The alignment of galaxies across all scales

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List of publications

First Author

Halo shapes constrained from a pure sample of central galaxies in KiDS-1000
C. Georgiou, H. Hoekstra, K. Kuijken, M. Bilicki, A. Dvornik, T. Schrabback, A&A, in prep.

GAMA+KiDS: Alignment of galaxies in galaxy groups and its dependence on galaxy scale
C. Georgiou, N.E. Chisari, M.C. Fortuna, H. Hoekstra, K. Kuijken, B. Joachimi, M. Vakili, M. Bilicki, A. Dvornik, T. Erben, B. Giblin, C. Heymans, N.R. Napolitano, H. Shan, A&A 628, A31 (2019)

The dependence of intrinsic alignment of galaxies on wavelength using KiDS and GAMA
C. Georgiou, H. Johnston, H. Hoekstra, M. Viola, K. Kuijken, B. Joachimi, N.E. Chisari, D.J. Farrow, H. Hildebrandt, B.W. Holwerda, A. Kannawadi, A&A 622, A90 (2019)

Contributing Author

Luminous red galaxies in the Kilo-Degree Survey: selection with broad-band photometry and weak lensing measurements
M., Vakili, M. Bilicki, H. Hoekstra, N.E. Chisari, M.J.I. Brown, **C. Georgiou**, A. Kannawadi, K. Kuijken, A.H. Wright, MNRAS 487, 3 (2019)

Consistent cosmic shear in the face of systematics: a B-mode analysis of KiDS-450, DES-SV and CFHTLenS
M. Asgari, C. Heymans, H. Hildebrandt, L. Miller, P. Schneider, A. Amon, A. Choi, T. Erben, **C. Georgiou**, J. Harnois-Deraps, K. Kuijken, A&A 624, A134 (2019)

KiDS+GAMA: Intrinsic alignment model constraints for current and future weak lensing cosmology
H. Johnston, **C. Georgiou**, B. Joachimi, H. Hoekstra, N.E. Chisari, D.J. Farrow, M.C. Fortuna, C. Heymans, S. Joudaki, K. Kuijken, A.H. Wright, A&A 624, A30 (2019)

Photometric redshifts for the Kilo-Degree Survey. Machine-learning analysis with artificial neural networks
M. Bilicki, H. Hoekstra, M.J.I. Brown, V. Amaro, C. Blake, S. Cavuoti, J.T.A de Jong, **C. Georgiou**, H. Hildebrandt, C. Wolf, A. Amon, M. Brescia, S. Brough, M.V. Costa-Duarte, T. Erben, K. Glazebrook, A. Grado, C. Heymans, T. Jarrett, S. Joudaki, K. Kuijken, G. Longo, N.R Napolitano, D. Parkinson, C, Vellucci, G.A. Verdoes Kleijn, L. Wang, A&A 616, A69, (2018)

Curriculum Vitae

I was born in Ioannina on 1992 and grew up in a small, seaside town called Igoumenitsa in the north-west of Greece. I developed an inquisitive and curious nature since I was little, which made it natural to be drawn to the sciences of physics and mathematics. I was fascinated by the fact that we can predict the travel time of a falling object or the deflection of light rays using simple mathematics and hypotheses, and I wondered how many more secrets of physical phenomena could be unravelled. Motivated by this, I joined national competitions in physics and astronomy during high school receiving honourable mentions for my performance, and I participated in a summer school in astronomy in Corinth, Greece.

After high school, I joined the BSc programme in physics, in the Aristotle university of Thessaloniki, Greece in September of 2010. During my studies, I was drawn to the biggest mysteries and questions about nature on a grand scheme, and chose the specialization of astronomy. On top of that, I attended two more summer schools on astronomy in Volos, Greece and an international conference on X-ray astronomy, to cultivate my research interest. I was also selected as a teaching assistant (problem sheet marker) on the undergraduate courses of Calculus I and Introduction to Astronomy. During my final year, I focused on cosmology and general relativity which led to my thesis, titled "Covariant and Gauge-Invariant perturbations in Tilted FLRW models", under the supervision of Prof. dr. Christos Tsagkas. In this work, I studied linear perturbations, using general relativity, for observers that have a peculiar velocity with respect to the Hubble flow. My performance in the overall BSc programme

allowed me to receive a scholarship from the bequest of "Afon Zosima" as well as graduate cum laude. In the summer of 2014, I attended the summer school on cosmology in Trieste, Italy, where I presented my undergraduate thesis.

I proceeded to enroll in the MSc of theoretical physics, in the university of Edinburgh, in September of 2014. I was able to secure funding for my masters through the "Highly skilled workforce scholarship" together with a scholarship from the "Lilian Voudouri" foundation. I chose many elective courses focused on astronomy, and ultimately carried out my master thesis on "Enzo AMR simulations of cooling gas in galaxy haloes", supervised by Prof. dr. Avery Meiksin and Dr. Eric Tittley, where we investigated the performance of different AMR simulation setups with regards to dark matter and gas profiles. I graduated with a distinction in August of 2015.

Following my graduate studies, I joined the Leiden Observatory as a PhD Candidate in October of 2015. Under the supervision of Prof. dr. Koen Kuijken and the now Prof. dr. Henk Hoekstra, I joined the Kilo Degree Survey (KiDS) collaboration to work on gravitational lensing. Together with Dr. Massimo Viola, I used a sophisticated method to measure galaxy shapes from the high quality KiDS imaging data and quantify the intrinsic galaxy alignment signal, the coherent orientation patterns of physically associated galaxies due to their interaction with the tidal gravitational field. The measurement of intrinsic alignments will ultimately help better understand and model the phenomenon, which will bias cosmological parameters inferred through weak gravitational lensing measurements, if left unaccounted for. Moreover, I was involved in the Physics of the Accelerating Universe Survey (PAUS), and worked on developing a part of the photometry pipeline. I attended the winter school in cosmology in Tonale, Italy and presented my research during the PhD in several conferences in Netherlands, Australia, China and Japan. I also served as a teaching assistant for the astronomy bachelor course "astronomy lab & observing project" in Leiden University, organised the weekly group meetings of the weak gravitational lensing group during 2018-2019 and gave a public science talk on gravitational lensing, organised by "Astronomy on Tap" in 2018.

Looking ahead, I wish to employ my skills and knowledge to help us better understand the world and how best to use it.

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A great many number of people have made their contribution, in many ways, to my endeavour to obtain my PhD. I would not be in this position today without the massive, selfless support of my parents, in their many ways, since the very beginning of my undergraduate studies. Σας ευχαριστώ από τα βάθη της καρδιάς μου.

The work I have conducted during my research is the product of a large team of scientists, namely the KiDS and GAMA collaborations, and this thesis would not have been possible without their hard work. In particular, I thank my close collaborators, Harry Johnston and Elisa Chisari for always being willing to help and making work fun. In addition, I would like to thank Massimo Viola for his support in the early days of my PhD and for having his way of making me feel excited to work after each and every one of our meetings. I am also grateful to the weak gravitational lensing group in Leiden, for all our meetings and discussions; thank you Andrej, Stijn, Lammim, Maria Cristina, Patricia, Yannick, Matthieu, Mohammadjavad, Arun, David, Alessandro, Omar, Riccardo, Cristobal, Margot, Fabian and Marcello.

In my experience, the quality of work during the PhD is somewhat intertwined with one's private life, and vice versa. I was fortunate enough to be surrounded by wonderful people during these four years, that made a direct or indirect contribution to the finishing of this thesis. Tommaso, I was certain we would be good friends since the first day of work that I met you. Jit, I admired your kindness and selflessness and I was happy and honoured to be your close friend. A big thanks to both of you, for all the beers, trips, talks and late nights,

and always being helpful and supportive to me no matter what; I could not go on without you. A big thank you also goes to Eleonora and Maria Cristina, for the many trips, dinners, talks and for being there for me and willing to help even when I did not know I needed it. My thanks extend to the rest of my friends who made my everyday life more interesting and fun: Andrej, Valeriya, Fraser, Dilovan, Gabriela, Aayush, Alberto, Emanuele, Clément, Vincenzo, Kim, Pedro, Francesco and Kirsty. Andrea, thank you for your valuable support in these last months of my PhD.

It is not a coincidence that many astronomers and physicists enjoy the sport of climbing, since it requires an analytic mind's approach. During my PhD, climbing was a safe haven where my mind would stop being occupied with anything except for how to top the climb in question. I made many friends during this activity which made climbing and life a lot better for me and led to many nice trips and experiences. For this, I would like to thank Andrea, Jit, Christiane, Pablo, Marta, Lieslore, Liuba, Filippo, Vincenzo, Lise, Chloe and Arthur.

Lastly, I thank my brother and sister, for their support in their many ways, during the years of my PhD, as well as my grandfather and grandmother, for their unconditional love and support.