

Ugo Niccolò Di Carlo

ASTROPHYSICS POSTDOCTORAL RESEARCHER - UNIVERSITÀ DEGLI STUDI DI PADOVA

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Education

Visiting Student

NORTHWESTERN UNIVERSITY

Evanston, Illinois - USA

January 2020 - March 2020

- Project: Formation and evolution of heavy black hole binaries in star clusters (Supervisor: Dr. Mario Spera)

PhD in Astrophysics

UNIVERSITÀ DEGLI STUDI DELL'INSUBRIA

Como, Italy

2017 - November 2020

- Thesis: Black Holes in Young Star Clusters (Supervisors: Prof. Francesco Haardt, Prof. Michela Mapelli)

Master Degree in Astronomy (SC1173 2010 - LM58)

UNIVERSITÀ DEGLI STUDI DI PADOVA

Padova, Italy

2015 - October 26, 2017

- Final mark: 110/110 cum laude
- Weighted mean of exams marks: 29.55/30
- Thesis on 'Study of Rotation of Young Massive Star Clusters by means of Hydrodynamical and Direct N-Body Simulations' (Supervisors: Prof. Michela Mapelli, Prof. Giampaolo Piotto)

Bachelor Degree in Astronomy (SC1160 2008 - L-30)

UNIVERSITÀ DEGLI STUDI DI PADOVA

Padova, Italy

2010 - June 26, 2015

- Final mark: 103/110
- Thesis on 'Study of Tidal Disruption of Star Clusters by means of N-Body Simulations' (Supervisor: Prof. Paola Marigo - Co-Supervisor: Prof. Michela Mapelli)

High School

LICEO SCIENTIFICO A. EINSTEIN

Teramo, Italy

2005 - 2010

- Final mark: 100/100

Publications

* Binary black holes in young star clusters: the impact of metallicity

Di Carlo, Ugo Niccolò ; Mapelli, M.; Giacobbo, N.; Spera, M.; Bouffanais, Y.; Rastello, S.; Santoliquido, F.; Pasquato, M.; Ballone, A.; Trani, A.A.; Torniamenti, S.; Haardt, F.

MNRAS, 498, 495

[HTTPS://ARXIV.ORG/ABS/2004.09525](https://arxiv.org/abs/2004.09525)

2020

* Binary black holes in the pair instability mass gap

Di Carlo, Ugo Niccolò ; Mapelli, M.; Bouffanais, Y.; Giacobbo, N.; Santoliquido, F.; Bressan, A.; Spera, M.; Haardt, F.

MNRAS, 497, 1043

[HTTPS://ARXIV.ORG/ABS/1911.01434](https://arxiv.org/abs/1911.01434)

2020

* Merging black holes in young star clusters

Di Carlo, Ugo Niccolò ; Giacobbo, N.; Mapelli, M.; Pasquato, M.; Spera, M.; Wang, L.; Haardt, F.

MNRAS, 487, 2947

[HTTPS://ARXIV.ORG/ABS/1901.00863](https://arxiv.org/abs/1901.00863)

2019

* Most important publications

From hydrodynamics to N-body simulations of star clusters: mergers and rotation

Ballone, A.; Torniamenti, S.; Mapelli, M.; **Di Carlo, Ugo N.**; Spera, M.; Rastello, S.; Gaspari, N.; Iorio, G.

MNRAS, 501, 2920

[HTTPS://ARXIV.ORG/ABS/2012.00767](https://arxiv.org/abs/2012.00767)

2021

Evolution of fractality and rotation in embedded star clusters

Ballone, A.; Mapelli, M.; **Di Carlo, Ugo N.**; Torniamenti, S.; Spera, M.; Rastello, S.

MNRAS, 496, 49

[HTTPS://ARXIV.ORG/ABS/2001.10003](https://arxiv.org/abs/2001.10003)

2020

Populating the upper black hole mass gap through stellar collisions in dense star clusters

Kremer, K.; Spera, M.; Becker, D.; Chatterjee, S.; **Di Carlo, Ugo N.**; Fragione, G.; Rodriguez, C. L.; Ye, C. S.; Rasio, F. A.

ApJ, in press

[HTTPS://ARXIV.ORG/ABS/2006.10771](https://arxiv.org/abs/2006.10771)

2020

The cosmic merger rate density evolution of compact binaries formed in young star clusters and in isolated binaries

Santoliquido, F.; Mapelli, M.; Bouffanais, Y.; Giacobbo, N.; **Di Carlo, Ugo N.**; Rastello, S.; Artale, M. C.; Ballone, A.

ApJ, 898, 152

[HTTPS://ARXIV.ORG/ABS/2004.09533](https://arxiv.org/abs/2004.09533)

2020

Radial Dependence of the Proto-Globular Cluster Contribution to the Milky Way Formation

Chung, C.; Pasquato, M.; Lee, S.; **Di Carlo, Ugo N.**; An, D.; Yoon, S.; Lee, Y.

ApJ, 883, L31

[HTTPS://ARXIV.ORG/ABS/1909.01353](https://arxiv.org/abs/1909.01353)

2019

Gravitational-wave detection rates for compact binaries formed in isolation: LIGO/Virgo O3 and beyond

Baibhav, V.; Berti, E.; Gerosa, D.; Mapelli, M.; Giacobbo, N.; Bouffanais, Y.; **Di Carlo, Ugo N.**

Physical Review D, 100, 064060

[HTTPS://ARXIV.ORG/ABS/1906.04197](https://arxiv.org/abs/1906.04197)

2019

Constraining the fraction of binary black holes formed in isolation and young star clusters with gravitational-wave data

Bouffanais, Y.; Mapelli, M.; Gerosa, D.; **Di Carlo, Ugo N.**; Giacobbo, N.; Berti, E.; Baibhav, V.

ApJ, 886, 25

[HTTPS://ARXIV.ORG/ABS/1905.11054](https://arxiv.org/abs/1905.11054)

2019

Conferences and Workshops

235th meeting of the American astronomical society

AAS

Contributed Talk: Young star clusters: a nursery of merging binary black holes

[Honolulu - USA](#)

04-08 January, 2020

IAU Symposium 351 & MODEST-19: Star Clusters: from the Milky Way to the Early Universe

IAU

Contributed Talk: Young star clusters: a nursery of merging binary black holes

[Bologna, Italy](#)

26-31 May, 2019

Schools

IHPCCS19 - International High Performance Computing Summer School 2019

RIKEN, PRACE, XSEDE

[Kobe - Japan](#)

08-13 July, 2019

Advanced software programming for astrophysics

LAPP

[Annecy, France](#)

08-12 April, 2019

PHAROS PhD Training School: Multi-messenger physics and astrophysics with compact binaries

FSU UNIVERSITY OF JENA

[Jena, Germany](#)

11-15 March, 2019

N-body techniques for Astrophysics (Teacher: Michela Mapelli)

UNIVERSITÀ DEGLI STUDI DI PADOVA

[Padova, Italy](#)

November 2018

Heraeus Summer School - Astronomy from four perspectives: V Multi-messenger astrophysics

WILHELM UND ELSE HERAEUS STIFTUNG

[Padova, Italy](#)

September 2018

Waves on the Lake: the Astrophysics behind Gravitational Waves

LAKE COMO SCHOOL OF ADVANCES STUDIES

[Como, Italy](#)

May 28 - June 1, 2018

Machine learning for astrophysics

UNIVERSITÀ DEGLI STUDI DI PADOVA

[Padova, Italy](#)

February 2018

Heraeus Summer School -Astronomy from four perspectives: IV Origin of Stars and Planets

WILHELM UND ELSE HERAEUS STIFTUNG

Oral contribution: Effects of different initial mass functions on the evolution of star clusters

[Firenze, Italy](#)

September 2016

Heraeus Summer School -Astronomy from four perspectives: III Gravitational Wave Universe

WILHELM UND ELSE HERAEUS STIFTUNG

Oral contribution: Effects of the environment on the formation of gravitational waves sources in star clusters

[Jena, Germany](#)

September 2015

Collisional dynamics

UNIVERSITÀ DEGLI STUDI DI PADOVA

[Padova, Italy](#)

November 2014

Invited Colloquia

Binary black holes in the pair-instability mass gap

CIERA THEORY GROUP

• <https://planetpurple.northwestern.edu/event/562679>

Evanston, USA

2020

Young Star Clusters: a Black Holes' Dancing Stage

TOKYO UNIVERSITY

Tokyo, Japan

2019

Memberships

Member of the ERC funded DemoBlack research group at Università degli Studi di Padova

<http://www.demoblack.com>

2015 - now

Affiliated to INAF (Italian astrophysical institution) and INFN (Italian nuclear physics institution)

2017 - now

IT Knowledge

Operating Systems

- Linux (excellent)
- Windows (excellent)
- Android
- MacOS

Programming

- Python (excellent)
- C/C++
- sh/bash (excellent)
- Git
- Keras Neural Networks
- HTML
- Unity (Game Engine)
- PBS/SLURM (Queue schedulers for HPC)
- LaTeX
- Matlab
- Mathematica
- Fortran 77 and 90
- Cuda
- Open MP and MPI
- Supermongo

Codes, user

- Nbody6/Nbody6++GPU (direct N-body code)
- BSE/MOBSE (Stellar Population synthesis codes)
- Starlab (software environment for direct N-body simulations, <http://sns.ias.edu/starlab/>)
- pkdgrav/gasoline (tree-code with sph)
- IRAF
- tipsy

Codes, user and developer

- Nbody6++GPU + MOBSE (I interfaced Nbody6++GPU and the population synthesis code MOBSE)
- SEVN (Stellar Population synthesis codes)
- HiGPUs/ISTEDDAS (direct N-body code)

HPC Experiences GPU/CPU N-Body and hydrodynamical simulations with HPC supercomputers (e.g. CINECA, RIKEN)

Awards and Grants

2019	Travel Grant , 2000€ Grant awarded by PRACE for the participation to the International HPC Summer School 2019	<i>Kobe, Japan</i>
2019	Travel Grant , 150€ Grant awarded by IAU for the participation to the IAU Symposium 351 & MODEST-19	<i>Bologna, Italy</i>
2019	Travel Grant , 150€ Grant awarded by ASTERICS for the participation to the Third ASTERICS-OBELICS International School	<i>Annecy, France</i>
2019	Travel Grant , 320€ Grant awarded by PHAROS for the participation to the PHAROS PhD Training School: Multi-messenger physics and astrophysics with compact binaries	<i>Jena, Germany</i>
2018	Travel Grant , 350€ Grant awarded by CINECA for the participation to the CINECA Summer School of Parallel Computing 2018	<i>Rome, Italy</i>
2012	Tuition Fees Refund , Refund of the bachelor tuition fees (3000€) for merit	<i>Padova, Italy</i>

Teaching

Junior Tutor

Padova, Italy

UNIVERSITÀ DEGLI STUDI DI PADOVA

2017

- Physics tutoring (lectures and exercises) to Natural Science bachelor students

Physics teacher: training for university admission tests

Padova, Italy

UNID S.R.L COMPANY

2017-2018

- Frontal lessons and exercises to train students for university admission tests

Languages

Italian Native

English Fluent speaking and writing - Certifications: FCE (2008), PET (2006)

Observing experience

Observations of transits of exoplanets to extract light curves by using imaging differential photometry

Asiago, Italy

ASIAGO ASTROPHYSICAL OBSERVATORY, 182 CM

10-11, 29-30 October 2017

- Under the supervision of Prof. Giampaolo Piotto

Adaptive Optics speckle interferometry of a sample of unresolved binary stars

Asiago, Italy

ASIAGO ASTROPHYSICAL OBSERVATORY, 122 CM

13-14 January 2017

- Under the supervision of Prof. Roberto Ragazzoni

Long-slit spectroscopy of Soul Nebula (IC 1848) and Crab Nebula (M1)

Asiago, Italy

ASIAGO ASTROPHYSICAL OBSERVATORY, 122 CM

21-24 November 2012

- Under the supervision of Prof. Stefano Ciroi

Outreach

Astronomy on Tap - 20/02/2020

Chicago, USA

COSMIC COUPLES: FOLLOWING THE BILLION-YEAR ROMANCE OF STELLAR PARTNERS

20 February 2020

Hobbies & Other Interests

Drums and Music

I PLAY DRUMS SINCE I WAS 13 AND I HAVE BEEN THE MEMBER OF MANY BANDS. I RECORDED SOME ORIGINAL TRACKS AND I KEEP PRACTISING A LOT ALSO BECAUSE IT KEEPS ME STRESS FREE.

Video games

I HAD MY FIRST COMPUTER WHEN I WAS VERY YOUNG AND THIS HELPED ME DEVELOP A STRONG PASSION FOR IT AND VIDEO GAMES.

Cooking

I LOVE SPENDING MY TIME COOKING. IT'S RELAXING AND WHEN YOU DO IT FOR OTHERS IS VERY SATISFYING; I THINK FOOD CAN CREATE AND STRENGTHEN BONDS BETWEEN PEOPLE IN A WAY THAT SIMPLY TALKING CANNOT.