Name: **Giulia Despali**

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Email: gdespali@uni-heidelberg.de

Date of birth: 26.01.1987, Venice

Nationality: Italian

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- **EDUCATION**

2015	PhD in Astronomy (20/04/2015)
	Department of Physics and Astronomy, University of Padova, Italy
	<u>Supervisor:</u> Prof. Giuseppe Tormen
2011	Master Degree in Astronomy, magna cum laude
	University of Padova, Italy
2008	Bachelor Degree in Astronomy
	University of Padova, Italy

- **POSITIONS**

from 12/2020	Gliese Fellow 2020
	Institut für Theoretische Astrophysik, Zentrum für Astronomie
	University of Heidelberg, Heidelberg, Germany
2016 – 2020	Postdoctoral Fellow
	Max Planck Institute for Astrophysics, Garching bei München, Germany
2015	Visiting postdoctoral Fellow
	Laboratoire d'Astrophysique de Marseille, Marseille, France
2015	1 month visitor
	University of Pennsylvania, Philadelphia, USA

- **RESEARCH INTERESTS & ACHIEVEMENTS**

Keywords:
dark matter and the evolution of large-scale structures, ellipsoidal collapse, alternative dark matter scenarios (WDM, SIDM fuzzy DM), hydrodynamical simulations, gravitational lensing, Bayesian modelling of observational data, comparisons between theory/simulations and observations.

Achievements:
- first halo finder based on the Ellipsoidal Collapse model (Triaxial Haloes), developed for my PhD (Despali et al. 2013, 2014, 2017)
- developed universal scaling relations for the halo shapes (Despali et al. 2014, 2017 Bonamigo et al. 2015)) and the halo mass function (Despali et al. 2016) in cosmological simulations, now widely used to calculate halo abundances
- coordinator of the simulation activities in the cosmology group at the university of Padova (2012-2016), resulting in the SBARBINE simulations used for papers and the PhD thesis of
- first detailed estimates of the impact of line-of-sight structures on the gravitational imaging technique and impact on real data (Despali et al. 2018, Hsueh et al. 2019)
- first simulations of Early-Type galaxies in SIDM, including dark matter and baryons with Arepo (Despali et al. 2019)

- **FELLOWSHIPS AND AWARDS**

2020   Gliese Independent research Fellowship 2020, University of Heidelberg
2015   "Ing. A. Gini" Fellowship, University of Padova (grant for students of the University of
            Padova to work abroad - in my case at LAM Marseille)
2015   OCEVU visiting fellowship, Laboratoire d'Astrophysique de Marseille
2010   Erasmus Grant, University of Padova - University of Heidelberg

- **SUPERVISION**

2021   Co-supervisor of Claudio Mastromarino - Master Thesis project in Heidelberg during
            his Erasmus period (with Prof. Lauro Moscardini - University of Bologna) -
            resulting in one publication in prep.
2017-2021   PhD Co-supervisor of Wolfgang Enzi, MPA Garching (Germany) - resulting in two
            publications with W.E. as first author and other co-authored publications
2019   Supervisor of Levi Walls, Summer internship project at MPA Garching (Germany)
2013   Co-supervisor of Mario Bonamigo, Master Thesis, University of Padova (Italy), with
            prof. Giuseppe Tormen - resulting in 1 publication

- **TEACHING ACTIVITIES**

2022   **Lecturer** - Python programming for scientists, University of Heidelberg
2021/2022   **Head tutor** Theoretical Astrophysics I, University of Heidelberg
            i.e. lecturer for the Exercise part of the course and coordinator of the students' tutors
2021   **Lecturer** - Python programming for scientists, University of Heidelberg
2014   Teaching assistant - Experimental physics I, University of Padova
2012 – 2014 **Tutor** for Calculus I and II at University of Padova

- **ORGANISATION OF SCIENTIFIC MEETINGS**

2019   Member of the Organising Committee for the "Matera Oscura/ Dark Matera"
            international conference, held in Matera (Italy)
2019   SHARP Collaboration meeting, Marseille (France)

- **INSTITUTIONAL RESPONSIBILITIES**

2019 - 2020 Postdoc Representative, MPA, Garching
2017 – 2020 Coordinator of the MPA "Women Encouragement Group" - organising meetings,
            seminars and events dedicated to gender equality in science, diversity and career issue,
            in order to create a network among the young female researchers in Garching
2013 -2014 PhD student representative, Department of Physics and Astronomy, Padova

- **MAJOR COLLABORATIONS**

2021-   Member of the Euclid consortium
2016-   Member of the SHARP collaboration, involving researchers from Germany, Danemark,
            the UK, the Netherlands and the US, with the aim of studying dark matter with adaptive
            optics and radio data. In this context, I am responsible for the theory section.

- **OTHER**

- Frequent referee for MNRAS, ApJ, A&A and PASJ
- co-PI in the accepted HST Cycle 27 proposal - ID: 15923 - Title: "Gravitational lensing by field halos: a clean test of dark matter models"
- PI of two accepted proposals to work with the TNG simulation suite

- **INVITED TALKS (selected)**

(12/2021) Astronomy colloquium, Observatory of Wien (virtual)
(10/2021) Nottingham Astronomy colloquium (virtual)
(09/2021) Strong lensing meeting, Grainau (DE)
(02/2021) Galaxy group seminar, Oxford University (virtual)
(12/2020) Astronomy Colloquium, UC Davis, California (virtual)
(08/2019) Review talk on substructure lensing. Conference "Gravitational lensing and plasma physics", Kunming, China
(06/2019) Strong lensing meeting, Isle of Skye, Scotland
(11/2018) OPINAS seminar, MPE, Garching
(05/2018) "VI Meeting on Fundamental Cosmology"   Granada, Spain
(02/2018) Workshop "Has sterile neutrino dark matter been detected?", Lorentz Center, Leiden
(06/2017) Workshop "Aosta 2017", Cogne, Italy
(06/2016) MPA Institute seminar, Garching
(04/2016) Workshop "Dark matter on the smallest scales", Lorentz Center, Leiden, Netherlands

- **REFERENCES**

Dr. Simona Vegetti, Max Planck Institute for Astrophysics, Garching bei München Germany
svegetti@mpa-garching.mpg.de

Prof. Dr. Ravi K. Sheth, University of Pennsylvania (Upenn), Philadelphia, USA
shethrk@sas.upenn.edu

Prof. Dr. Simon White, Max Planck Institute for Astrophysics, Garching bei München Germany
 swhite@mpa-garching.mpg.de

Dr. Marceau Limousin, Laboratoire d'Astrophysique de Marseille, France
marceau.limousin@lam.fr

PUBLICATION LIST

9 first author papers with 411 citations
27 publications in total with 759 citations
H-index = 15
Researcher unique identifier - ORCID: https://orcid.org/0000-0001-6150-4112

First author publications:

- *Detecting low-mass haloes with strong gravitational lensing I: the effect of data quality and lensing configuration,*
  Giulia Despali, Simona Vegetti, Simon White, Devon Powell, Hannah Stacey, Christopher Fassnacht, Francesca Rizzo, Wolfgang Enzi, MNRAS 2021

- *The lensing properties of subhaloes in massive elliptical galaxies in sterile neutrino cosmologies,*
  Giulia Despali, Mark Lovell, Simona Vegetti, Robert Crain, Benjamin Oppenheimer, MNRAS 2020

- *The interplay of Self-Interacting Dark Matter and baryons in shaping the halo evolution.*
  Giulia Despali, Martin Sparre, Simona Vegetti, Mark Vogelsberger, Jesús Zavala. MNRAS 2019

- *Modelling the line-of-sight contribution in substructure lensing,*
  Giulia Despali, Simona Vegetti, Simon D. M. White, Carlo Giocoli, Frank C. Van den Bosch, MNRAS 2018

- *The impact of baryonic physics on the subhalo mass function and implications for gravitational lensing.*
  Giulia Despali and Simona Vegetti, MNRAS 2017

- *A look into the inside of haloes: a characterization of the halo shape as a function of overdensity in the Planck cosmology.*
  Giulia Despali, Carlo Giocoli, Mario Bonamigo, Marceau Limousin, Giuseppe Tormen, MNRAS 2017

- *The universality of the virial halo mass function and models for non-universality of other halo definitions.*
  Giulia Despali, Carlo Giocoli, Raul Angulo, Giuseppe Tormen, R. K. Sheth, G. Baso, L. Moscardini. MNRAS 2016

- *Some like it triaxial: the universality of dark matter halo shapes and their evolution along the cosmic time.*
  Giulia Despali, Carlo Giocoli, Giuseppe Tormen. MNRAS 2014 https://arxiv.org/abs/1404.6527

- *Ellipsoidal halo finders and implications for models of triaxial halo formation.*
  Giulia Despali, Giuseppe Tormen, Ravi K. Sheth. MNRAS 2013

Co-authored publications:

- *- Joint constraints on thermal relic dark matter from a selection of astrophysical probes*
  Wolfgang Enzi, Riccardo Murgia et al, including **GD**, submitted to MNRAS 2020

- *Time delay Lens modelling challenge*
  X. Ding, T. Treu, S. Birrer et al including **GD**, MNRAS 2021

- *Systematic errors in strong gravitational lensing reconstructions, a numerical simulation perspective*
  Wolfgang Enzi, Simona Vegetti, **Giulia Despali**, Jen-Wei Hsueh, Ben Metcalf, MNRAS 2020

- *SHARP -- VII. New constraints on warm dark matter free-streaming properties and substructure abundance from flux-ratio anomalous lensed quasars*
  Jen-Wei Hsueh, Wolfgang Enzi, Simona Vegetti, Matt Auger, Christopher Fassnacht, **Giulia Despali**, Leon Koopmans, John McKean, MNRAS 2019

- *Low-mass halo perturbations in strong gravitational lenses at redshift z ˜ 0.5 are consistent with CDM.*
  Elisa Ritondale, Simona Vegetti, **Giulia Despali**, Matt Auger, L. Koopmans, John McKean, MNRAS 2019

- *Constraining the Mass Density of Free-Floating Black Holes using Razor-thin Lensing Arcs.*
  U. Banik, F.C. van den Bosch, M. Tremmel, M. Anupreeta, **G. Despali**, M. Surhud, S. Vegetti, J.P. McKean. MNRAS 2018

- *Constraining sterile neutrino cosmologies with strong gravitational lensing observations at redshift z~0.2*
  Simona Vegetti, **Giulia Despali**, Mark Lovell, Wolfgang Enzi, MNRAS 2018

- *Accretion of satellites on to central galaxies in clusters: merger mass ratios and orbital parameters*,
  Carlo Nipoti, Carlo Giocoli, **Giulia Despali**, MNRAS 2018

- *Flux-ratio anomalies from discs and other baryonic structures in the Illustris simulation,*
  Jen-Wei Hsueh, **Giulia Despali**, Simona Vegetti, Dandan Xu, C. D. Fassnacht, R. B. Metcalf, MNRAS 2017

- *Characterizing strong lensing galaxy clusters using the Millennium-XXL and MOKA simulations.*
  Carlo Giocoli, M. Bonamigo, M. Meneghetti, M. Moscardini, R. Angulo, **G. Despali**, E. Jullo, MNRAS 2016

- *The universality of the shape of dark matter haloes over six decades in mass: insights from the Millennium XXL and Sbarbine simulations.*
  Mario Bonamigo, **Giulia Despali,** Marceau Limousin, Raul Angulo, Carlo Giocoli, G. Soucail, MNRAS 2015