

Stanford



Davide Racco

Postdoctoral Scholar, Physics

Bio

BIO

I am currently a Postdoctoral Fellow at SITP (Stanford Institute for Theoretical Physics) since Oct 2021.

Before, I was a Postdoctoral Fellow at Perimeter Institute for Theoretical Physics (Waterloo, Canada) between Oct 2018 and Sep 2021.

I obtained my PhD degree from the University of Geneva under the supervision of Antonio Riotto in Sep 2018.

During my PhD I spent six months (Apr-Sep 2017) at IFAE in the Universitat Autònoma de Barcelona to collaborate with Josep Ramon Espinosa.

During my undergraduate studies I was enrolled in the University of Padova and in the Galilean School of Higher Education, and I completed the Master thesis in 2014 under the supervision of Fabio Zwirner and Andrea Wulzer.

HONORS AND AWARDS

- Prix Vacheron-Constantin for the best PhD thesis in Physics of the University of Geneva in 2018, University of Geneva (June 2019)
- Buchalter Cosmology Prize 2018, First Prize for the paper Phys. Rev. Lett. 120 (2018) no.12, 121301, Buchalter Cosmology Prize (January 2019)
- Prize for the best 10 Bachelor students from the University of Padova graduated in 2012, Association "Amici dell'Università di Padova" (November 2013)

PROFESSIONAL EDUCATION

- Postdoctoral Fellow, Perimeter Institute for Theoretical Physics , Particle Physics and Cosmology (2021)
- Ph.D., University of Geneva (Switzerland) , Cosmology and Particle Physics (2018)
- Diploma, School of Excellence, Galilean School of Higher Education of Padova (Italy) , Natural Sciences (2014)
- M.Sc. in Physics, University of Padova (Italy) , Theoretical Physics (2014)
- Summer Student, CERN (Switzerland) , Experimental Particle Physics (2012)
- B.Sc. in Physics, University of Padova (Italy) , Physics (2012)

STANFORD ADVISORS

- Peter Graham, Postdoctoral Faculty Sponsor

LINKS

- Profile on Inspire-HEP: <https://inspirehep.net/authors/1395751?ui-citation-summary=true>
- Profile on Google Scholar: <https://scholar.google.com/citations?user=UWYMAAAAJ>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am interested in topics at the crossover between Particle Physics and Cosmology, focusing in particular on dark matter, gravitational waves, non-Gaussianities, Higgs metastability and early universe.

My main area of interest is Dark Matter, and I have worked on various classes of candidates, ranging from WIMPs (particles with masses and interaction strengths comparable to the Standard Model particles, who are currently the target of many experimental searches) to Primordial Black Holes (hypothetical black holes that could have formed in the early history of the Universe) and axions (particles which would also solve the strong CP problem in particle physics).

Concerning the production mechanism for Dark Matter, I have been studying gravitational production during inflation, which is a well-motivated and minimal scenario and can guide the identification of benchmarks for direct detection.

I am also very interested in stochastic backgrounds of primordial gravitational waves. Their potential discovery would disclose precious information on the cosmology of the early universe, and the particle content at high energy scales.

Publications

PUBLICATIONS

- **Dark QED from inflation** *JOURNAL OF HIGH ENERGY PHYSICS*
Arvanitaki, A., Dimopoulos, S., Galanis, M., Racco, D., Simon, O., Thompson, J. O.
2021
- **Causal gravitational waves as a probe of free streaming particles and the expansion of the Universe** *JOURNAL OF HIGH ENERGY PHYSICS*
Hook, A., Marques-Tavares, G., Racco, D.
2021
- **Maximal axion misalignment from a minimal model** *JOURNAL OF HIGH ENERGY PHYSICS*
Huang, J., Madden, A., Racco, D., Reig, M.
2020
- **Minimal signatures of the standard model in non-Gaussianities** *PHYSICAL REVIEW D*
Hook, A., Huang, J., Racco, D.
2020; 101 (2)
- **Searches for other vacua. Part II. A new Higgstory at the cosmological collider** *JOURNAL OF HIGH ENERGY PHYSICS*
Hook, A., Huang, J., Racco, D.
2020
- **Dark Matter benchmark models for early LHC Run-2 Searches: Report of the ATLAS/CMS Dark Matter Forum** *PHYSICS OF THE DARK UNIVERSE*
Abercrombie, D., Akchurin, N., Akilli, E., Alcaraz Maestre, J., Allen, B., Gonzalez, B., Andrea, J., Arbey, A., Azuelos, G., Azzi, P., Backovic, M., Bai, Y., Banerjee, et al
2020; 27
- **Testing primordial black holes as dark matter with LISA** *PHYSICAL REVIEW D*
Bartolo, N., De Luca, Franciolini, G., Peloso, M., Racco, D., Riotto, A.
2019; 99 (10)
- **Implications of the detection of primordial gravitational waves for the Standard Model** *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*
Franciolini, G., Giudice, G. F., Racco, D., Riotto, A.
2019
- **Primordial black holes from Higgs vacuum instability: avoiding fine-tuning through an ultraviolet safe mechanism** *EUROPEAN PHYSICAL JOURNAL C*
Espinosa, J. R., Racco, D., Riotto, A.
2018; 78 (10): 806

- **A cosmological signature of the SM Higgs instability: gravitational waves** *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*
Espinosa, J. R., Racco, D., Riotto, A.
2018
- **Cosmological Signature of the Standard Model Higgs Vacuum Instability: Primordial Black Holes as Dark Matter** *PHYSICAL REVIEW LETTERS*
Espinosa, J. R., Racco, D., Riotto, A.
2018; 120 (12): 121301
- **On dark matter interactions with the Standard Model through an anomalous Z'** *JOURNAL OF HIGH ENERGY PHYSICS*
Ismail, A., Katz, A., Racco, D.
2017
- **Complementarity of DM searches in a consistent simplified model: the case of Z'** *JOURNAL OF HIGH ENERGY PHYSICS*
Jacques, T., Katz, A., Morgante, E., Racco, D., Rameez, M., Riotto, A.
2016
- **The 750 GeV diphoton excess, dark matter and constraints from the IceCube experiment** *JOURNAL OF HIGH ENERGY PHYSICS*
Morgante, E., Racco, D., Rameez, M., Riotto, A.
2016
- **Scanning of the supersymmetry breaking scale and the gravitino mass in supergravity** *JOURNAL OF HIGH ENERGY PHYSICS*
Farakos, F., Kehagias, A., Racco, D., Riotto, A.
2016
- **The halo Boltzmann equation** *JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS*
Biagetti, M., Desjacques, V., Kehagias, A., Racco, D., Riotto, A.
2016
- **Simplified models for dark matter searches at the LHC** *PHYSICS OF THE DARK UNIVERSE*
Abdallah, J., Araujo, H., Arbey, A., Ashkenazi, A., Belyaev, A., Berger, J., Boehm, C., Boveia, A., Brennan, A., Brooke, J., Buchmueller, O., Buckley, M., Busoni, et al
2015; 9-10: 8-23
- **Robust collider limits on heavy-mediator Dark Matter** *JOURNAL OF HIGH ENERGY PHYSICS*
Racco, D., Wulzer, A., Zwirner, F.
2015