

# Héctor Ramírez, Ph.D.

Curriculum vitae

Present Position	<b>Research fellow in Theoretical Physics</b> <b>Instituto de Física Corpuscular (IFIC) &amp; Department of Theoretical Physics</b> <b>University of Valencia</b> Parque Científico, C/Catedrático José Beltrán, 2. Paterna, 46980; Spain. (+34)693012381 — <a href="mailto:vanhramirez@gmail.com">vanhramirez@gmail.com</a> — <a href="https://hectoramirez.github.io">https://hectoramirez.github.io</a>
Nationality	Mexican — Current residence: Spain
Research Interests	Cosmology: Inflation, Dark Energy, Modified Gravity, Scalar-Tensor Theories of Gravity, Primordial Black-Holes, Gravitational Waves

## Education

<b>PhD in Physics</b> 2015-2019	<b>University of Valencia</b> , Spain. Supervisor: Dr. Olga Mena Dissertation: <i>'Noncanonical Approaches to Inflation'</i>
<b>MA in Advanced Physics</b> 2013-2014	<b>University of Valencia</b> , Spain. Supervisor: Dr. Olga Mena Dissertation: <i>'The Hu-Sawicki Model of Modified Gravity'</i>
<b>BA in Physics</b> 2008-2013	<b>University of Veracruz</b> , Mexico. Supervisor: Dr. Sergio Lerma Dissertation: <i>'Quantum Chaos in the Dicke Model'</i>
2012	<b>University of Valencia</b> (Academic exchange semester), Spain.

## Professional Experience

### Long Research Stays

Apr - Jun, 2018	<b>Institute of Cosmology and Gravitation, University of Portsmouth</b> Studied general phenomenological implications of general scalar-tensor theories for inflation.
Jan - Mar, 2018	<b>Kavli IPMU, The University of Tokyo</b> Developed inflationary models from scalar-vector-tensor theories of gravity.
May - Aug, 2017	<b>Fermi National Accelerator Laboratory (Fermilab) &amp; Kavli Institute for Cosmological Physics – The University of Chicago</b> Developed inflationary models from Horndeski Gravity.
Apr - Jun, 2015	<b>Abdus Salam International Center for Theoretical Physics (ICTP)</b> Carried out a forecast of CORE and for selected inflationary models.
Mar - May, 2014	<b>NEXT Experiment, Instituto de Física Corpuscular (IFIC)</b> Carried out a gamma particle production simulation for the NEXT experiment.

### Teaching

I have taught undergraduate courses managed by the Department of Theoretical Physics at the University of Valencia during the last four academic years—about 45 hours in the classroom (groups of around 15 students) + class preparation, per academic year.

<b>Classical Mechanics</b>	<b>Teaching Assistant</b> (2017-2019): Resolution of problems, examinations, evaluation of teaching contents and elaboration of teaching material.
<b>Introductory Physics</b>	<b>Teaching Assistant</b> (2015-2018): Resolution of problems, occasional lectures, examinations and grading.

### Journal referee

2017 -	Referee for <i>Physical Review Letters</i> , American Physical Society (USA).
2016 -	Referee for <i>Physical Review D</i> , American Physical Society (USA).

## Publications

2018	<p>L. Heisenberg, <b>H. Ramírez</b>, S. Tsujikawa,  <i>“Inflation with mixed helicities and its observational imprint on CMB”</i>,  <b>Phys. Rev. D</b> <b>99</b> (2019) no.2, 023505.  arXiv:1812.03340 [gr-qc]</p> <p><b>H. Ramírez</b>, S. Passaglia, H. Motohashi, W. Hu and O. Mena,  <i>“Reconciling tensor and scalar observables in G-inflation”</i>,  <b>JCAP</b> <b>1804</b> (2018) no.04, 039  arXiv:1802.04290 [astro-ph.CO].</p>
2017	<p>S. Gariazzo, O. Mena, V. Miralles, <b>H. Ramírez</b> and L. Boubekeur,  <i>“The running of featureful primordial power spectra”</i>,  <b>Phys. Rev. D</b> <b>95</b> (2017) no.12, 123534  arXiv:1701.08977 [astro-ph.CO].</p>
2016	<p>S. Gariazzo, O. Mena, <b>H. Ramírez</b> and L. Boubekeur,  <i>“Primordial power spectrum features in phenomenological descriptions of inflation”</i>,  <b>Phys. Dark Univ.</b> <b>17</b> (2017) 38  arXiv:1606.00842 [astro-ph.CO].</p>
2015	<p>M. Escudero, <b>H. Ramírez</b>, L. Boubekeur, E. Giusarma and O. Mena,  <i>“The present and future of the most favoured inflationary models after Planck 2015”</i>,  <b>JCAP</b> <b>1602</b> (2016) no.02, 020  arXiv:1509.05419 [astro-ph.CO].</p> <p>L. Boubekeur, E. Giusarma, O. Mena and <b>H. Ramírez</b>,  <i>“Do Current Data Prefer a Non-minimally Coupled Inflaton?”</i>,  <b>Phys. Rev. D</b> <b>91</b> (2015) 103004  arXiv:1502.05193 [astro-ph.CO].</p>
2014	<p>L. Boubekeur, E. Giusarma, O. Mena and <b>H. Ramírez</b>,  <i>“Phenomenological approaches of inflation and their equivalence”</i>,  <b>Phys. Rev. D</b> <b>91</b> (2015) 8, 083006  arXiv:1411.7237 [astro-ph.CO].</p> <p>L. Boubekeur, E. Giusarma, O. Mena and <b>H. Ramírez</b>,  <i>“On the current status of Modified Gravity”</i>,  <b>Phys. Rev. D</b> <b>90</b>, no. 10, 103512 (2014)  arXiv:1407.6837 [astro-ph.CO].</p>

## Awards and Fellowships

2015 - 2019	<p><b>FPI Research fellow</b> by the <i>Ministry of Economy, Industry and Competitiveness</i> (MINECO)  Spanish Government</p>
Jul - Sep, 2014	<p><b>Research scholarship</b> granted by the University of Valencia  Valencia, Spain.</p>
Jan - Jul, 2012	<p><b>Grant for an abroad academic exchange semester</b> by the University of Veracruz  Carried out at the Faculty of Physics, <i>University of Valencia</i>.</p>
2009 - 2011	<p><b>Faculty award</b> due to academic excellence (received twice)  <i>University of Veracruz</i></p>

## Talks

### Conference talks

2018	Apr 18	<p><b>Computing inflationary predictions in general scalar-tensor theories</b> [Link]  <b>BritGrav18 meeting</b>, <i>Institute of Cosmology and Gravitation, University of Portsmouth</i>.</p> <p><b>Generalized slow-roll approach for Horndeski inflation</b> [Link]  <b>Gravity and Cosmology 2018</b>, <i>Yukawa Institute for Theoretical Physics, Kyoto University</i>.</p>
2017	Sep 13	<p><b>Meeting on Fundamental Cosmology</b>, <i>Centro de Estudios de Física del Cosmos de Aragón</i>.</p>
	Aug 30	<p><b>COSMO-17</b>, <i>Paris Diderot University</i>.</p>

2016	May 25	<b>Do current data prefer a nonminimally coupled inflaton?</b> <a href="#">[Link]</a> <i>Planck 2016, University of Valencia.</i>
<b>Seminars</b>		
2018	Dec 12	<b>Inflation beyond GR</b> <a href="#">[Link]</a> 2nd <i>Valencia Winter Workshop</i> on Theoretical Physics, <i>University of Valencia.</i>
	Oct 16	<i>Theoretical seminar</i> , Theory Group (hosted by Vincent Vennin). <i>APC – Paris Diderot University</i>
	Mar 26	<b>Computing inflationary predictions in general scalar-tensor theories</b> Webinar for the <i>Elusives</i> Network
	Mar 6	Astro Lunch Seminar, <i>Kavli Institute for the Physics and Mathematics of the Universe (IPMU), The University of Tokyo.</i>
2017	Nov 2	<b>Generalized slow-roll approach for Horndeski inflation</b> Journal club seminar, Astrophysics group (hosted by Bruno Moraes and Will Hartley). <i>University College London</i>
	Nov 1	<i>Theoretical Cosmology Meeting</i> , <i>Institute for Cosmology and Gravitation</i> (hosted by David Wands). <i>University of Portsmouth</i>
	Sep 6	<i>Group seminar</i> , <i>Institute de Physique Théorique</i> (hosted by Filippo Vernizzi). <i>CNRS, Saclay</i>
	Aug 9	<i>Group seminar</i> , <i>Center for Computational Astrophysics (CCA)</i> (hosted by Francisco Villaescusa). <i>Flatiron Institute, New York.</i>
	Jun 8	<i>Special seminar</i> , <i>Lawrence Berkeley National Laboratory</i> (hosted by Shirley Ho). <i>University of California at Berkeley</i>
	Jul 27	<b>Revisiting slow-roll inflation</b> (Blackboard talk) <i>Chalk talk series</i> , <i>Fermilab Center for Particle Astrophysics.</i>
2016	Feb 24	<b>Do current data prefer a nonminimally coupled inflaton?</b> <i>54th Schlading Winter School of Theoretical Physics</i>
	Feb 9	<b>Single-Field Slow-Roll Inflation: a review and some particular aspects</b> <a href="#">[Link]</a> <i>Students Seminar series, (IFIC) – University of Valencia.</i>
2013	May 7	<b>Quantum Chaos in the Dicke Model</b> <i>Special seminar, Faculty of Physics – University of Veracruz.</i>

## Participations at Workshops and Schools

### Workshops

2015	Jun 22-26	<b>Invisibles '15 workshop</b> Institute of Theoretical Physics, <i>Autonomous University of Madrid (UAM).</i>
	Apr 13-17	<b>Workshop on ‘Off-the-Beaten-Track Dark Matter and Astrophysical Probes of Fundamental Physics</b> Abdus Salam International Center for Theoretical Physics (ICTP)

### Schools

2016	Feb 21-26	<b>54th Schlading Winter School of Theoretical Physics: ‘New Trends in Particle Physics, Quantum Gravity and Cosmology’</b>
2015	May 18-29	<b>First ICTP Advanced School on Cosmology</b> Abdus Salam International Center for Theoretical Physics (ICTP)
2014	Oct 6-10	<b>Tools for Cosmology: Class and Monte Python Codes</b> Course taught by Prof. Julien Lesgourgues <i>et al.</i> at ICC, Barcelona.
2013	Jul 22-2	<b>Latin American School of Physics, Marcos Moshinsky: ‘Non-Linear Dynamics in Hamiltonian Systems’</b>

2011 Jun 20-28 | **VII National School on Nuclear and Particle Physics**  
Institute of Physics and Nuclear Sciences, National Autonomous University of Mexico (UNAM)

As well as special [courses](#) on **Inflation**, **Group Theory**, **Supersymmetry**, **Black Holes** and **Holography**.

## Skills

### Computer

Programming	Python (NumPy, Matplotlib, pandas, SciPy, GetDist, etc.), Mathematica.
Database	SQL ( <a href="#">DataCamp</a> certificates).
Web	HTML, CSS.
Office suits	L <sup>A</sup> T <sub>E</sub> X, Apple iWork, Microsoft Office, OpenOffice.
Other	Git, Bash scripting.

### Languages

**Spanish:** Native; **English:** Fluent; **French:** B2 level. I have also taken **German** and **Italian** courses.

### Sports

Highly active in organizing, managing and participating in sport teams, mainly on **football soccer**—I have joined and organized football teams in every place I have done a research stay.

## References

### Dr. Olga Mena Requejo

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### Prof. Nick E. Mavromatos

Department of Theoretical Physics  
King's College London  
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### Prof. Wayne Hu

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### Prof. David Wands

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### Prof. Shinji Tsujikawa

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### Dr. Sergio Lerma

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### Teaching References:

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