



Adrien Kuntz

Curriculum Vitae

Positions

2020–?? **Postdoctoral researcher**, *Scuola Normale Superiore, Pisa*, with Enrico Trincherini.
Title : Effective field theories in gravity and cosmology

Education

2016–2017 **Master of Physics**, *Ecole Normale Supérieure, Paris, M2 ICFP Theoretical Physics*.
obtained with honors

2015–2016 **Bachelor of Mathematics**, *Ecole Normale Supérieure, Paris*.
obtained with honors

2014–2015 **Master of Physics**, *Ecole Normale Supérieure, Paris, M1 ICFP*.
obtained with honors

2013–2014 **Bachelor of Physics**, *Ecole Normale Supérieure, Paris*.
obtained with honors

PhD thesis

Title *Testing gravity with the two-body problem*

Dates 2017-2020

Supervisor Federico PIAZZA

Description My PhD focuses on tests of gravity, notably with gravitational waves observations

Publications

- [1] Adrien Kuntz, Francesco Serra, and Enrico Trincherini. Effective two-body approach to the hierarchical three-body problem. *Phys. Rev. D*, 104(2):024016, 2021.
- [2] Ehsan Hatefi and Adrien Kuntz. On Perturbation Theory and Critical Exponents for Self-Similar Systems. *Eur. Phys. J. C*, 81(1):15, 2021.
- [3] Adrien Kuntz, Riccardo Penco, and Federico Piazza. Extreme Mass Ratio Inspirals with Scalar Hair. *JCAP*, 08:023, 2020.
- [4] Adrien Kuntz. Half-solution to the two-body problem in General Relativity. *Phys. Rev. D*, 102(6):064019, 2020.

- [5] Philippe Brax, Lavinia Heisenberg, and Adrien Kuntz. Unveiling the Galileon in a three-body system : scalar and gravitational wave production. *JCAP*, 05:012, 2020.
- [6] Adrien Kuntz, Federico Piazza, and Filippo Vernizzi. Effective field theory for gravitational radiation in scalar-tensor gravity. *JCAP*, 05:052, 2019.
- [7] Adrien Kuntz. Two-body potential of Vainshtein screened theories. *Phys. Rev. D*, 100(2):024024, 2019.
- [8] Philippe Brax, Anne-Christine Davis, and Adrien Kuntz. Disformally Coupled Scalar Fields and Inspiralling Trajectories. *Phys. Rev. D*, 99(12):124034, 2019.
- [9] Adrien Kuntz. Cross-correlation of CFHTLenS galaxy catalogue and Planck CMB lensing using the halo model prescription. *Astron. Astrophys.*, 584:A53, 2015.

Internships, visiting

- October 2021 **Visiting**, *LUPM*, Montpellier, France.
One-week invitation from the IFAC team
- February 2020 **Visiting**, *ETH Zurich*, Zurich, Switzerland.
One-week invitation from Lavinia Heisenberg
- November 2019 **Visiting**, *Carnegie Mellon university*, Pittsburgh, USA.
One-week invitation from Riccardo Penco
- November 2019 **Visiting**, *Perimeter Institute*, Waterloo, Canada.
One-week invitation from Matthew Johnson
- October 2019 **Visiting**, *CENTRA*, Lisbon.
This one-month visiting was funded by the COST action GWVerse to initiate collaboration on superradiance with Vitor Cardoso
- August 2019 **PhD school**, *Euclid school*, Banyuls.
This school is organized by the Euclid France consortium. The courses are oriented towards observational cosmology for the future cosmological datasets.
- July 2018 and July 2019 **PhD school**, *l'Agape summer school*, Mezeyrac.
This school is intended for (and organized by) PhD and young postdocs and offers various courses and reflections on fundamental physics.
- June 2018 **PhD school**, *ICTP summer school on Cosmology*, Trieste.
- Oct-Dec 2017 **PhD school**, *Solvay Institutes*, Paris, Bruxelles, Amsterdam, *Quantum field theory, Strings and Gravity school*.
This 3-month school held in Brussels, Paris and Amsterdam offers an opportunity to study advanced theoretical physics topics with other PhD students coming from all Europe.
- April–June 2017 **Internship**, *CEA Saclay*, Gif-Sur-Yvette, France.
3-month research internship in statistical physics, on the subject of many-body localization
Supervisor: Marco SCHIRO
- Feb-July 2015 **Internship**, *Canada-France Hawaii Telescope*, Hawaii, USA.
5-month research internship in both theoretical and observational cosmology. This internship led to a first published paper.
Supervisor: Simon PRUNET

July 2014 **Internship**, *CEA Saclay*, Gif-Sur-Yvette, France.
1-month internship on the subject of core-collapse supernovae (SWASI experiment)
Supervisor: Thierry FOGLIZZO

Teaching

- 2018-2019 **Experimental challenges**, *M1 Fundamental Physics*, Marseille, 32h.
The students are asked to set up their own experimental project
- July 2018 **Effective field theories**, *l'Agape summer school*, 3h.
This 3h course is an introduction to EFT intended for PhD students in theoretical physics.
It can be found on my website.
- 2017-2019 **Exercices pour Mathématiciens pour Physiciens**, *L2 Physique*, Aix-en-Provence, Marseille, 126h.
The exercices cover linear algebra, series, differential equations and probabilities
- 2017-2018 **Introduction à Python**, *L2 Physique*, Aix-en-Provence, 30h.
This course is a first introduction to Python for bachelor students
- 2015-2017 **Colles**, *PCSI*, Lycée Saint-Louis, Paris, 168h.
'Colles' are oral exams in classe préparatoire. I based my exercices mainly on Feynman's exercices book.

Talks

You can find my presentations on my website

- 2021 **Hierarchical three-body problem.**
- GdR gravitational waves, online meeting, 30 March 2021
- 2020 **Extreme mass ratio inspirals with scalar hair.**
- GdR gravitational waves, Paris Meudon observatory, 04 February 2020
 - Dark Energy colloquium, online meeting, 25 May 2020
- 2019-2021 **The two-body problem in modified gravity.**
- Laboratoire d'Annecy-le-Vieux de Physique Théorique, France, 30 March 2021
 - Laboratoire Univers et Particules de Montpellier, France, 30 March 2021
 - ETH Zurich, Switzerland, 25 February 2020
 - Carnegie Mellon University, Pittsburg, USA, 15 November 2019
 - Perimeter Institute, Waterloo, Canada, 7 November 2019
 - GRIT at CENTRA, Lisbon, 3 October 2019
- 2019 **Two-Body potential of Vainshtein screened theories.**
- National Dark Energy meeting, IAP, Paris, 20 May 2019
- 2018-2019 **Effective field theory for gravitational radiation in scalar-tensor gravity, and disformally coupled scalar fields.**
- Hot topics in Modern Cosmology, Cargese (Corsica), 9 May 2019
 - Working group "GR and alternative theories tests", CEA Saclay, Paris, 31 January 2019
 - National Dark Energy colloquium, IAP, Paris, 24 October 2018
- 2018-2019 **Gravitational waves.**
- 20 July 2019 (L'Agape summer school)
 - 21 March 2019 (Bachelor students)
 - 13 June 2018 (Bachelor students)
 - 14 March 2018 (Bachelor students)

Referees

Federico Piazza, *Federico.Piazza@cpt.univ-mrs.fr.*

Filippo Vernizzi, *filippo.vernizzi@ipht.fr.*

Vitor Cardoso, *vitor.cardoso@tecnico.ulisboa.pt.*

Enrico Trincherini, *enrico.trincherini@sns.it.*

Philippe Brax, *philippe.brax@ipht.fr.*

Riccardo Penco, *rpenco@andrew.cmu.edu.*

Miscellaneous

Fellowships, grants.

- *COST action GWVerse* : I got a funding for a one-month Short-Term Scientific Mission at CENTRA (Lisbon), to work with Vitor Cardoso on superradiance.

Referee, for the following journals.

- General Relativity and Gravitation
- International Journal of Modern Physics
- Physics of the Dark Universe

Outreach.

- Fête de la science
- Déclics (Link)
- Nuit des Sciences et des Lettres (Link)

Feb 2018 **FPT**, *French Physicists Tournament.*

The french selection for the International Physicists Tournament evolved into a national tournament of its own. This year I was team leader of the Aix-Marseille team and also part of the jury. More information : <http://france.iphtnet.info/>

Sept-Dec 2013 **IPT**, *International Physicists Tournament.*

During this tournament, two teams of eight people compete to propose a solution to various problems in Physics (for example : what is the optimal diameter of a ball composed only of rubber bands ?)