M.Alessandra Papa

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https://www.aei.mpg.de/continuouswaves

POSITIONS HELD

MAX PLANCK RESEARCH-GROUP LEADER

1/2018 - ongoing, W2, permanent appointment as leader of a permanent and centrally-funded independent-research-group
1/2007 - 12/2017, W2 scale, permanent appointment, in division of B.F. Schutz and A. Buonanno

FACULTY

2021-ongoing, Professor of Gravitational Wave Astronomy, Leibniz University, Hannover
2017, Visiting Professor for Research Activities 2016 Fellowship award, University ``La Sapienza", Roma, Italy
1/2007-ongoing, Adjunct Professor (part-time support $\leq$ 20%), University of Wisconsin Milwaukee, USA
1/2005-6/2005, Visiting Associate Professor, University of Wisconsin Milwaukee, USA
12/2003-7/2004, Visiting Associate Professor, University of Wisconsin Milwaukee, USA
1/2002-6/2002, Visiting Assistant Professor, University of Wisconsin Milwaukee, USA
12/2000-6/2001, Visiting Assistant Professor, University of Wisconsin Milwaukee, USA

STAFF SCIENTIST

4/2006-1/2007, Senior scientist, with tenure, University of Wisconsin Milwaukee, USA
9/2005-4/2006, Senior scientist, tenure-track, University of Wisconsin Milwaukee, USA
7/2003-9/2005, Staff scientist, BaT scale, permanent, MPI für Gravitationsphysik, Golm

POST-DOC

7/1999-7/2003, Staff scientist, BaT scale, MPI für Gravitationsphysik, Golm
1/1999-7/1999, Post-doctoral fellow, INFN Laboratories, Frascati, Italy
6/1997-1/1999, Post-doctoral Fellow, MPI für Gravitationsphysik, Golm

EDUCATION

PhD, 1997, supervisors: Prof. V. Ferrari and Prof. G. Pizzella, University of Rome "Tor Vergata'
Laurea, 1993, with mark 110/110, supervisor: Dr. S. Frasca, University of Rome "La Sapienza"

SCIENTIFIC LEADERSHIP AND MENTORING

CURRENT STATUS

I lead a permanent independent research group that comprises about 15 scientists at the MPI for gravitation physics in Hannover. My goal is to detect continuous gravitational waves -- very weak signals that have not yet been observed but that will tell us a great deal on neutron stars and potentially on fundamental physics. After over 20 years of hard work in the LIGO Scientific Collaboration in mid August 2018 I left the Collaboration in order to pursue my research with greater independence and agility.

RECENT PROFESSIONAL SERVICE

- 2022, European Research Council (ERC) grant panel Chair
- 2022, La Caixa Foundation grant panel expert
- 2022, European Research Council (ERC) Marie Curie grant panel expert
- 2022, Reviewer for the Israel Science Foundation
- 2020, Reviewer for the UK Science and Technology Facilities Council
- 2020, Univ. Balearic Islands, PhD defence panel, Chair

- 2020, European Research Council (ERC) grant expert panel, Vice-cChair
- 2019, European Research Council (ERC) grant expert advisor
- 2018, European Research Council (ERC) grant expert panel member
- 2018, reviewer for National Science Centre, Poland
- 2017-2018, LIGO-program advisory committee member
- Referee for Physical Review, Physical Review Letters, Astrophysical Journal, Astrophysical Journal Letters, Astronomy &Astrophysics, Classical and Quantum Gravity, European Physical Journal C
- Editor Board member of journal Galaxies, ISSN 2075-4434
- Editor Board member of Journal of Cosmology and Astroparticle Physics (JCAP), ISSN 1475-7516

SELECTED RECENT SCIENTIFIC LEADERSHIP

- 2022, GWPAW, Melbourne, Australia, scientific organising committee member.
- 2021, Gravitational Wave Physics and Astronomy Workshop (GWPAW), Hannover, scientific organising committee chair.
- 1/2021, Continuous gravitational waves: sources, emission and searches, Schloss Ringberg workshop `https://workshops.aei.mpg.de/ringberg/`, organiser and scientific organising committee chair.
- 2019-2020, SIGRAV school on General Relativity, scientific organising committee
- 2019, GWPAW, Tokyo, Japan, scientific organising committee member.
- 2017-2019, "Neutron stars" group of the 3G (3rd generation gravitational wave detectors) Science Case Team, co-chair.
- 2018, Worskshop on Astro-Solids, Dense Matter, and Gravitational Waves, INT, U. Washington, Seattle (USA), one of the three organizers.
- 2018-2022, Committee of the Italian Society for Gravitational Physics, executive committee member.
- 2015-2016, First gravitational wave detection paper: I was one of the six editors of the historic paper ``Observation of Gravitational Waves from a Binary Black Hole Merger", Phys.Rev.Lett. 116 (2016) 6, 061102

RECENT FUNDING

- 2022, co-PI of computing award of 10 million graphics processing unit core hours on the high-performance computing services offered by the Partnership for Advanced Computing in Europe (PRACE).
- 2021, Marie Curie funding for postdoc Pep Covas (co-PI)

RECOGNITION

- 2017 Bruno Rossi Prize of the American Astronomical Society (shared with the LIGO Scientific Collaboration)
- 2017 Group achievement award of the Royal Astronomical Society (shared with the LIGO Scientific Collaboration)
- 2017 Princess of Asturias Award (shared with the LIGO Scientific Collaboration)
- Foreign Policy's 100 Leading Global Thinkers of 2018 award recipient (on behalf of the LIGO Scientific Collaboration), Washington DC, December 2016
- 2016 Breakthrough Prize in Fundamental Physics (with LIGO)
- 2016 Gruber Cosmology Prize (with LIGO)
- 2014 Elected Fellow of the American Physical Society *For numerous key contributions to gravitational-wave astronomy, including devising new data analysis methods for gravitational waves from pulsars and coordinating the worldwide exchange and analysis of data*

POST DOCS AND STUDENTS DIRECTLY SUPERVISED BY ME SINCE 2012

Post docs

- P. Covas, 10/2020-ongoing
- A. Singh, 7/2021-ongoing
- G. Bihain, 6/2020-6/2022
- T. Menne, 6/2020-6/2022
- Y. Zhang, 10/2017 - 9/2021
- J. Ming, 8/2017 - ongoing
- S. Zhu, 10/2015-6/2019
- S. Walsh, 4/2013 - 1/2018
- G. Meadors, 1/2015-2/2018
- I. Di Palma, 2012-8/2015
- P. Leaci, 2008-10/2014
- B. Behnke, 2013-6/2014

PhD Students

- B. Mc Gloughlin, Leibniz University Hannover, 10/2022-
- G. Pagliaro, Leibniz University Hannover, 4/2021-ongoing
- L. Fesik, Leibniz University Hannover, 11/2017-ongoing
- A. Ashok, Leibniz University Hannover, 9/2018-ongoing
- B. Stelltner, Leibniz University Hannover, 7/2018-ongoing
- A. Singh, Leibniz University Hannover, 11/2014 -11/2017, Sehr Gut, ``Improved post-processing in searches for continuous gravitational waves and a model for transient continuous gravitational wave emission from neutron star glitches"
- J. Ming, PhD student, 9/2013-8/2017, Leibniz University Hannover, Sehr Gut, ``Optimal directed searches for continuous gravitational waves''

- B. Behnke, PhD student, graduated in 2007-2013, Leibniz University Hannover, Ausgezeichnet, Otto-Hahn Medaille 2014, ``A directed search for continuous gravitational waves from unknown isolated neutron stars at the Galactic Center''.
- I. Di Palma, PhD student, graduated in 2009-2012, Leibniz University Hannover, Sehr Gut, ``A first search for coincident Gravitational Waves and High Energy Neutrinos''.

Master students
- S. Miller, Fullbright scholar, 1-8/2021
- D. Singh, master student, 7/2017-3/ 2018, IISER, University of Pune, Pune, India
- B. Stelltner, master student, 3/2017-7/2018, Leibniz University Hannover,
- O. Piccinni, 3/2014-10/2014, University of Rome La Sapienza

Summer students
- E. Swaroop, summer 2018, DAAD-WISE Fellowship award from IISER, Pune, India
- D. Singh, summer 2016, DAAD-WISE Fellowship award from IISER, Pune, India
- Y. Fu, summer 2016, from Beijing Normal University
- M. Li, summer 2014, from Beijing Normal University

RECENT LECTURES AND OUTREACH

- *Student Seminar and lectures "Gravitational Wave Astronomy: methods and results"* Spring 2022 Leibniz University Hannover
- *"Join us on a journey into the depths of our Galaxy"* 2022 https://youtu.be/mV4-DUaIJ5I
- *Golden Webinars in Astrophysics Series : panel member for "Gravitational Waves: A New Window on Our Universe"* 5/2021 https://youtu.be/7xIAHdDipNg
- *Searching for continuous gravitational waves* 2020 https://youtu.be/7xIAHdDipNg
- TedX talk *The Origins* 2019 https://youtu.be/t8A2L5dG4S0
- Lectures on searches for continuous waves at the Les Houches Summer School on Gravitational Wave Astronomy Les Houches, France, July 2018
- Lectures on searches for continuous waves at the 73rd Scottish Universities Summer School in Physics on Gravitational Wave Astronomy (SUSSP73), St. Andrews, Scotland, August 2017
- Lectures on gravitational wave data analysis at then NewCompStar School 2016 ``Neutron stars: gravitational physics theory and observations, Coimbra, Portugal, September 2016
- Lectures on statistics and gravitational wave data analysis at the AEI International Max Planck Research School

CURRENT FUNDING

2018-ongoing : MPG core funding, 530,000 € per year
2018-2023 : Continuous wave searches, MPG, 1,750,000 €, PI
2018-2023 : Einstein@Home, MPG, 1,750,000 €, PI
2018-2021 : Searches for new neutron stars, NFS grant Nr.1816904 Collaborative Research, U. Wisconsin Milwaukee 532,000 $, co-PI

PUBLICATIONS AND PRESENTATIONS

> 250 publications, h-index > 90. For the full publication list : ORCID 0000-0002-1007-5298

RECENT PUBLICATIONS

- Dergachev, V.; Papa, M. A., "A frequency resolved atlas of the sky in continuous gravitational waves", arXiv:2202.10598v, submitted for publication, (2022)
- Covas, P. B.; Papa, M. A.; Prix, R.; Owen , B. J " Constraints on r-modes and mountains on millisecond neutron stars in binary systems. ", The Astrophysical Journal Letters 929 (2), L19 (2022)
- J. Ming, M. A. Papa, H.-B. Eggenstein, B. Machenschalk, B. Steltner et al "Results from an Einstein@Home search for continuous gravitational waves from G347.3 at low frequencies in LIGO O2 data", The Astrophysical Journal 925 (1), 8 (2022)
- B. Steltner, M. A. Papa, H.-B. Eggenstein, "Identification and removal of non-Gaussian noise transients for gravitational wave searches" , Physical Review D 105 (2), 022005 (2022)
- Kalogera, V. et al "The Next Generation Global Gravitational Wave Observatory: The Science Book.", Gravitational Wave International Committee (2021), 69 pages, 18 figures , arXiv:2111.06990v1
- A. Ashok, B. Beheshtipour, M. A. Papa, P. C. C. Freire, B. Steltner et al "New searches for continuous gravitational waves from seven fast pulsars", The Astrophysical Journal 923 (1), 85 (2021)
- V. Dergachev, M. A. Papa , "Search for continuous gravitational waves from small-ellipticity sources at low frequencies. Physical Review D 104 (4), 043003 (2021)
- V. Dergachev, M. A. Papa , "Results from high-frequency all-sky search for continuous gravitational waves from small-ellipticity sources", Phys. Rev. D **104**, 4, 063019 (2021)

- B. Beheshtipour, M. A. Papa, "Deep learning for clustering of continuous gravitational wave candidates II: identification of low-SNR candidates", Phys. Rev. D **103**, 6, 043003 (2021)
- V. Dergachev, M. A. Papa , "Results from high-frequency all-sky search for continuous gravitational waves from small-ellipticity sources", Phys. Rev. D **103**, 6, 063019 (2021)
- B. Steltner, M. A. Papa, H.-B. Eggenstein, B. Allen, V. Dergachev et al. "Einstein@Home all-sky search for continuous gravitational waves in LIGO O2 public data", arXiv:2009.12260 (2020), The Astrophysical Journal, Volume **909**, Number 1, 79 (2021)
- Y. Zhang, M. A. Papa, B. Krishnan, A. L. Watts "Search for Continuous Gravitational Waves from Scorpius X-1 in LIGO O2 Data", arXiv:2011.04414 (2020), The Astrophysical Journal Letters **906**, L14 (2021)
- V. Dergachev, M. A. Papa "Results from the first all-sky search for continuous gravitational waves from small-ellipticity sources", Phys. Rev. Lett. **125**, 171101 (2020)
- L. Nieder et al. "Discovery of a Gamma-ray Black Widow Pulsar by GPU-accelerated Einstein@Home" The Astrophysical Journal Letters, Volume **902**, Number 2 (2020)
- S. J. Zhu, M. Baryakhtar, M. A. Papa, D. Tsuna, N.ʻKawanaka, H.-B. Eggenstein "Characterizing the continuous gravitational-wave signal from boson clouds around Galactic isolated black holes", Phys. Rev. D **102**, 063020 (2020)
- M. A. Papa, J. Ming, E. V. Gotthelf, B. Allen, R. Prix, V. Dergachev, H. B. Eggenstein, A. Singh and S. J. Zhu, "Search for Continuous Gravitational Waves from the Central Compact Objects in Supernova Remnants Cassiopeia A, Vela Jr. and G347.3-0.5," The Astrophysical Journal, Volume **897**, Number 1 (2020)
- L. Fesik and M. A. Papa, "First search for r-mode gravitational waves from J0537-6910," The Astrophysical Journal, Volume **895**, Number 1 (2020)
- B. Beheshtipour and M. A. Papa, "Deep learning for clustering of continuous gravitational wave candidates," Phys. Rev. D **101** (2020) no.6, 064009
- V. Dergachev and M. A. Papa, "Results from an Extended Falcon All-Sky Survey for Continuous Gravitational Waves," Phys. Rev. D **101** (2020) no.2, 022001
- C. Horowitz, M. Papa and S. Reddy, "Gravitational waves from compact dark matter objects in the solar system," Phys. Lett. B **800** (2020), 135072
- B. P. Abbott *et al.* [LIGO Scientific and Virgo], "Search for intermediate mass black hole binaries in the first and second observing runs of the Advanced LIGO and Virgo network," Phys. Rev. D **100** (2019) no.6, 064064
- L. Nieder, C. Clark, C. Bassa, J. Wu, A. Singh, J. Donner, B. Allen, R. Breton, V. Dhillon, H. B. Eggenstein, J. Hessels, M. Kennedy, M. Kerr, S. Littlefair, T. Marsh, D. M. S□nchez, M. Papa, P. Ray, B. Steltner and J. Verbiest, "Detection and timing of gamma-ray pulsations from the 707 Hz pulsar J0952−0607," The Astrophysical Journal, Volume **883**, Number 1 (2019),
- B. P. Abbott *et al.* [LIGO Scientific and Virgo], "All-Sky Search for Short Gravitational-Wave Bursts in the Second Advanced LIGO and Advanced Virgo Run," Phys. Rev. D **100** (2019) no.2, 024017
- A. Singh, M. A. Papa and V. Dergachev, "Characterizing the sensitivity of isolated continuous gravitational wave searches to binary orbits," Phys. Rev. D **100** (2019) no.2, 024058
- V. Kalogera, M. A. Bizouard, A. Burrows, T. Janka, K. Kotake, B. Messer, T. Mezzacappa, B. Mueller, E. Mueller, M. A. Papa, S. Reddy and S. Rosswog, "The Yet-Unobserved Multi-Messenger Gravitational-Wave Universe," (2019)
- J. Ming, M. A. Papa, A. Singh, H. B. Eggenstein, S. J. Zhu, V. Dergachev, Y. M. Hu, R. Prix, B. Machenschalk, C. Beer, O. Behnke and B. Allen, "Results from an Einstein@Home search for continuous gravitational waves from Cassiopeia A, Vela Jr. and G347.3," Phys. Rev. D **100** (2019) no.2, 024063
- V. Dergachev, M. A. Papa, B. Steltner and H. B. Eggenstein, "Loosely coherent search in LIGO O1 data for continuous gravitational waves from Terzan 5 and the galactic center," Phys. Rev. D **99** (2019) no.8, 084048
- V. Dergachev and M. A. Papa, "Sensitivity improvements in the search for periodic gravitational waves using O1 LIGO data," Phys. Rev. Lett. **123** (2019) no.10, 101101

RECENT INVITED TALKS

- Invited Speaker at the “Vulcano Workshop 2022 - Frontier Objects in AstroPhysics and Particle Physics” 26/9-1/10, 2022, Italy
- Invited Speaker at the “Physics and Astronomy World Forum” 12/02-04, 2021, Frankfurt, Germany.
- Invited Speaker at the “Marcel Grossman Meeting on General Relativity”, 5-10/7/2021 (online)
- Invited speaker at ICERM’s Semester Program Workshop “Statistical Methods for the Detection, Classification, and Inference of Relativistic Objects”, 16-20/11/2020 , Brown University, USA
- Colloquium at MPI for Radio astronomy, Bonn, 11/9/2020
- Invited talk at ”Current Themes in High Energy Physics and Cosmology Workshop”, Niels Bohr Institute, 8/2019
- Colloquium at the Edoardo Amaldi Center, U. of Rome La Sapienza, Italy, 5/2019
- Cosmology seminar at Dartmouth College, NH, USA, 4/2019
- Colloquium at Columbia University, NYC, USA, 4/2019
- Colloquium at International Center for Theoretical Physics, Trieste 4/2019

PERSONAL

Birth

Rome, Italy, 6/6/1967

Current

I live in the Hannover Region, Germany.
I am married and have two children born in 2001 and 2004