Period: academic year 2015-16 Supervision of Master research internship (Nicola Colacino) Title: "LQG observables with quantum groups" Period: academic year 2014/15 Supervision of Master research internship (Bertrand Jayles) Title: "Entanglement in spinnetwork states" Period: academic year 2013/14 Supervision of Bachelor research internship (John van de Wetering) Title: "Entanglement in spinnetwork states" Period: academic year 2013/14

# **Doctoral Thesis Committee**

François Collet, Aix-Marseille Université Tommaso de Lorenzo, Aix-Marseille Université

# Other interests

- Didactics of Physics and Astronomy
- Philosophy of Science, epistemology.
- History of Science, and sociological aspects of science.
- Art & Science. I have been active in promoting science in theatre.

### Public Engagement

- 2019 Public debate for the feminist organisation Pinkabbestia, Rimini, Italy
- 2018 Public discussion on Time at the Genoa Science Festival, Italy
  - Public Talk on Science and Theatre, Treviso, Italy
- 2017 Skype seminar to the students of Hampshire College, Amherst, US
  - Presentation of the science of Stephen Hawking for the projection of the movie "Theory of Everything" at the University of Bologna, Italy
  - Public talk on "Spacetime" for high school students, Belluno, Italy
  - Ted talk on "Roots to the Future" at the Ted-X event in Treviso, Italy
  - Ted talk on "Particles" for the Italian Physics Society in Trento, Italy
  - Ted talk on "Time" at the Ted-X event in Udine, Italy
  - Public talk on "Time in Modern Physics" at the University of Padua, Italy
  - Dutch premiere the movie "Hidden Figures" and chair of the debate after the projection, LUX, Nijmegen, Netherlands
- 2015 Lecture on General Relativity for its centenary, Radboud University, Nijmegen, NL
  - Open-air lecture "La nascita del tempo" at Festival delle Scienze, Agrigento, Italy
- 2011 Open-air lecture "L'equazione dell'universo" at Festival della Letteratura, Mantova, Italy
- 2005 Preparation and guide service at the Scientific Exposition "Sperimentando" for INFN and Physics department, Padova, Italy
  - Scientific advisor for the play "That Blue Light. Life of Marie Curie" by Ursa Major Theatre
  - Main organizer of the Theatrical Review "La Scienza a Teatro", University of Padova, Italy
  - Invited speaker, Seminar "Gender in Science and Engineering: testimonies, researches, ideas.", University of Padova;
- 2001 Lecture, "Donne, Scienza e Potere. Oseremo disturbare l'Universo?" Second Conference of the Italian Women and Science Association, University of Lecce, Italy;
  - Scientific Committee and Chair Person, Third Conference of the Italian Women and Science Association, University of Padova;
  - Main organizer, Workshop "Globalizzazione, quale (co)scienza?", University of Padova;
  - Main organizer, Conferences Cycle "Donne e Scienza: tre incontri con/tra donne di scienza", University of Padova.

#### Conferences and selected talks

( for the slides of each talk, please visit: loopy.space/vidotto/events/myevents.html ) Talks presented at international conferences: ~70 Plenary invited talks at international conferences: ~35

- 2019 New Directions in the Foundations of Physics' conference, Tarquinia, Italy
  - 68 Invited plenary talk "Quantum spacetime: from principles to measurements" Seminar (invited) at the Center for Philosophy of Time, Milano, Italy

– Workshop'Cross-disciplinary perspectives on model-independent searches', Edinburgh, UK

66 Invited plenary talk on Philosophy of Cosmology

- Seminar (invited) "How does a black hole die?" at CSIC, Madrid, Spain

2018 – Workshop "The origin and evolution of spacetime", Lateran University, Rome, Italy 65 Invited plenary talk "Bouncing Cosmology from Loop Quantum Gravity"

– Seminar (invited) "How does a black hole die? Cosmological and astrophysical consequences" at Scuola Normale Superiore, Pisa, Italy

- Workshop "Fundamental physics with LISA", Galilei Institute, Arcetri, Italy

64 Invited moderator of the panel on Black Hole physics with LISA

- Foundational problems in black holes and gravitational radiation, MCMP, Germany 63 Invited plenary talk "White is the new black"

- Quantum Gravity meets Lattice QFT, Trento, Italy (TBC)

62 Talk "Loop Quantum Gravity: a general-covariant lattice gauge theory"

– First Irvine-Munich-PoliMi-Salzburg Conference in Philosophy and Foundations of Physics (IMPS 2018), Salzburg, Austria

61 Invited talk "Relational Observables and Relational Time"

- Gravity in the Quantum Lab, Benasque, Spain

60 Invited talk "Quanta of Spacetime"

59 Invited talk "White is the new Black"

- "100 Years of Gauge Theory", Bad Honnef, Germany

58 Invited talk "Loop Quantum Gravity: a general-covariant lattice gauge theory"

- 2nd World Summit on Exploring the Dark Side of the Universe, Guadalupe

57 Invited talk "Quantum Insights on Primordial Black Holes as Dark Matter"

Summer Institute on Philosophy of Cosmology, London, Ontario, Canada
 56 Invited talk TBA

New Directions in the Foundations of Physics' conference, Viterbo, Italy (invited)
 Cosmology Workshop in San Servolo, Venice, Italy

55 Invited talk "Quantum Insights on Primordial Black Holes as Dark Matter"

The 2nd workshop on "Singularities of general relativity and their quantum fate" 54 Invited talk "Planck Stars: the final fate of quantum non-singular black holes and its phenomenological consequences"

- Time & the Observer Workshop, La Jolla, California

– Seminar (invited) "Planck Stars: theory and phenomenology" at DAMTP, Cambridge, UK

– Colloquium (invited) "Planck Stars: explosions from a quantum hole" at the Kapteyn Astronomical Institute, Groningen, NL

2017 - Texas Symposium on Relativistic Astrophysics, Cape Town, South Africa

Current Themes in High Energy Physics and Cosmology, Copenhagen, Denmark
 Conference of the Italian Physics Society (SIF), Trento, Italy

53 Talk "Quantum gravity phenomenology with primordial black holes"

- XIX International Summer School in Philosophy of Physics (SILFS), Urbino, Italy

52 Series of four lectures (invited) on the "Principles of Quantum Gravity"

- LOOPS 17, Warsaw, Poland

51 **Invited plenary** talk "How to measure a realistically observable quantity in LQG: primordial black holes"

- Workshop Conceptual Issues in Fundamental Physics, Grenoble, France

50 Invited plenary talk "No Time No Problem"

– Conference on the Philosophy of Cosmology, London, Western-Ontario University, Canada

49 Invited plenary talk "Quanta of spacetime in a non-singular universe"

- String Theory & Cosmology (GRS), Tuscany, Italy

48 Talk "Exploding Black Holes" (Junior Highlight)

– String Theory & Cosmology (GRS), Tuscany, Italy

47 Talk "Quantum-gravity signals from primordial black holes" (Junior Highlight)

New Directions in the Foundations of Physics' conference, Tarquinia, Italy
 Seminar (invited) "Possible quantum-gravity signals from primordial black

- Seminar (invited) "Possible quantum-gravity signals from primordial black holes" (Napoli, Italy)

- Pine Symposium 2017, Minnesota, US (invited)

– Workshop "Black Holes, Gravitational Waves and Spacetime Singularities, Vatican 46 Invited plenary talk "Quantum gravity phenomenology with primordial black holes"

- Fundamental Physics with SKA, Mauritius

45 Invited talk "Quantum gravity phenomenology with primordial black holes"

– Do Black Holes Exist? – The Physics and Philosophy of Black Holes, Bad Honnef, Germany

- Workshop "Quantum Gravity in Paris 2017", IHP, Paris, France

– Workshop "Symmetry and Symmetry Breaking in Fundamental Physics, University Paris-6

44 Invited talk "Gauge is in the eye of the beholder"

- "Experimental Search of Quantum Gravity" Conference, Frankfurt, Germany

43 Invited talk "Quantum-gravity signals from primordial black holes"

- SIGARV Congress 2016, Cefalù, Italy;

42 Invited talk "Quantum black holes: theory and phenomenology"

– 5th international FQXi conference on "The Physics of the Observer", Banff, Canada

41 Invited talk "Happened=Observed. A relational Argument"

– 21st International Conference on General Relativity and Gravitation (GR21), New York, US

40 talk "Quantum-gravity signals from primordial black holes"

- Conference "Time in Cosmology", Perimeter Institute, Canada

2016 – II FLAG (FieLds And Gravity) meeting on Quantum Gravity, Trento, Italy 39 Invited talk "Quantum black holes: theory and phenomenology"

– 4th International Conference on the Nature and Ontology of Spacetime, Varna, Bulgaria

38 Invited keynote talk"Atomism and Relationalism as guiding principles for Quantum Gravity"

– Seminar "Possible quantum-gravity signals from primordial black holes" (Physics Dep.,Geneva)

– Seminar (invited) "A relational ontology from General Relativity and Quantum Mechanics" (Geneva)

- CarloFest (organizer), Conference for the 60th birthday of Carlo Rovelli, Marseille 37 talk "Quantum-gravity phenomenology with primordial black holes"

– Seminar (invited) "Possible quantum-gravity signals from primordial black holes" (IAP, Paris)

#### 2015 - Conference "A century of General Relativity", Berlin, December;

– Seminar (invited) "Possible quantum-gravity signals from primordial black holes" (LUTH, Paris)

– Seminar (invited) "Possible quantum-gravity signals from primordial black holes" (SISSA, Trieste)

- "From Inflation to Galaxies: a workshop in honour of Sabino Matarrese", Castiglioncello, Italy

- Hawking Radiation Conference, Stockholm, Sweden

36 Invited plenary talk"A new quantum black-hole phenomenology"

- Karl Schwarzschild Meeting, Frankfurt, Germany

35 **Invited plenary** talk "Quantum-gravity phenomenology with primordial black holes"

- Quantum Gravity Meeting, Rome, Italy

34 **Invited plenary** talk "New signals from quantum gravity with primordial black holes"

- LOOPS15, Erlagen, Germany

33 Talk "Compactification of LQG Phase Space"

- Conference 100 Years of General Relativity, Penn State, US

32 Talk "Quantum-gravity phenomenology with primordial black holes"

– Seminar "What if the universe accelerates because time is discrete?" (Perimeter Institute, Canada)

– Seminar "Planck stars: from cosmology to black holes and back" (Physics Dep.,Oxford, UK)

– Philosophy of Physics Research Seminars HT 2015, Oxford, UK

– Seminar (invited) "A relational ontology from General Relativity and Quantum Mechanics"

- "Quantum Gravity Foundations: UV to IR" program, KITP, Santa Barbara, US

- EFI Winter Conference on Canonical and Covariant LQG, Tux, Austria
- 31 talk "The compact phase space of Loop Quantum Gravity"
- Seminar "Planck Stars" GRAPPA Institute, Amsterdam, the Netherlands
- Physics@FOM Veldhoven 2015, Utrecht, the Netherlands
- 30 talk "Planck Stars"
- 2014 seminar (invited) "Planck Stars" Physics Department, Trento, Italy (04/12/14) – XI International Ontology Congress, Barcelona, Spain

29 Invited talk "A relational ontology from General Relativity and Quantum Mechanics"

– XXI SIGRAV Conference on General Relativity and Gravitational Physics, Alessandria, Italy

28 Invited talk "What can we learn from Loop Quantum Cosmology? The case of Planck Stars"

- International Conference "The Philosophy of Cosmology", Tenerife, Spain

- Conceptual and Technical Challenges for Quantum Gravity, Rome

27 talk "Spinfoam Cosmology and Maximal Acceleration"

- Experimental Search for Quantum Gravity, SISSA, Italy

26 talk "Experimental Search for Planck Stars"

- WE-Heraeus-Seminar Quantum Cosmology, Bad Honnef, Germany 25 Invited talk "What can we learn from Loop Quantum Cosmology? The case of Planck Stars"

- Conference "Frontiers in Fundamental Physics", Marseille, France

24 talk "Atomism and Relationalism as guiding principles for Quantum Gravity"

- XI SIGRAV graduate school "Gravity and the Quantum", Como, Italy

23 talk 'Spinfoam Cosmology'

– Workshop Cosmology and the Constants of Nature, DAMPT, Cambridge, UK

– 4th FQXi's Conference "The Physics of Information", Vieques, Puerto Rico
 2013 – Seminar on the Philosophical Foundations of Quantum Gravity, U. of Illinois, Chicago

2013 – Seminar on the Philosophical Foundations of Quantum Gravity, O. of himos, Chicago 22 talk "Atomism and Relationalism as guiding principles for Quantum Gravity"

- LOOPS13, Perimeter Institute, Waterloo, Canada July 21 talk "A covariant prospective on singularity resolution"

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

20 talk "Maximal acceleration in covariant loop gravity and singularity resolution"

- Mini-workshop "Philosophie et Physique", Laboratoire Sphere\*, Paris, France
- Seminar "Spinfoam and Cosmology", APC, Paris, France
- Third Oxford Miniseries: "Cosmology and Quantum Foundations", Oxford, UK
- Workshop and Discussion Group: "Inflationary Evidence", Oxford, UK
- Workshop "Spacetime and the Wavefunction", Barcelona, Spain
- Workshop "Infinities and Cosmology", DAMPT, Cambridge, UK

19 talk "Infinities as a measure of our ignorance"

- 1st EFI Winter Conference on Canonical and Covariant LQG, Tux, Austria

18 talk "A new twist on spin connection"

2012 – "The Search for Quantum Gravity: CDT and Friends", Nijmegen, the Netherlands – Perspectives of Fundamental Cosmology, Nordita Program, Stockholm, Sweden 17 talk "Spinfoam and Cosmology";

– X International Ontology Congress "Physis. From elementary particle to human nature"San Sebastian, Spain, October;

- 13th Marcel Grossmann Meeting, Stockholm, Sweden, July;
- 16 talk "Spinfoam Cosmology"
- 15 talk "Spinfoam for cosmologists"
- Workshop "Quantum Gravity in Paris", APC-Paris, France, March;
- Workshop "Landscapes for Quantum Gravity", Pavia, Italy, February;
- VII International Conference on Gravitation and Cosmology, Goa, India
- 14 talk "An Invitation to Spinfoam Cosmology"
- VI Aegean Summer School of Quantum Gravity and Quantum Cosmology, Greece
- 13 talk "An Invitation to Spinfoam Cosmology"
- Women in Physics , Perimeter Institute, Canada
- 12 talk "What's the entropy of the gravitational field?"

- "Challenges for Early Universe Cosmology, Perimeter Institute, Canada
- Seminar "Spinfoam Cosmology", Perimeter Institute, Canada
- 2011 LOOPS11 "Celebrating 25 years of Loop Quantum Gravity", Madrid, Spain
  - 11 talk "Results and open issues in Spinfoam Cosmology"
  - 10 talk "Singularity Resolution in Loop Quantum Cosmology"

– Workshop Mathematical, Physical and Conceptual aspects of Quantum Gravity, APC Paris, France

Workshop "Quantum Gravity and Quantum Field Theory", Nice, France
 9 talk "Spinfoam Cosmology"

- 3rd Quantum Geometry and Quantum Gravity School, Zakopane, Poland

- 8 International Loop Quantum Gravity Seminars, given talk "Spinfoam Cosmology"
- 2010 International Fall Workshop on GEOMETRY and PHYSICS, Paris, France

– Spanish Relativity Meeting (ERE2010), Granada, Spain

7 talk "Toward Spinfoam Cosmology"

– 19th International Conference on General Relativity and Gravitation (GR19), Mexico City, Mexico

6 talk "Spinfoam Cosmology: quantum cosmology from the full theory"

- PASI Quantum Gravity summer school, Morelia, Mexico, June;

– ESF science meeting: Open problems in Loop Quantum Gravity, Zakopane, Poland

2009 – 2nd School and Workshop on Quantum Gravity and Quantum Geometry, Corfù, Greece

– LOOPS09 International Conference on Quantum Gravity, Beijing Normal University, China, August;

5 talk "Quantum-Gravity Thermodynamics"

– The BNU International Summer School on Quantum Gravity, Beijing Normal University, China

2008 – Quantum Gravity in Cracow^2, Jagiellonian University, Institute of Physics, Cracow, Poland

4 talk "Mini-superspace Loop Quantum Gravity"

– Second TRR33 Winter School "Theory for observers & Observations for theorists", Passo del Tonale, Italy, December

3 talk "Loop Quantum Cosmology"

- Emergent Gravity 08 Workshop, MIT Boston, US, August;

- Young Loops and Foams 08 Workshop, Perimeter Institute, Canada, August;

- QG<sup>2</sup> Quantum Geometry and Quantum Gravity Conference, Nottingham, UK

- 2 talk "Stepping out of homogeneity in Loop Quantum Cosmology"
- Quantum Gravity Colloquium 4, Albert Einstein Institute, Berlin, Germany
- 1 talk "Dipole Cosmology";
- Workshop CosmoTools, Marseille, France, April;

- ESF science meeting Quantum Gravity: Loops and Foams, Zakopane, Poland

- 2007 Italian Logic and Philosophy of Science (SILFS) Conference, Milano, Italy
  - 1-mont visit to the Quantum Gravity group of AEI, Golm, Germany

– "From Quantum to Emergent Gravity: Theory and Phenomenology", SISSA Trieste, Italy

- 1st Quantum Geometry and Quantum Gravity School, Zakopane, Poland
- 2005 International Conference "Spacetime in Action", Pavia, Italy
- 2001 IV Summer School of Philosophy of Physics (SILFS), Cesena, Italy

# References Francesca Vidotto

#### Contacts for research references

- Prof. Carlo Rovelli PhD advisor rovelli@cpt.univ-mrs.fr Centre de Physique Théorique de Luminy, case 907, 13288 Marseille, France
- Prof. Lee Smolin
   Ismolin@perimeterinstitute.ca
  Perimeter Institute, 31 Caroline St. N, Waterloo, Ontario, Canada, N2L 2Y5
- Prof. Stefano Liberati
   liberati@sissa.it
   SISSA, Via Bonomea 265, 34136 Trieste, Italy

#### Contacts for teaching references

- Prof. Klaas Landsman former Department director landsman@math.ru.nl Mathematics Department, p.o. box 9012, 6512GL Nijmegen, the Netherlands
- Prof. Aurelien Barrau former research director barrau@lpsc.in2p3.fr LPSC, 53 rue des Martyres, 38026 Grenoble, France

# For further informations about the Loop Quantum Gravity network:



www.google.com/maps/d/embed?mid=1JOTBtsdNR0LUEtJCgr3jsjggP\_A