

Gabriele Franciolini

□ Curriculum Vitae

Current Position

Post-doctoral Fellow

UNIVERSITY "LA SAPIENZA" OF ROME, DEPARTMENT OF THEORETICAL PHYSICS

Rome - Italy

November 2021 - Present

Einstein Telescope Observational Science Board

CORE MEMBER OF DIVISION 3 (POPULATION STUDIES)

2021 - Present

LISA collaboration

MEMBER OF THE COSMOLOGY WG

2019 - Present

Experience

PhD student - Teaching assistant

UNIVERSITY OF GENEVA, DEPARTMENT OF THEORETICAL PHYSICS

Geneva - Switzerland

November 2017 - October 2021

- [Website](#), Supervisor: [Prof. Antonio Riotto](#).

IFT - Institute for Theoretical Physics (CSIC - UAM).

VISITING RESEARCHER

Madrid - Spain

March 2020 - August 2020

Fermilab - Fermi National Accelerator Laboratory

SUMMER SCHOOL - INTERNSHIP

Batavia (IL) - U.S.

July 2016 - September 2016

- [Website](#), Supervisor: [George Velev PhD](#). CDF measurement of Top quark mass using ME method on the full Run II luminosity.

Education

University of Pisa

MASTER'S DEGREE IN THEORETICAL PHYSICS - 110/110 CUM LAUDE

Pisa - Italy

September, 2015 - October 2017

- Supervisor: [Prof. Enrico Trincherini](#), Thesis Title: "An effective field theory approach to black holes quasi-normal modes".
- Related publications: [[hep-th/1810.07706](#)] and [[hep-th/1811.05481](#)]

Alma Mater University of Bologna

BACHELOR'S DEGREE IN PHYSICS - 110/110 CUM LAUDE

Bologna - Italy

September, 2011 - July, 2015

- Supervisor: [Prof. Roberto Casadio](#), Thesis Title: "Inflazione cosmologica R^2 ".

Organization of Conferences and Workshops

Primordial Black Holes confront GW data

"LA SAPIENZA" UNIVERSITY OF ROME, [LINK](#)

(held online)

8-12 Feb, 2021

Conferences and Workshops

Kick Off Workshop of the ET Observational Science Board

VIRTUAL MEETING HOSTED BY EGO, [LINK](#)

(held online)

21-22 Sep, 2021

Seventh Physics & Astrophysics At The Extreme (PAX-VII) Workshop

[LINK](#)

(held online)

23-27 Aug, 2021

Cosmo 2021, International Conference on Particle Physics and Cosmology

UNIVERSITY OF ILLINOIS, [LINK](#)

(held online)

2-6 Aug, 2021

Gravitational Waves - A new window to the Universe

FIRST IPHU CONFERENCE SERIES, [LINK](#)

(held online)

6-7 Jul, 2021

GW Early Career Scientists Funding Opportunity Workshop

[LINK](#)

(held online)

22-23 Jun, 2021

GWADW2021 Gravitational Wave Advanced Detector Workshop

[LINK](#)

(held online)

17-21 May, 2021

First EuCAPT Annual Symposium EUROPEAN CONSORTIUM FOR ASTROPARTICLE THEORY, LINK	<i>(held online)</i> 5-7 May, 2021
Current challenges in gravitational physics LINK	<i>(held online)</i> 21-28 Apr, 2021
Gravitational waves: a new messenger to explore the universe INSTITUT HENRI POINCARÉ, PARIS, LINK	<i>(held online)</i> 1 Mar-9 Apr, 2021
Cosmology 2021: the Rise of Field Theory LINK	<i>(held online)</i> 4-8 Jan, 2021
11th Einstein Telescope Symposium LAPP (ANNECY) - FRANCE LINK	<i>(held online)</i> 30 Nov-3 Dec, 2020
Cosmological Correlators virtual workshop LINK	<i>(held online)</i> 7-9 Sep, 2020
8th LISA Cosmology Working Group Workshop UNIVERSITY OF PARIS, LINK	<i>(held online)</i> 15-17 Jul, 2020
7th LISA Cosmology Working Group Workshop UNIVERSITY OF PADOVA, LINK	<i>Padova - Italy</i> 23-27 Sep, 2019
Cosmo 2019, International Conference on Particle Physics and Cosmology RWTH AACHEN UNIVERSITY, LINK	<i>Aachen - Germany</i> 2-6 Sep, 2019
Swiss Cosmology days 2019 UNIVERSITY OF ZURICH, LINK	<i>Zurich - Switzerland</i> 4-5 July, 2019
Cosmo 2018, International Conference on Particle Physics and Cosmology IBS SCIENCE AND CULTURE CENTER, LINK	<i>Daejeon - Korea</i> 27-31 Aug, 2018
Primordial versus Astrophysical Origin of Black Holes CERN, LINK	<i>Geneva - Switzerland</i> 14-18 May, 2018
Swiss Cosmology days 2018 CERN, LINK	<i>Geneva - Switzerland</i> 5-6 February, 2018

International stays

National Technical University of Athens VISITING PROF. ALEXANDROS KEHAGIAS	<i>Athens - Greece</i> 20 - 23 August, 2019
Perimeter Intitute VISITING DAVIDE RACCO, PHD	<i>Waterloo - Canada</i> 15 - 25 July, 2019
Technion Institute VISITING PROF. VINCENT DESJACQUES	<i>Haifa - Israel</i> 13 - 21 June, 2019
University of Bologna VISITING PROF. ROBERTO CASADIO	<i>Bologna - Italy</i> 23-24 May, 2018

Seminars and Talks

“Searching for Primordial Black Holes: The Role of 3rd Generation GW Detectors” UNIVERSITY OF ILLINOIS, COSMO 2021, PARALLEL SESSION, LINK	<i>(held online)</i> 2 Aug, 2021
“Primordial Black Holes and Gravitational Wave Observations” UCLA, INVITED SPEAKER, LINK	<i>(held online)</i> 2 June, 2021
“Searching for Primordial Black Holes: The Role of 3rd Generation GW Detectors” GWADW2021 GRAVITATIONAL WAVE ADVANCED DETECTOR WORKSHOP, INVITED CONTRIBUTION, LINK	<i>(held online)</i> 17 May, 2021
“Evidence for primordial black holes in LIGO/Virgo gravitational-wave data” LIGO COLLABORATION R&P INTERNAL CALL	<i>(held online)</i> 6 May, 2021

“Using spin distributions and accretion effects to distinguish primordial from astrophysical binaries”	<i>(held online)</i>
UNIVERSITY OF ROME, DISCUSSION PANELIST, LINK	10 Feb, 2021
“Primordial Black Holes and Gravitational Wave observations”	<i>(held online)</i>
UNIVERSITY OF CAMBRIDGE, INVITED SPEAKER, LINK	9 Nov, 2020
“Primordial Black Holes and Gravitational Wave observations”	<i>(held online)</i>
UNIVERSITY OF LIVERPOOL, INVITED SPEAKER, LINK	27 Oct, 2020
“LISA Serendipity”	Padova - Italy
7TH LISA COSMOLOGY WORKING GROUP WORKSHOP, INVITED SPEAKER, LINK	23 Sep, 2019
“Testing Primordial Black holes as Dark Matter at LISA”	Geneva - Switzerland
CERN, COSMO COFFEE, INVITED SPEAKER, LINK	18 Sep, 2019
“Testing Primordial Black holes as Dark Matter at LISA”	Aachen - Germany
RWTH AACHEN UNIVERSITY, COSMO 2019 CONFERENCE, PARALLEL SESSION, LINK	4 Sep, 2019
“Testing Primordial Black holes as Dark Matter at LISA”	Waterloo - Canada
PERIMETER INSTITUTE FOR THEORETICAL PHYSICS - COSMOLOGY JOURNAL CLUB	18 July, 2019
“Testing Primordial Black holes as Dark Matter at LISA”	Zurich - Switzerland
UNIVERSITY OF ZURICH - SWISS COSMOLOGY DAYS CONFERENCE, LINK	5 July, 2019
“Topics on primordial black holes from inflation”	Daejeon - Korea
IBS SCIENCE AND CULTURE CENTER, COSMO 2018 CONFERENCE, PARALLEL SESSION, LINK	28 Aug, 2018
“Topics on primordial black holes from inflation”	Bologna - Italy
UNIVERSITY OF BOLOGNA, INVITED SPEAKER	23 May, 2018

Teaching

University of Geneva	Geneva - Switzerland
MATHEMATICAL METHODS II	September, 2020 - June 2021
University of Geneva	Geneva - Switzerland
MATHEMATICAL METHODS II	September, 2019 - February 2020
University of Geneva	Geneva - Switzerland
SERIES OF LECTURES “PRIMORDIAL BLACK HOLES”	May, 2019
University of Geneva	Geneva - Switzerland
MATHEMATICAL METHODS II	September, 2018 - June 2019
University of Geneva	Geneva - Switzerland
MATHEMATICAL METHODS I	September, 2017 - June 2018

Grants

Mobility grant for doctoral students working on SNSF-funded research projects	
DÉCISION 200020 178787 / 2 WITHIN THE PROJECT “THE NON-GAUSSIAN UNIVERSE AND COSMOLOGICAL SYMMETRIES”	1 Mar - 31 Aug 2020
COST - Trainee Grant - COST Action CA15108	
COST-TS-ECOST-TRAINING_SCHOOL-CA15108-080118-089112	8-26 Jan 2018
COST - Trainee Grant - COST Action CA15108	
COST-TS-ECOST-TRAINING_SCHOOL-CA15108-080117-080013	9-27 Jan 2017

Scientific Adviser activity

Referee for international journals:

- MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY (SINCE 2021)
- PHYSICAL REVIEW LETTERS (SINCE 2021)
- JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS (SINCE 2021)
- MDPI (SINCE 2021)
- PHYSICS OF THE DARK UNIVERSE (SINCE 2020)
- PHYSICAL REVIEW D (SINCE 2020)
- MODERN PHYSICS LETTERS A (SINCE 2019)

Press Coverage & Outreach

Interviews:

- “STUDY SHOWS THAT THE GW190521 EVENT COULD BE EXPLAINED BY PRIMORDIAL BLACK HOLES”, 5 Mar 2021
Ingrid Fadelli, Phys.org, [Link](#)
- “COSMIC RINGTONES IN PULSAR DATA?”, 28 Jan 2021
Michael Schirber, APS Physics, [Link](#)

Media and press coverage:

- “ASTRONOMERS MAY HAVE FOUND BLACK HOLES THAT FORMED SOON AFTER BIG BANG”, 14 May 2021
Leah Crane, The New Scientist, [Link](#)
- “HAVE ASTROPHYSICISTS FINALLY DISCOVERED PRIMORDIAL BLACK HOLES?”, 13 May 2021
Discover Magazine, [Link](#)
- “THEORETICAL INTERPRETATIONS OF THE PULSAR TIMING DATA RECENTLY RELEASED BY NANOGRV”, 2 Mar 2021
Ingrid Fadelli, Phys.org, [Link](#)
- “PRIMORDIAL BLACK HOLES COULD EXPLAIN DARK MATTER”, 9 Feb 2021
Unige, The physics section, [Link](#)
- “GALAXY-SIZE GRAVITATIONAL-WAVE DETECTOR HINTS AT EXOTIC PHYSICS”, 3 Feb 2021
Adam Mann, Scientific American, [Link](#)
- “SOME PHYSICISTS SEE SIGNS OF COSMIC STRINGS FROM THE BIG BANG”, 29 Sep 2020
Thomas Lewton, Quanta Magazine, [Link](#)

Publication List

Link: InspireHep **Link: Google Scholar** **Link: OrcID:0000-0002-6892-9145**

39 articles, 3 PRL, 1300+ citations, Hirsch index h = 22 (Google Scholar)

LIST OF PUBLICATIONS: (HIGHLIGHTS IN **RED**).

- 36) "STOCHASTIC GRAVITATIONAL-WAVE BACKGROUND AS A TOOL TO INVESTIGATE MULTI-CHANNEL ASTROPHYSICAL AND PRIMORDIAL BLACK-HOLE MERGERS", [astro-ph.CO/2109.05836],
arXiv preprint
S. S. Bavera, G. Franciolini, G. Cusin, A. Riotto, M. Zevin and T. Fragos,
- 35) "THE MINIMUM TESTABLE ABUNDANCE OF PRIMORDIAL BLACK HOLES AT FUTURE GRAVITATIONAL-WAVE DETECTORS", [astro-ph.CO/2106.13769],
Accepted for publication in JCAP.
V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 34) "THE FORMATION PROBABILITY OF PRIMORDIAL BLACK HOLES", [astro-ph.CO/2105.07810],
Phys. Lett. B **820**, 136602 (2021)
M. Biagetti, V. De Luca, G. Franciolini, A. Kehagias and A. Riotto,
- 33) "QUANTIFYING THE EVIDENCE FOR PRIMORDIAL BLACK HOLES IN LIGO/VIRGO GRAVITATIONAL-WAVE DATA", [gr-qc/2105.03349],
arXiv preprint
G. Franciolini, V. Baibhav, V. De Luca, K. K. Y. Ng, K. W. K. Wong, E. Berti, P. Pani, A. Riotto and S. Vitale,
[Media Coverage](#)
- 32) "CONSTRAINING THE INITIAL PRIMORDIAL BLACK HOLE CLUSTERING WITH CMB-DISTORTION", [astro-ph.CO/2103.16369],
Phys. Rev. D **104**, no.6, 063526 (2021)
V. De Luca, G. Franciolini and A. Riotto,
- 31) "STANDARD MODEL BARYON NUMBER VIOLATION SEEDED BY BLACK HOLES", [astro-ph.CO/2102.07408],
Phys. Lett. B **819**, 136454 (2021)
V. De Luca, G. Franciolini, A. Kehagias and A. Riotto,
- 30) "BAYESIAN EVIDENCE FOR BOTH ASTROPHYSICAL AND PRIMORDIAL BLACK HOLES: MAPPING THE GWTC-2 CATALOG TO THIRD-GENERATION DETECTORS", [gr-qc/2102.03809],
JCAP **05**, 003 (2021)
V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 29) "THE ASTRO-PRIMORDIAL BLACK HOLE MERGER RATES: A REAPPRAISAL", [gr-qc/2012.03585],
JCAP **05**, 039 (2021)
K. Kritos, V. De Luca, G. Franciolini, A. Kehagias and A. Riotto,
- 28) "THE THRESHOLD FOR PRIMORDIAL BLACK HOLE FORMATION: A SIMPLE ANALYTIC PRESCRIPTION", [astro-ph.CO/2011.03014],
Phys. Rev. D **103**, 063538 (2021)
I. Musco, V. De Luca, G. Franciolini and A. Riotto,
- 27) "CONSTRAINING THE PRIMORDIAL BLACK HOLE SCENARIO WITH BAYESIAN INFERENCE AND MACHINE LEARNING: THE GWTC-2 GRAVITATIONAL WAVE CATALOG", [gr-qc/2011.01865],
Phys. Rev. D **103**, no.2, 023026 (2021)
K. W. K. Wong, G. Franciolini, V. De Luca, V. Baibhav, E. Berti, P. Pani and A. Riotto,
- 26) "NANOGrav HINTS TO PRIMORDIAL BLACK HOLES AS DARK MATTER", [astro-ph.CO/2009.08268],
Phys. Rev. Lett. **126**, no.4, 041303 (2021)
V. De Luca, G. Franciolini and A. Riotto,
[Physical Review Letters + Editors' suggestion + Media Coverage](#)
- 25) "THE CLUSTERING EVOLUTION OF PRIMORDIAL BLACK HOLES", [astro-ph.CO/2009.04731],
JCAP **11**, 028 (2020)
V. De Luca, V. Desjacques, G. Franciolini and A. Riotto,
- 24) "THE GW190521 MASS GAP EVENT AND THE PRIMORDIAL BLACK HOLE SCENARIO", [astro-ph.CO/2009.01728],
Phys. Rev. Lett. **126**, no.5, 051101 (2021)
V. De Luca, V. Desjacques, G. Franciolini, P. Pani and A. Riotto,
[Physical Review Letters + Media Coverage](#)
- 23) "THE IMPORTANCE OF PRIORS ON LIGO-VIRGO PARAMETER ESTIMATION: THE CASE OF PRIMORDIAL BLACK HOLES", [astro-ph.CO/2008.12320],
JCAP **01**, 037 (2021)
S. Bhagwat, V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 22) "PRIMORDIAL BLACK HOLES CONFRONT LIGO/VIRGO DATA: CURRENT SITUATION", [astro-ph.CO/2005.05641],
JCAP **06**, 044 (2020)
V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 21) "CONSTRAINTS ON PRIMORDIAL BLACK HOLES: THE IMPORTANCE OF ACCRETION", [astro-ph.CO/2003.12589],
Phys. Rev. D **102**, 043505 (2020)
V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 20) "THE EVOLUTION OF PRIMORDIAL BLACK HOLES AND THEIR FINAL OBSERVABLE SPINS", [astro-ph.CO/2003.02778],
JCAP **04**, 052 (2020)
V. De Luca, G. Franciolini, P. Pani and A. Riotto,
- 19) "ON THE PRIMORDIAL BLACK HOLE MASS FUNCTION FOR BROAD SPECTRA", [astro-ph.CO/2001.04371],
Phys. Lett. B **807**, 135550 (2020)
V. De Luca, G. Franciolini and A. Riotto,
- 18) "ON THE GAUGE INVARIANCE OF COSMOLOGICAL GRAVITATIONAL WAVES", [gr-qc/1911.09689],
JCAP **03**, 014 (2020)
V. De Luca, G. Franciolini, A. Kehagias and A. Riotto,
- 17) "GRAVITATIONAL WAVE ANISOTROPIES FROM PRIMORDIAL BLACK HOLES", [astro-ph.CO/1909.12619],
JCAP **02**, 028 (2020)
N. Bartolo et al.,
- 16) "CONSTRAINING GRAVITON NON-GAUSSIANITY THROUGH THE CMB BISPECTRA", [astro-ph.CO/1908.00366],
Phys. Rev. D **100**, no.6, 063535 (2019)
V. De Luca, G. Franciolini, A. Kehagias, A. Riotto and M. Shiraishi,
- 15) "PRIMORDIAL BLACK HOLES FROM BROAD SPECTRA: ABUNDANCE AND CLUSTERING", [astro-ph.CO/1906.08978],
JCAP **11**, 001 (2019)
A. Moradinezhad Dizgah, G. Franciolini and A. Riotto,
- 14) "GRAVITATIONAL WAVES FROM PEAKS", [astro-ph.CO/1905.13459],
JCAP **09**, 059 (2019)
V. De Luca, V. Desjacques, G. Franciolini and A. Riotto,
- 13) "THE INELUDIBLE NON-GAUSSIANITY OF THE PRIMORDIAL BLACK HOLE ABUNDANCE", [astro-ph.CO/1904.00970],
JCAP **07**, 048 (2019)
V. De Luca, G. Franciolini, A. Kehagias, M. Peloso, A. Riotto and C. Ünäl,
- 12) "THE INITIAL SPIN PROBABILITY DISTRIBUTION OF PRIMORDIAL BLACK HOLES", [astro-ph.CO/1903.01179],
JCAP **05**, 018 (2019)
V. De Luca, V. Desjacques, G. Franciolini, A. Malhotra and A. Riotto,
- 11) "COSMOLOGICAL SHAPES OF HIGHER-SPIN GRAVITY", [hep-th/1902.01251],
JCAP **04**, 045 (2019)
D. Anninos, V. De Luca, G. Franciolini, A. Kehagias and A. Riotto,
- 10) "IMPLICATIONS OF THE DETECTION OF PRIMORDIAL GRAVITATIONAL WAVES FOR THE STANDARD MODEL", [hep-ph/1811.08118],
JCAP **05**, 022 (2019)
G. Franciolini, G. F. Giudice, D. Racco and A. Riotto,
- 9) "STABLE WORMHOLES IN SCALAR-TENSOR THEORIES", [hep-th/1811.05481],
JHEP **01**, 221 (2019)
G. Franciolini, L. Hui, R. Penco, L. Santoni and E. Trincherini,

- 8) "TESTING PRIMORDIAL BLACK HOLES AS DARK MATTER THROUGH LISA",
N. Bartolo, V. De Luca, G. Franciolini, M. Peloso, D. Racco and A. Riotto, [\[astro-ph.CO/1810.12224\]](#),
Phys. Rev. D **99**, no.10, 103521 (2019)
- 7) "THE PRIMORDIAL BLACK HOLE DARK MATTER - LISA SERENDIPITY",
N. Bartolo, V. De Luca, G. Franciolini, M. Peloso and A. Riotto, [\[astro-ph.CO/1810.12218\]](#),
Physical Review Letters **122**, no.21, 211301 (2019)
- 6) "EFFECTIVE FIELD THEORY OF BLACK HOLE QUASINORMAL MODES IN SCALAR-TENSOR THEORIES",
G. Franciolini, L. Hui, R. Penco, L. Santoni and E. Trincherini, [\[hep-th/1810.07706\]](#),
JHEP **02**, 127 (2019)
- 5) "CONSTRAINTS ON LONG-LIVED, HIGHER-SPIN PARTICLES FROM GALAXY BISPECTRUM",
A. Moradinezhad Dizgah, G. Franciolini, A. Kehagias and A. Riotto, [\[astro-ph.CO/1805.10247\]](#),
Phys. Rev. D **98**, no.6, 063520 (2018)
- 4) "PRIMORDIAL BLACK HOLES FROM INFLATION AND QUANTUM DIFFUSION",
M. Biagetti, G. Franciolini, A. Kehagias and A. Riotto, [\[astro-ph.CO/1804.07124\]](#),
JCAP **07**, 032 (2018)
- 3) "DETECTING HIGHER SPIN FIELDS THROUGH STATISTICAL ANISOTROPY IN THE CMB BISPECTRUM",
G. Franciolini, A. Kehagias, A. Riotto and M. Shiraishi, [\[astro-ph.CO/1803.03814\]](#),
Phys. Rev. D **98**, no.4, 043533 (2018)
- 2) "PRIMORDIAL BLACK HOLES FROM INFLATION AND NON-GAUSSIANITY",
G. Franciolini, A. Kehagias, S. Matarrese and A. Riotto, [\[astro-ph.CO/1801.09415\]](#),
JCAP **03**, 016 (2018)
- 1) "IMPRINTS OF SPINNING PARTICLES ON PRIMORDIAL COSMOLOGICAL PERTURBATIONS",
G. Franciolini, A. Kehagias and A. Riotto, [\[hep-th/1712.06626\]](#),
JCAP **02**, 023 (2018)
- LIST OF WHITE PAPERS:
- 3) "GRAVITATIONAL WAVES FROM PRIMORDIAL BLACK HOLES",
S. Clesse et al., [Snowmass2021](#)
Snowmass2021 - Letter of Interest
[\[gr-qc/2001.09793\]](#),
Gen. Rel. Grav. **52**, no.8, 81 (2020)
- 2) "PROSPECTS FOR FUNDAMENTAL PHYSICS WITH LISA",
E. Barausse et al., [\[astro-ph.CO/1903.04424\]](#),
ASTRO2020 White Paper
- 1) "ELECTROMAGNETIC PROBES OF PRIMORDIAL BLACK HOLES AS DARK MATTER",
A. Kashlinsky *et al.*,