

GUILLEM DOMÈNECH FUERTES

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EXECUTIVE SUMMARY: I am a research associate at the Institute for Theoretical Physics, Heidelberg university, working on gravity and cosmology. I have 21 published articles with more than 300 citations in total. My research topics are:

*General Relativity; Early Universe Physics; Inflation; Modified Gravity; CMB Physics;
Cosmological Perturbation Theory; Gravitational Waves; Euclidean Gravity; Dark Matter; Dark Energy.*

EDUCATION:

- 2014 - 2017 Doctor Course in Cosmology,**
Yukawa Institute for Theoretical Physics, University of Kyoto, Japan
Thesis: “Inflationary Cosmology in Scalar-Tensor Theories”
Advisor: Prof. Misao Sasaki
- 2013 - 2014 Research student in Cosmology,**
Yukawa Institute for Theoretical Physics, University of Kyoto, Japan
Advisor: Prof. Misao Sasaki
- 2012 - 2013 Master of Physics in Astrophysics, Particle Physics and Cosmology,**
University of Barcelona, Spain
9.6/10 *First Class Honours* | Major: Cosmology and Particle Physics
Thesis: *Canonical Halo Mass Definition and Universal Halo Mass Function*
Advisor: Prof. Eduard Salvador-Solé
- 2008 - 2012 Bachelor in Physics**
University of Barcelona, Spain
9.1/10 *First Class Honours* | Major: Particle Physics

ACADEMIC POSITIONS:

- 10/2017 - present Research Associate**
Institute for Theoretical Physics, Heidelberg University, Germany
Host: Christof Wetterich

SUPERVISION OF GRADUATE STUDENTS:

- April 2018 - March 2019 Co-supervised master student (w/ Javier Rubio): Julius Wons.
Institute for Theoretical Physics, Heidelberg University, Germany
Thesis: *Interacting spectator fields in the Primordial Universe*^[P17]

INSTITUTIONAL RESPONSIBILITIES:

- 2018 - present Seminar organiser of the cosmology group (Prof: Luca Amendola)
ITP, Heidelberg University

FELLOWSHIPS AND AWARDS:

- 2019 Balzan Center for Cosmological Studies Program (one month visit)
2014 Japanese Government Scholarship (MEXT) for Graduate Students (Doctor course)
2012 Faculty of Physics Masters Scholarship (Catalunya Caixa)
2008 Undergraduate degree Scholarship (Caixa Manresa)
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TEACHING ACTIVITIES:

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| April 2019 - July 2019 | Tutoring for Advanced Quantum Field Theory (Prof: Christof Wetterich)
ITP, Heidelberg University, Germany |
| Oct. 2018 - March 2019 | Co-coordinator of the Cosmology course (Prof: Luca Amendola)
ITP, Heidelberg University, Germany |
| April 2018 - July 2018 | Co-coordinator of the General Relativity course (Prof: Luca Amendola)
ITP, Heidelberg University, Germany |
| Oct. 2017 - March 2018 | Tutoring for Theoretical Statistical Physics (Prof: Ulrich Schwarz)
ITP, Heidelberg University, Germany |
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REFEREEING EXPERIENCE:

- **Journal of Cosmology and Astroparticle Physics:** co-refereed 6 and refereed 7 papers.
 - **Physics of the Dark Universe:** refereed 2 papers.
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CHAIRING EXPERIENCE:

- Chaired **inflation session** in Gravity and Cosmology 2018, February, YITP, Kyoto University, Japan.
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OUTREACH ACTIVITIES:

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| December 2015 | Outreach talk in Sunion high-school, Barcelona, Spain. |
| May 2013 | Outreach talk in Sunion high-school, Barcelona, Spain. |
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COMPUTATIONAL TOOLS:

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| Boltzmann codes: | CLASS (basic) |
| Computer Languages: | Python (intermediate) & Fortran (intermediate) |
| Scientific Software: | Mathematica including xAct (tensor computation), \LaTeX & R |
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LANGUAGES:

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| Spanish: | Native |
| Catalan: | Native |
| English: | Fluent |
| Japanese: | Intermediate |
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LIST OF PUBLICATIONS:

Peer Reviewed Publications

- [P17] “*Mimicking features in alternatives to inflation with interacting spectator fields*”
Guillem Domènech, Javier Rubio & Julius Wons,
arXiv:1905.04323, **Phys.Lett. B790 (2019) 263-269**, citations: 1
- [P16] “*Gravitational waves from global cosmic strings in quintessential inflation*”
Dario Bettoni, Guillem Domènech & Javier Rubio,
arXiv:1810.11117, **JCAP 1902 (2019) 034**, citations: 2
- [P15] “*Vacuum birefringence and the Schwinger effect in (3+1) de Sitter*”
Mariona Banyeres, Guillem Domènech & Jaume Garriga,
arXiv:1809.08977, **Phys.Lett. B790 (2019) 263-269**, citations: 8
- [P14] “*Vector disformal transformation of generalized Proca theory*”
Guillem Domènech, Shinji Mukohyama, Ryo Namba & Vassilis Papadopoulos,
arXiv:1807.06048, **Phys.Rev. D98 (2018) no.6, 064037**, citations: 3
- [P13] “*Doppelgänger dark energy: modified gravity with non-universal couplings after GW170817*”
Luca Amendola, Dario Bettoni, Guillem Domènech & Adalto R. Gomes,
arXiv:1803.06368, **JCAP 1806 (2018) no.06, 029**, citations: 19
- [P12] “*Hamiltonian approach to second order gauge invariant cosmological perturbations*”
Guillem Domènech & Misao Sasaki,
arXiv:1709.09804, **Phys.Rev. D97 (2018) no.2, 023521**, citations: 5
- [P11] “*Thermal activation of thin-shells in anti-de Sitter black hole spacetime*”
Pisin Chen, Guillem Domènech, Misao Sasaki & Dong-han Yeom,
arXiv:1704.04020, **JHEP 1707 (2017) 134**, citations: 13
- [P10] “*CMB Scale Dependent Non-Gaussianity from Massive Gravity during Inflation*”
Guillem Domènech, Takashi Hiramatsu, Chunshan Lin, Misao Sasaki, Maresuke Shiraishi & Yi Wang,
arXiv:1701.05554, **JCAP 1705 (2017) no.05, 034**, citations: 26
- [P9] “*Strongly scale-dependent CMB dipolar asymmetry from super-curvature fluctuations*”
Christian Byrnes, Guillem Domènech, Misao Sasaki & Tomo Takahashi,
arXiv:1610.02650, **JCAP 1612 (2016) no.12, 020**, citations: 9
- [P8] “*Consistency relation and inflaton field redefinition in the delta N formalism*”
Guillem Domenech, Jinn-Ouk Gong & Misao Sasaki,
arXiv:1606.03343, **Phys.Lett. B769 (2017) 413-417**, citations: 8
- [P7] “*Inflationary Magnetogenesis with Broken Local U(1) Symmetry*”
Guillem Domènech, Chunshan Lin & Misao Sasaki,
arXiv:1512.01108, **EPL 115 (2016) no.1, 19001**, citations: 13
- [P6] “*Stationary bubbles and their tunneling channels toward trivial geometry*”
Pisin Chen, Guillem Domènech, Misao Sasaki & Dong-han Yeom,
arXiv:1512.00565, **JCAP 1604 (2016) no.04, 013**, citations: 20
- [P5] “*Derivative-dependent metric transformation and physical degrees of freedom*”
Guillem Domènech, Shinji Mukohyama, Ryo Namba, Atsushi Naruko, Rio Saitou & Yota Watanabe,
arXiv:1507.05390, **Phys.Rev. D92 (2015) no.8, 084027**, citations: 58

- [P4] “*Cosmological disformal invariance*”
Guillem Domènech, Atsushi Naruko & Misao Sasaki,
arXiv:1505.00174 , **JCAP 1510 (2015) no.10, 067**, citations: 50
- [P3] “*Conformal Frame Dependence of Inflation*”
Guillem Domènech & Misao Sasaki,
arXiv:1501.07699 , **JCAP 1504 (2015) no.04, 022) 134** , citations: 54
- [P2] “*Fixing a Rigorous Formalism for the Accurate Analytic Derivation of Halo Properties*”
Enric Juan, Eduard Salvador-Solé, Guillem Domènech & Alberto Manrique,
Mon.Not.Roy.Astron.Soc. 439 (2014) no.1, 719-724, citations: 6
- [P1] “*Halo Mass Definition and Multiplicity Function*”
Enric Juan, Eduard Salvador-Solé, Guillem Domènech & Alberto Manrique,
Mon.Not.Roy.Astron.Soc. 439 (2014) no.3, 3156-3167, citations: 3

Submitted

- [P18] “*Lensing anomaly and oscillations in the primordial power spectrum*”
Guillem Domènech and Marc Kamionkowski
arXiv:1905.04323, citations: 2

Proceedings

- [C3] “*Inflationary Magnetogenesis with On-shell Local $U(1)$ Symmetry*”
Guillem Domènech, Chunshan Lin & Misao Sasaki,
J.Phys.Conf.Ser. 883 (2017) no.1, 012013
- [C2] “*Conformal frames in cosmology* ”
Guillem Domènech & Misao Sasaki,
arXiv:1602.06332, **Int.J.Mod.Phys. D25 (2016) no.13, 1645006**, citations: 18
- [C1] “*Stationary bubbles: information loss paradox?*”
Guillem Domènech & Misao Sasaki,
arXiv:1602.04969, **Everything about Gravity, pp. 572-577 (2017)**, citations: 2

INTERNATIONAL TALKS:

Conferences:

- May 2019 Spring workshop in Gravity and Cosmology. University of Warsaw, Poland.
- July 2018 String Pheno 18. University of Warsaw, Poland.
- February 2018 Gravity and Cosmology 2018. YITP, Japan.
- August 2017 COSMO-17. APC, University Paris Diderot.
- January 2017 Testing Gravity 2017. SFU, Canada.
- October 2016 Gravitation and the Universe (HGU 2016). VAST, Vietnam.
Workshop on General Relativity and Gravitation JGRG26, Osaka, Japan.
- January 2016 Mini-Workshop on Cosmology. APCTP, Korea.
- December 2015 2nd LeCosPA International Symposium: Everything about Gravity. LeCosPa, Taiwan.
Workshop on General Relativity and Gravitation (JGRG25). YITP, Japan.
- November 2015 2nd Mini-Workshop on Gravity and Cosmology. IAP, France.
- December 2014 Workshop on General Relativity and Gravitation (JGRG24). IMPU, Japan.
- October 2013 IX International Workshop, The Dark Side of the Universe. SISSA, Italy.

Invited seminars:

- January 2019 Johns Hopkins University, USA.
- November 2018 ITP, Heidelberg, Germany.
- October 2018 Warsaw University, Warsaw, Poland.
- November 2017 ITP, Heidelberg, Germany.
- September 2016 UPV-EHU, Bilbao, Spain.
University of Barcelona, Spain.
- May 2016 NCTS, Hsinchu, Taiwan.
- April 2016 LeCosPa, Taipei, Taiwan.
- December 2015 University of Barcelona, Spain.
- November 2015 IAP, Paris, France.
- March 2015 APTCP, Pohang, Korea.

Poster presentations:

- January 2017 Testing Gravity 2017. SFU, Vancouver, Canada.
- June 2015 New Ideas Meet New Experimental Data. String Theory & Cosmology. Hong Kong

Schools and workshops:

- February 2016 School on Strings and Fields,
Yukawa Institute for Theoretical Physics, Kyoto University, Japan
- August 2015 Summer School on Cosmology and Particle Astrophysics,
RESCEU APCosPA, Japan
- May 2015 Molecular type Workshop: Black hole information loss paradox,
Yukawa Institute for Theoretical Physics, Kyoto University, Japan