## Leonardo Gualtieri

### Curriculum Vitæ

### Part I - General Information

Full Name: Leonardo Gualtieri

Birth: Rome, 9/10/1971

Citizenship: Italian

Address: Dipartimento di Fisica, "Sapienza" Università di Roma

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Academic Sector: FIS/02 - 02/A2

Spoken Languages: English (fluent), French (good knowledge), Italian (mother language)

### Part II - Education and Habilitations

Mar 2021 Italian National Scientific Habilitation (ASN):

• Astrophysics (02/C1) - Full Professor

Jul 2018 Italian National Scientific Habilitation (ASN):

• Theoretical Physics (02/A2) - Full Professor

Jan 2014 Italian National Scientific Habilitation (ASN):

• Theoretical Physics (02/A2) - Full Professor

• Theoretical Physics (02/A2) - Associate Professor

• Astrophysics (02/C1) - Associate Professor

Feb 2000 Ph.D. in Physics at Università di Torino

Title of the Thesis: "Harmonic analysis and superconformal gauge theories in three dimensions from the AdS/CFT correspondence"

Dec 1995 "Laurea" Degree in Physics at "Sapienza" Università di Roma

(110/110 cum laude)

### Part III - Appointments

From Nov 2015 Associate Professor at "Sapienza" Università di Roma

Mar 2006 - Oct 2015 Research Scientist at "Sapienza" Università di Roma

Oct 2005 - Feb 2006 Enrico Fermi Fellow at "Sapienza" Università di Roma

May 2001 - Sep 2005 Postdoctoral Researcher at "Sapienza" Università di Roma

Nov 1999 - Apr 2001 Postdoctoral Researcher at Universitè Libre de Bruxelles

### **Part IV - Teaching experience**

	Teaching the undergraduate course "Relatività Generale" at "Sapienza" Università di Roma
	Teaching the undergraduate course "Onde Gravitazionali, Stelle e Buchi Neri" at "Sapienza" Università di Roma
	Teaching the undergraduate course "Meccanica Analitica e Relativistica" at "Sapienza" Università di Roma
	Teaching the undergraduate course "Meccanica" at "Sapienza" Università di Roma
	Teaching the undergraduate course "Fisica" for Natural Scientists at "Sapienza" Università di Roma
	Teaching the undergraduate course "Relatività Generale" at "Sapienza" Università di Roma
	Teaching the Ph.D. course "Buchi Neri in Relatività Generale" at "Sapienza" Università di Roma
2003/2004 - 2008/2009	Teaching Assistant at various undergraduate and Ph.D. courses

In the last nineteen years I have also been involved in the training of several graduate and undergraduate students. Most of these students have become successful and respected scientists, as: Emanuele Berti (Professor, JHU, Baltimora, U.S.), Giovanni Miniutti (CAB-CSIC Researcher, Madrid, Spain), Brynmor Haskell (Associate Professor, Warsaw, Poland), Paolo Pani (Associate Professor, Sapienza, Rome), Riccardo Ciolfi (INAF Researcher, Padova), Francesco Pannarale (Associate Professor, Sapienza, Rome).

at "Sapienza" Università di Roma

I have published - in collaboration with Valeria Ferrari and Paolo Pani - a textbook, "General Relativity and its Applications: Black Holes, Compact Stars and Gravitational Waves" (CRC Press - Taylor & Francis), addressed to third-year undergraduate and especially to graduate students in Physics or Astrophysics, who want to learn the basics of General Relativity and its diverse phenomenological consequences.

### Part V - Awards & Honors

2019	Class.Quant.Grav. 36, 143001 selected for the Highlights of CQG
2018	Phys. Rev. Lett. 120, 081101 selected as Editor's Suggestion
2015	Class.Quant.Grav. 32, 243001 selected for the Highlights of CQG.
2015	<u>Class.Quant.Grav. 32, 204001</u> selected for an Insight on CQG+ - <i>high-quality papers published in Class.Quant.Grav.</i>
2012	<u>Phys.Rev.Lett. 109, 131102</u> selected for a <u>Highlight</u> in <i>Physics - spotlighting exceptional research</i> of APS, and reported on the <u>New Scientist</u>
2007	"Honorable mention" in the "GRF Essay Contest" from Gravity Research Foundation
1996	"Luca Branca" Fellowship for Graduates in Astrophysics from "Sapienza" Università di Roma
1992	"Persico" Fellowship for Undergraduate Students in Physics from Accademia Nazionale dei Lincei

# **Part VI - Research Grants**

• Principal Investigator (PI) or Principal Investigator of a local node (Local PI):

2021-2025	H2020-MSCA-RISE Grant "Gravitational Universe: Challenges and Opportunities" - GRU PI	European Union	280.6 k€
2020	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	35.5 k€
2019	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	28.0 k€
2018-2019	Research Grant "Gravitational Wave sources" PI	"Sapienza" Università di Roma	15.0 k€
2018	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	29.0 k€
2017	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	26.5 k€

2016	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	30.5 k€
2016-2019	H2020-MSCA-RISE Grant "Strong Gravity and High Energy Physics" - StronGrHEP Local PI	European Union	36.0 k€
2015	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	32.0 k€
2014-2015	Research Grant "Gravitational Wave sources" PI	"Sapienza" Università di Roma	7.0 k€
2014	"Iniziativa Specifica" Grant TEONGRAV <b>PI</b>	INFN	20.5 k€
2013-2014	Research Grant "Gravitational Wave sources" PI	"Sapienza" Università di Roma	7.0 k€
2013-2014	Funding for a 2-year postdoctoral position <b>PI</b>	"Sapienza" Università di Roma & INFN Roma1	45.6 k€
2012-2013	Research Grant "Gravitational Wave sources" PI	"Sapienza" Università di Roma	8.0 k€
2012-2015	FP7-PEOPLE-IRSES Grant "Numerical Relativity and High Energy Physics" - NRHEP Local PI	European Union	23.1 k€
2011-2012	Research Grant "Gravitational Wave sources" PI	"Sapienza" Università di Roma	8.0 k€
2002-2003	Research Grant "Progetto Giovani Ricercatori" PI	Italian University Ministry	4.0 k€

# • Scientist in Charge:

2015-2016	FP7-PEOPLE-IEF Grant (Marie Curie fellowship) "Gravity, fundamental physics and astrophysics: the missing link" - ASTROGRAPHY Scientist in charge	European Union	179.7 k€
2016	Research Grant for Outstanding Visiting Researchers <b>Scientist in charge</b>	"Sapienza" Università di Roma	5.0 k€

# • Investigator (team member)

2019-2022	PRIN 2017 "LISA on track: the black holes of the Gravitational Universe"	Italian University Ministry
2017-2021	COST-Research Networking Programme GWverse	European Union
2013-2017	COST-Research Networking Programme NewCompStar	European Union
2011-2013	PRACE (Computing time)	European Union
2010-2012	COFIN 2008	Italian University Ministry
2010-2018	Ricerche Universitarie	"Sapienza" Università di Roma
2009-2010	Ricerche di Ateneo Federato coordinate da un Ricercatore	Ateneo Federato Scienza e Tecnologia "Sapienza" Università di Roma
2008-2012	COST-Research Networking Programme CompStar	European Union
2007-2010	Ricerche di Ateneo Federato	Ateneo Federato Scienza e Tecnologia "Sapienza" Università di Roma
2007-2008	Acquisizione Grandi Attrezzature Scientifiche	Ateneo Federato Scienza e Tecnologia "Sapienza" Università di Roma
2006-2007	Projecto de Investigação Cientifica	FCT Portugal
2003-2005	COFIN 2005	Italian University Ministry
2003-2005	Azioni Integrate Italia-Spagna	Italian University Ministry
2001-2007	Ricerche di Facoltà	Facoltà di Scienze MM.FF.NN. "Sapienza" Università di Roma
2001-2003	FP5-HUMAN POTENTIAL-Research Training Network	European Union
2001-2013	Iniziativa Specifica OG51	INFN
1997-2000	FP4-Training and Mobility of Researchers	European Union

### Part VII - Research Activity

(with references to the Selected Publications of the Last Ten Years in Part IX)

My research field is gravitational theory, which is an extremely diversified subject. During the years, I have been challenging this variety, studying **gravity** under many different points of view. During my Ph.D. studies in Turin (under the supervision of Pietro Frè), my main interest has been **Supergravity**, which I have seen as a way to approach String Theory/M theory starting from General Relativity (GR). Indeed Supergravity (a low energy limit of String Theory/M theory) is the supersymmetric extension of GR, and incorporates all of its deeper successes, problems and issues. After an extensive study of four-dimensional maximal gauged supergravities, in which we pioneered the use of an "embedding tensor" to describe these theories, I focused on the **AdS/CFT correspondence**, a conjecture according to which it is possible to describe the quantum non-perturbative regime of conformal quantum theories in terms of a classical supergravity theory in a higher dimensional space-time. The main result of my Ph.D. studies has been the systematic analysis of a specific case of this correspondence, from the derivation of the supergravity theory to the construction of the dual conformal theory.

After the Ph.D., I was postdoc fellow at ULB (Bruxelles), working in the group of Marc Hennaux. In these years I have been studying **gravitational theory as a spin-two field theory**. Using gauge theory techniques like Batalin-Vilkovisky formalism we found that GR is the only consistent and non-trivial interaction of massless spin-two fields. <u>This work</u> had a significant impact on the field, receiving ~200 citations (ISI-WoS).

Subsequently, I moved to "Sapienza" Università di Roma, first as a postdoc fellow, then as a Research Scientist and finally as an Associate Professor. In these years, I worked within the Rome group of theory and phenomenology of gravity and with other collaborators worldwide (in particular, I am an external collaborator of the <u>GRIT-CENTRA</u> group in Lisbon), and I focused on gravitational wave sources.

- Using a perturbative approach, we studied the **coalescence of neutron star binary systems**, one of the most promising sources for ground-based gravitational wave detectors. We studied how the tidal deformation of the stars in the last stages of the inspiral affects the gravitational wave emission, and how this effects can be a probe of the neutron star equation of state (3,9).
- We gave a major contribution to the development of **gravitational wave asteroseismology**, a powerful tool to study the behaviour of matter at supranuclear density, through the detection (by gravitational wave experiments) of the proper oscillation modes of a neutron star. We considered different kinds of compact stars: neutron stars, quark matter stars, newly born proto-neutron stars (e.g., 5,10,14).
- We studied possible **extensions and deviations of GR** which include scalar fields and/or vector fields in the gravitational sector, and their observational signatures. We recently wrote (I am among of the main contributors) an extensive review of GR tests from astrophysical observations (7), which is one of the "Highly-Cited Papers" receiving over 500 citations on ISI-WoS. In particular, we studied:
  - the phenomenological consequences of scalar-tensor theories, in which gravity is coupled to scalar fields, possibly through bilinear terms in the curvature tensor (1,2,4,8,11,13); in these context, we used different approaches, from post-Newtonian expansions, to perturbation theory, to fully non-linear numerical relativity simulations;
  - the so-called "string axiverse" scenario, characterised by the presence of extremely light massive scalar (or vector) particles (12);
  - the possibility of modification of the black hole structure due to quantum gravity corrections, which may be observable by next-generation gravitational wave detectors.
- I kept working on **gravity in higher dimensions** (15). In this context I have studied the so-called "brane-world" scenario, in which our four-dimensional space-time is embedded in a higher-

dimensional space; this model predicted the formation of mini-black holes in LCH, and has been tested (and mostly disproved) by LHC in recent years; our works, in which we applied the techniques of numerical relativity to model the black hole generation, have been used in the event generators for the LHC data analysis. More recently, we studied perturbations of the Kerr brane in higher dimensions and the tidal deformations of higher-dimensional black holes.

Gravitational waves are a powerful probe of the strong-field regime of gravity; their direct observation, started in 2015, provides new opportunities to study fundamental interactions: from gravity itself (testing general relativity against possible modifications), to nuclear physics (e.g. the elusive equation of state of neutron stars), to new fundamental fields and dark matter candidates which necessarily couple with the gravitational interaction. In my research activity I try to address fundamental physics issues and problems using strong gravity and gravitational wave physics. This necessarily involves several, different fields - from general relativity to gravitational wave phenomenology and data analysis, from astrophysics to cosmology, from nuclear physics to high-energy physics - , employing different approaches (perturbation theory, post-Newtonian expansions, Numerical Relativity). Most importantly, this research activity requires both theoretical and phenomenological work.

I presently have active collaborations with - but not limited to - world-leading experts as: Vitor Cardoso (Lisbon, Portugal), leader of the GRIT-CENTRA group of IST-Lisbon, Portugal; Luciano Rezzolla (Frankfurt, Germany), leader of the Numerical Relativity group of Frankfurt, Germany; Emanuele Berti (Johns Hopkins Univ., U.S.), Nicolas Yunes ((Illinois Univ. at Urbana-Champaign, U.S.), experts in black hole perturbation theory; Frans Pretorius (Princeton, U.S.), Ulrich Sperhake (Cambridge, U.K.) and Helvi Witek (Illinois Univ. at Urbana-Champaign, U.S.), experts in numerical relativity; José A. Pons and Juan A. Miralles (Alicante, Spain), experts in neutron star physics; Carlos Herdeiro (Lisbon, Portugal) and Akihiro Ishibashi (Osaka, Japan), experts in black holes and high-energy physics; Omar Benhar (Rome), Fiorella Burgio and Hans-Josef Schultze (Catania), Mikhail Gusakov and Elena Kantor (S. Petersburg, Russia), experts in physics of nuclear matter.

I am the Principal Investigator of a project funded by the European Union (280.6 k€) involving a network of Universities and Research Institutions (the Universities of Roma "Sapienza", Lisbon, Rikkyo (Japan), John Hopkins (US), together with Caltech in U.S., the Perimeter Institute in Canada, SISSA in Italy and the CNRS in France), with the aim of developing theoretical models of gravitational wave sources and data-analysis algorithms.

I have also been invited to  $\sim$ 30 national and international conferences, to present the results of my research activity and to give review talks.

### Part VIII - Summary of Scientific Achievements

Articles on ISI Journals	105
Total Hirsch number (Scopus/SPIRES/Google Scholar)	42/45/49
Total number of citations (Scopus/SPIRES/Google Scholar)	5180/6529/7167
Articles on ISI Journals in 2011-2021 [ASN]	56
Number of citations (Scopus) in 2006-2021 [ASN]	4944
Hirsch number (Scopus) in 2006-2021 [ASN]	37

Only 8 of my publications are co-authored with my Ph.D. supervisor (Pietro Frè), and 44 of them are co-authored with my Master Thesis supervisor (Valeria Ferrari). Most of my publications appeared in Phys. Rev. D (IF 4.380); eight of them appeared in Phys. Rev. Lett. (IF 8.385), one in Liv. Rev. Rel. (IF 23.333).

#### Part IX - Selected Publications of the Last Ten Years in Refereed Journals

- 1. A. Maselli, N. Franchini, L. Gualtieri, T.P. Sotiriou,

  Detecting scalar fields with extreme mass-ratio inspirals, Phys. Rev. Lett. 125, 141101 (2020)
- 2. H. Witek, L. Gualtieri, P. Pani, T.P. Sotiriou,

  Black holes and binary mergers in scalar Gauss-Bonnet gravity: scalar field dynamics, <u>Phys.</u>

  Rev. D99, 064035 (2019)
- 3. T. Abdelsalhin, L. Gualtieri, P. Pani, Post-Newtonian Spin-Tidal couplings for compact binaries, <u>Phys. Rev. D98, 104046 (2018)</u>
- 4. H.O. Silva, J. Sakstein, L. Gualtieri, T.P. Sotiriou, E. Berti, Spontaneous scalarization of black holes and compact stars from a Gauss-Bonnet coupling, Phys. Rev. Lett. 120 131104 (2018)
- 5. G. Camelio, A. Lovato, L. Gualtieri, O. Benhar, J.A. Pons, V. Ferrari, Evolution of a proto-neutron star with a nuclear many-body equation of state: neutrino luminosity and gravitational wave frequencies, Phys. Rev. D96, 043015 (2017)
- 6. V. Cardoso, L. Gualtieri, Testing the black hole 'no-hair' hypothesis, Class. Quant. Grav. 33, 174001 (2016)
- 7. E. Berti, E. Barausse, V. Cardoso, <u>L. Gualtieri</u>, et al., Testing general relativity with present and future astrophysical observations, <u>Class. Quant. Grav. 32</u>, 243001 (2015)
- 8. A. Maselli, <u>L. Gualtieri</u>, P. Pani, L. Stella, V. Ferrari, Testing gravity with quasi-periodic oscillations from accreting black holes: the case of the Einstein-Dilaton-Gauss-Bonnet theory, <u>Astrophys. J. 801</u>, 115 (2015)

- 9. P. Pani <u>L. Gualtieri</u>, A. Maselli, V. Ferrari, *Tidal deformations of a spinning compact object*, *Phys. Rev. D92*, 024010 (2015)
- 10. <u>L. Gualtieri</u>, E.M. Kantor, M.E. Gusakov, A.I. Chugunov, Quasinormal modes of superfluid neutron stars, <u>Phys. Rev. D90</u>, 024010 (2014)
- 11. E. Berti, V. Cardoso, <u>L. Gualtieri</u>, M. Horbatsch, U. Sperhake, Numerical simulations of single and binary black holes in scalar-tensor theories: circumventing the no-hair theorem, <u>Phys. Rev. D87</u>, 124020 (2013)
- 12. P. Pani, V. Cardoso, <u>L. Gualtieri</u>, E. Berti, A. Ishibashi, Black hole bombs and photon mass bounds, <u>Phys. Rev. Lett. 109</u>, <u>131102</u> (2012)
- 13. E. Berti, <u>L. Gualtieri</u>, M. Horbatsch, J. Alsing, *Light scalar field constraints from gravitational-wave observations of compact binaries*, *Phys. Rev. D85*, 122005 (2012)
- 14. G.F. Burgio, V. Ferrari, <u>L. Gualtieri</u>, H.-J. Schultze, Oscillations of hot, young neutron stars: Gravitational wave frequencies and damping times, Phys. Rev. D84, 044017 (2011)
- 15. H. Witek, M.Zilhão, <u>L. Gualtieri</u>, V.Cardoso, C.Herdeiro, A.Nerozzi, U.Sperhake, Numerical relativity for D-dimensional space-times: head-on collisions of black holes and gravitational wave extraction, <u>Phys. Rev. D82</u>, 104014 (2010)
- 16 R. Ciolfi, V. Ferrari, L. Gualtieri, Structure and deformations of strongly magnetized neutron stars with twisted torus configurations, <u>Mon. Not. Roy. Astron. Soc. 406, 2540 (2010)</u>

The complete list of my publications can be found in my Google Scholar profile webpage, <a href="http://scholar.google.it/citations?hl=en&user=-wWP-tUAAAAJ">http://scholar.google.it/citations?hl=en&user=-wWP-tUAAAAJ</a>

- Coordination and organization activities at Teaching & Research Institutions
- 2014- National coordinator of the INFN Specific Initiative "TEONGRAV", which includes the
- 2020 Italian community studying the theory and phenomenology of gravitational waves
- From Member of the organizing committee of the yearly Ph.D. School "Astroparticle Physics,
- 2017 Cosmology and Gravitation" for the Galileo Galilei Institute (GGI) of Florence
- 2016- Convener of the working group "Gravitational Waves" for the "What Next"
- 2017 initiative of INFN
- 2014- Topic Leader for "Gravitational Wave Emission from Individual Stars"
- 2016 in the NewCompStar COST Research Newtorking Programme

### • Coordination/participation to research groups

- 2021- Coordinator of the H2020-MSCA-RISE Network "Gravitational Universe: Challenges
- 2025 and Opportunities" (GRU)
- From Coordinator of the "Gravity theory and phenomenology" group at Dipartimento di Fisica,
- 2019 "Sapienza" Università di Roma
- 2016- Coordinator of the "Roma Sapienza" node of the H2020-MSCA-RISE Network
- 2019 "StronGrHEP"
- 2014- Topic Leader for "Gravitational Wave Emission from Individual Stars"
- 2016 in the NewCompStar COST Research Newtorking Programme
- 2012- Coordinator of the "Roma Sapienza" node of the FP7-PEOPLE-IRSES Network
- 2015 "NRHEP"
- From Member of the "GRIT Gravitation in Técnico" group at CENTRA Istituto Superior
- 2008 Tecnico University of Lisbon
- 2001- Member of the "Gravity theory and phenomenology" group at Dipartimento di Fisica,
- 2019 "Sapienza" Università di Roma

### Scientific Adviser

Referee for the following International Journals: Physical Review Letters, Physical Review D, Journal of High Energy Physics, The Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Classical and Quantum Gravity, General Relativity and Gravitation, Physica Scripta. External referee for the Ph.D. thesis of Helvi Witek at IST, Lisbon (Portugal), 2012; Antonio Figura, Wei Jibao at University of Catania 2021.

#### Committees and boards

2018	Member of the "Research and 3 <sup>rd</sup> Mission" committee of the Physics Department at "Sapienza" Università di Roma
From 2017	Member of the organizing committee of the "Ph.D. School of Astroparticle Physics, Cosmology and Gravitation" at the Galileo Galilei Institute, INFN, Firenze
2015	Convener of the working group "Gravitational Waves" for the "What Next" initiative of INFN
2015	Member of the defence committee for the Astrophysics Ph.D. at "Sapienza" Università di Roma
2012	Member of the committee to select the candidates for the Physics Ph.D. at "Sapienza" Università di Roma
From 2009	Member of the Physics Ph.D. Board at "Sapienza" Università di Roma
From 2006	Member of several committes to assign research and teaching fellowships at the Physics Department of "Sapienza" Università di Roma
2000-2001	Member of the Board of the Italian Ph.D. Students and Postdocs Association

# • Member of the Organising Committees of the following International Conferences in the last ten years

2021	23th SIGRAV Conference	Urbino	7/9-9/9
2020	SIGRAV International School 2020	Vietri sul Mare	3/2-7/2
2019	22th International Conference of General Relativity and Gravitation (GR22)	Valencia, Spain	7/7-12/7
2019	Theoretical Aspects of Astroparticle Physics, Cosmology and Gravitation	Firenze	11/3-22/3
2019	1st European Physical Society Conference on Gravitation	Roma	19/2-21/2
2017	"Strong Gravity Universe"	São Miguel, Portugal	3/7-7/7
2017	"New Frontiers of Gravitational-Wave Astrophysics"	Roma	19/6-22/6
2015	"4th NRHEP Network Meeting"	Roma	7/7 - 10/7
2013	VESF School "Gravitational waves, neutrinos	Monte Porzio,	15/4 - 18/4
	and multi-wavelength observations"	Roma	

• Invited speaker at the following International Conferences and PhD Schools in the last ten years:

2021	SIGRAV School 2021: Gravity of compact astrophysical objects and gravitational waves	Vietri sul Mare, Salerno	1/2-5/2
2019	PHAROS 2019: The multimessenger physics and astrophysics of neutron stars	Platja D'Aro (Spain)	22/4-26/4
2019	GWEOS 2019: Constraining the EOS of matter at extreme densities with GW observations	Pisa	25/2-26/2
2019	Athens 2019: Gravitational Waves and Fundamental Physics	Athens (Greece)	21/1-24/1
2018	23th SIGRAV Conference on General Relativity and Gravitational Waves	S. Margherita di Pula (Cagliari)	9/9-15/9
2018	Gravity @ Malta 2018	La Valletta (Malta)	22/1-25/1
2016	22th SIGRAV Conference on General Relativity and Gravitational Waves	Cefalù, Palermo	12/9-18/9
2016	What Next 2016	Roma	16/2-17/2
2015	Annual NewCompStar Conference 2015	Budapest (Hungary)	15/6-19/6
2013	VESF School "Gravitational waves, neutrinos and multi-wavelength observations"	Monte Porzio, Roma	15/4 - 18/4
2015	One Hundred Years of Strong Gravity	Lisbon (Portugal)	12/6-15/6
2014	NewCompstar WG3 Meeting	Lyon (France)	17/11-19/11
2014	21th SIGRAV Conference on General Relativity and Gravitational Waves	Alessandria	15/9-19/9
2014	Gravitational Physics in the Next 20 Years	Napoli	2/4
2012	Compstar 2012: the Physics and Astrophysics of Compact Stars	Tahiti (French Polynesia)	2/6-8/6

Roma, 2/7/2021 Leonardo Gualtieri

Jenh Golten