Gravitational waves through the cosmic web

Garoffolo, A.

List of Publications

1. " Gravitational waves and geometrical optics in scalar tensor theories",

   A. Garoffolo, G. Tasinato, C. Carbone, D. Bertacca, S. Matarrese.
   JCAP, 11 (2020) 040

2. "Detecting dark energy fluctuations with gravitational waves",

   A. Garoffolo, M. Raveri, A. Silvestri, G. Tasinato, C. Carbone, D. Bertacca, S. Matarrese.
   Phys.Rev.D, 103 (2021) 8, 083506.

3. "Gravitational wave cosmological distances in scalar-tensor theories of gravity",

   G. Tasinato, **A. Garoffolo**, D. Bertacca, S. Matarrese.
   JCAP, 06 (2021) 050.

4. "Unifying gravitational waves and dark energy",

   A. Garoffolo, O. Contigiani,
   e-Print: 2110.14689, submitted to *Phys.Rev.D*.

5. "Prospects of testing late-time cosmology with weak lensing of gravitational waves and galaxy surveys",

   A. Balaudo, **A. Garoffolo**, M. Martinelli, S. Mukherjee, A. Silvestri,
   e-Print: 2210.06398, submitted to *JCAP*.

6. "Wave-optics limit of the stochastic gravitational wave background", **A. Garoffolo**,
   e-Print: 2210.05718, submitted to *JCAP*.

Curriculum Vitae

I was born in Milan on November 24th, 1993, where I attended high school and university. Despite what one might assume from reading this Thesis, my interest in physics sparked, quite late, at the Gran Sasso laboratories while observing a liquid scintillator for low-energy solar neutrinos. Before that physics was not my top priority, perhaps partly because I skipped the first year of its teaching due to attending my third year of high school at Poudre High in Fort Collins, Colorado. Nevertheless, when I found myself face-to-face with such an enormous detector, with its interior walls all covered in "light bulbs", something clicked. Drifting towards more theoretical pursuits, I obtained my bachelor's degree from the University of Milan in 2016. The title of my thesis was *Study of stochastic properties of forces in long-range interaction systems*. If any, the role of this thesis was to make me appreciate the physics of plasmas. During my master's studies, I discovered that cosmology essentially involves studying an unimaginably vast one in a spacetime that is also expanding. This realization led me to the University of Padova, where I worked on my master thesis, *Propagation of Gravitational Waves through Cosmic Inhomogeneities in Modified Gravity*, in the group of Prof. S. Matarrese. I started my PhD in September 2019, in the theoretical cosmology group at the Lorentz Institute of Leiden University, under the supervision of Prof. dr. Ana Achúcarro and Dr. Alessandra Silvestri. During my time in Leiden, I had the pleasure to supervise multiple master students in their thesis work, and I was the teaching assistant of the courses "Quantum Field Theory" and "Theory of General Relativity". I participated in a number of schools and conferences and had the opportunity of presenting my work in various seminars in the Netherlands, Italy, Germany, Belgium, United Kingdom, France, Canada and the United States.

In the fall of 2023, I will start a postdoc at the University of Pennsylvania, Philadelphia, where I plan to continue my research on gravitational wave cosmology.

Acknowledgements

I would like to express my deepest gratitude to all those who have contributed to the completion of this PhD. Your support, guidance, and encouragement have been instrumental in this journey of academic and personal growth. Sometimes quietly and sometimes loudly, my perspective on many things has changed since I arrived in the Netherlands. I truly believe that these changes have been for the better, and I am filled with curiosity and excitement to witness the ongoing evolution that lies ahead.