

UNIVERSITÀ DEGLI STUDI DI MILANO

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## Luca Santoni

### CURRICULUM VITAE

#### INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	SANTONI
NOME	LUCA
DATA DI NASCITA	17/08/1989

#### • Work history

11-2018 - present: Postdoc, Department of Physics, Center for Theoretical Physics, Columbia University, 538 West 120th Street, New York, NY 10027, USA.

10-2016 - 10-2018: Postdoc, Institute for Theoretical Physics, Utrecht University, Princetonplein 5, 3584CC Utrecht, Netherlands.

11-2013 - 10-2016: Ph.D. student, Scuola Normale Superiore, Piazza dei Cavalieri 7, 56126 Pisa, Italy.

#### • Teaching experience

02-2021 - present: Lectures at Columbia University, Science Honors Program (SHP) for talented High School students. Title: Modern Cosmology.

16-10-2020: Guest lecture for the "Contemporary Physics/Astronomy" course held by Rachel A. Rosen at Columbia University, Master program.

10-2020 - 12-2020: Lectures (10 lectures, 20 hours) at Columbia University, Science Honors Program (SHP) for talented High School students. Title: Modern Cosmology.

01-2020 - 05-2020: Lectures (6 lectures, 18 hours) at Columbia University, Science Honors Program (SHP) for talented High School students. Title: Modern Cosmology.

09-2019 - 12-2019: Lectures (6 lectures, 18 hours) at Columbia University, Science Honors Program (SHP) for talented High School students. Title: Modern Cosmology.

09-10-2017 - 13-10-2017: Lectures (5 lectures, 15 hours) at the 39th Heidelberg Physics Graduate Days (Heidelberg, Germany), an internationally renowned advanced school for graduate students. Title of my course: The theory of cosmic inflation. Content: introduction to cosmology and the inflationary background, perturbations and adiabatic modes, quantization in de Sitter and power spectra, non-gaussianity, soft-theorems and consistency conditions, effective theory of inflation. Link: [https://gsfp.phys.uni-heidelberg.de/graddays\\_oktober\\_2017/](https://gsfp.phys.uni-heidelberg.de/graddays_oktober_2017/)

28-03-2017: Guest lecture for the cosmology course held by Enrico Pajer at Utrecht University, Master program. Title: Violation of the Null Energy Condition in Cosmology.

11-2014 - 10-2015: Tutoring to first year Physics course students, Scuola Normale Superiore, Pisa, Italy.

#### • Education

11-2013 - 10-2016: Ph.D. in Physics, Scuola Normale Superiore, Pisa, Italy, 70/70 cum laude. Advisor: Enrico Trincherini

09-2011 - 10-2013: Master of Science in Physics, Università di Pisa, Pisa, Italy, 110/110 cum laude. Advisor: Mihail Mintchev

09-2008 - 09-2011: Bachelor of Science in Physics, Università di Pisa, Pisa, Italy, 110/110 cum laude.  
Advisor: Luciano Bracci  
09-2003 - 07-2008: Scientific High School Diploma, Liceo Scientifico "Il Pontormo", Empoli (FI), Italy, 100/100 cum laude.  
07-2007: French Language Diploma (DELFB2), Commission Nationale du DELF et du DALF, DELF level B2.

### • Prizes, awards and honours received

2018: Mention of Merit in "Premio Nazionale Sergio Fubini" 2017, awarded by INFN (Italy) for the three best PhD thesis in theoretical physics of the academic year 2016/2017.  
Award: ROTARY club scholarship, Empoli (FI), Italy, May 2008.  
2005, 2007, 2008: Mathematical Games "Bocconi", National Finals, PRISTEM-ELEUSI Center, Università Bocconi, Milano, Italy.

### • Professional Activities

2021: Reviewer for the U.S.-Israel Binational Science Foundation.  
2018 - present: Referee for JHEP, JCAP, American Physical Society.  
01-2019 - present: Organizer of the theory seminars at Columbia University.  
09-2019 - 01-2020: Organizer of the group meetings at the Theory Center, Columbia University.  
10-2017 - 09-2018: Organizer of the cosmology seminars at the ITP, Utrecht University.

### • Languages

Italian: Mother Tongue  
English: Advanced  
French: Intermediate (Diplome d'études en langue française DELFB2)  
Dutch: Basic (Dutch introductory course, BABEL institute, Utrecht, NL)

### • Personal skills

Computer skills: C programming

### • Academic References

Prof. Lam Hui (lh399@columbia.edu), Department of Physics Columbia University, New York, USA  
Prof. Mihail Mintchev (mintchev@df.unipi.it), Università di Pisa and INFN Pisa, Italy  
Prof. Enrico Pajer (enrico.pajer@gmail.com), DAMTP, University of Cambridge, UK  
Prof. Rachel A. Rosen (rar2172@columbia.edu), Department of Physics Columbia University, New York, USA  
Prof. Enrico Trincherini (enrico.trincherini@sns.it), Scuola Normale Superiore, Pisa, Italy

### • Publications

#### HIGH ENERGY PHYSICS:

\_ Rachel A. Rosen, Luca Santoni. Black hole perturbations of massive and partially massless spin-2 fields in (anti) de Sitter spacetime. Accepted for publication in JHEP on February 4, 2021 (JHEP\_327P\_1120), arXiv:2010.00595 [hep-th].  
\_ Lam Hui, Austin Joyce, Riccardo Penco, Luca Santoni, Adam R. Solomon. Static response and Love numbers of Schwarzschild black holes. Accepted for publication in JCAP on March 6, 2021 (JCAP\_061P\_0121), arXiv:2010.00593 [hep-th].  
\_ Johannes Noller, Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. Scalar-tensor cosmologies without screening. JCAP 01 (2021) 045, arXiv:2008.08649 [astro-ph.CO].  
\_ Johannes Noller, Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. Black Hole Ringdown as a Probe for Dark Energy. Phys. Rev. D 101 (2020) 084049, arXiv:1911.11671 [gr-qc].  
\_ Lam Hui, Daniel Kabat, Xinyu Li, Luca Santoni, Sam S.C. Wong. Black Hole Hair from Scalar Dark Matter. JCAP 06 (2019) 038, arXiv:1904.12803 [gr-qc].  
\_ Gabriele Franciolini, Lam Hui, Riccardo Penco, Luca Santoni, Enrico Trincherini. Stable wormholes in scalar-tensor theories. JHEP 01 (2019) 221, arXiv:1811.05481 [hep-th].  
\_ Gabriele Franciolini, Lam Hui, Riccardo Penco, Luca Santoni, Enrico Trincherini. Effective Field Theory of Black Hole Quasinormal Modes in Scalar-Tensor Theories. JHEP 02 (2019) 127, arXiv:1810.07706 [hep-th].  
\_ Luca Santoni, Enrico Trincherini, Leonardo G. Trombetta. Behind Horndeski: structurally robust higher derivative EFTs. JHEP 08 (2018) 118, arXiv:1806.10073 [hep-th].  
\_ Bernardo Finelli, Garrett Goon, Enrico Pajer and Luca Santoni. The Effective Theory of Shift-Symmetric Cosmologies. JCAP 05 (2018) 060, arXiv:1802.01580 [hep-th].  
\_ Bernardo Finelli, Garrett Goon, Enrico Pajer and Luca Santoni. Soft Theorems For Shift-Symmetric Cosmologies. Phys. Rev. D 97 (2018) 063531, arXiv:1711.03737 [hep-th].  
\_ Paolo Creminelli, David Pirtskhalava, Luca Santoni and Enrico Trincherini. Stability of Geodesically

Complete Cosmologies. JCAP 11 (2016) 047, arXiv:1610.04207 [hep-th].

\_ David Pirtskhalava, Luca Santoni and Enrico Trincherini. Constraints on Single-Field Inflation. JCAP 06 (2016) 051, arXiv:1511.01817 [hep-th].

\_ David Pirtskhalava, Luca Santoni, Enrico Trincherini and Filippo Vernizzi. Large Non-Gaussianity in Slow-Roll Inflation. JHEP 04 (2016) 117, arXiv:1506.06750 [hep-th].

\_ David Pirtskhalava, Luca Santoni, Enrico Trincherini and Filippo Vernizzi. Weakly Broken Galileon Symmetry. JCAP 09 (2015) 007, arXiv:1505.00007 [hep-th].

\_ David Pirtskhalava, Luca Santoni, Enrico Trincherini and Patipan Uttayarat. Inflation from Minkowski Space. JHEP 12 (2014) 151, arXiv:1410.0882 [hep-th].

#### STATISTICAL PHYSICS AND FINITE TEMPERATURE QFT:

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Microscopic Features of Bosonic Quantum Transport and Entropy Production. Annalen der Physik 530 (2018) 201800170, arXiv:1805.07087 [cond-mat.stat-mech].

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Quantum Fluctuations of Entropy Production for Fermionic Systems in Landauer-Buttiker State. Phys. Rev. E 96 (2017) 052124, arXiv:1706.00561 [cond-mat.stat-mech].

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Quantum Transport in Presence of Bound States - Noise Power. Annalen Phys. 529 (2017) 8 1600274, arXiv:1609.05427 [cond-mat.stat-mech].

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Non-equilibrium current cumulants and moments with a point-like defect. J. Phys. A: Math. Theor, 49:26 (2016) 265002, arXiv:1601.01819 [cond-mat.stat-mech].

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Non-linear quantum noise effects in scale invariant junctions. J. Phys. A: Math. Theor, 48:28 (2015) 285002, arXiv:1502.05234 [cond-mat.stat-mech].

\_ Mihail Mintchev, Luca Santoni and Paul Sorba. Energy transmutation in non-equilibrium quantum systems. J. Phys. A: Math. Theor. 48:5 (2015) 055003, arXiv: 1409.2994 [cond-mat.stat-mech].

#### • Selected invited talks and seminars

Jan 20, 2021: "Symmetries of black hole perturbations", IFT Madrid, Spain. YouTube link: [https://www.youtube.com/watch?v=ufKjN\\_yZV40&t=2441s](https://www.youtube.com/watch?v=ufKjN_yZV40&t=2441s)

Nov 18, 2020: "Symmetries of black hole perturbations", Swansea University, UK.

Aug 11, 2020: "Unveiling fundamental aspects of gravity with spacetime symmetries in the era of the gravitational-wave astronomy", University of Padua, IT.

Nov 11, 2019: "From symmetries to cosmological observables: new soft theorems for cosmological correlators", IAS and Princeton University, Princeton.

Mar 26, 2019: "Effective Field Theory of Black Hole Quasi-Normal Modes in Scalar-Tensor Theories", NYU, New York.

Nov 15, 2017: "Soft theorems for shift-symmetric cosmologies", IPhT, Saclay, FR.

Nov 13, 2017: "Shift-symmetric adiabatic modes", Institut d'Astrophysique de Paris, FR.

Nov 3, 2017: "Investigating the infrared structure of curved spacetimes", DELTA ITP Retreat, Woerden, NL.

Nov 1, 2017: "Stability of geodesically complete cosmologies", Imperial College, London, UK.

Oct 31, 2017: "Investigating the infrared in cosmology: shift-symmetric adiabatic modes", DAMTP, University of Cambridge, UK.

Jun 19, 2017: "Stability of geodesically complete cosmologies", Institute of Physics, University of Amsterdam, NL.

May 23, 2017: "Weakly broken galileon symmetry and non-renormalization theorem", Van Swinderen Institute, Groningen University, NL.

Jun 23, 2016: "Inflation with weakly broken galileon symmetry", ITP, Utrecht University, Utrecht, NL.

Nov 16, 2015: "Inflation with weakly broken galileon symmetry", EPFL, Lausanne, CH.

Nov 11, 2015: "Inflation with weakly broken galileon symmetry", SNS, Pisa, IT.

#### • Selected workshops, conferences, and extended visits

Conference: "Cosmology 2021: the Rise of Field Theory", Jan 4-8, 2021, DAMTP, Cambridge University, UK.

Conference: "Cosmological Correlators", Sept 7-9, 2020, DAMTP, Cambridge University, UK.

Workshop: "Probing Effective Theories of Gravity in Strong Fields and Cosmology", Aug 17, 2020 - Sep 4, 2020, KITP, UC Santa Barbara, CA.

Conference: "Cosmic Controversies", Oct 5-8, 2019, KICP, UChicago Gleacher Center, Chicago, IL.

Conference: "24th Itzykson meeting: Effective Field Theory in Cosmology, Gravitation and Particle Physics", Jun 5-7, 2019, IPhT CEA-Saclay, FR.

Visit: Sept 6-19, 2018, DAMTP, University of Cambridge, UK.

Conference and talk: "Post-Inflationary String Cosmology", Sept 18-21, 2017, Department of Physics and Astronomy, University of Bologna, Italy; title of the talk: "Shift-symmetric adiabatic modes".

Conference and talk: "Advances in Theoretical Cosmology in Light of Data", July 3-28, 2017, NORDITA, Stockholm, SE; title of the talk: "Constraints and symmetries in the EFT of single-field inflation".

Conference: "Utrecht Cosmology Symposium", June 27-July 1, 2016, Utrecht, NL.

Conference and talk: "New Frontiers in Theoretical Physics - XXXV National Meeting", May 17-20, 2016, Galileo Galilei Institute, Florence, IT; title of the talk: "Inflation with weakly broken galileon symmetry".  
 Conference: "Physics on the Riviera 2015: an isthmus between high energy and condensed matter theoretical physics", Sept 16-18, 2015, Sestri Levante, IT.  
 School and talk: "First ICTP Advanced School on Cosmology", May 18-29, 2015, ICTP, Trieste, IT; title of the talk: "Inflation with weakly broken galileon symmetry".  
 Conference and talk: "Extended Theories of Gravity", Mar 2-20, 2015, NORDITA, Stockholm, SE; title of the talk: "Inflation from Galilean Genesis".  
 Conference: "New Frontiers in Theoretical Physics - XXXIV National Meeting", May 28-31, 2014, Cortona, IT.

Data

13/03/2021

Luogo

New York, USA