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Decreto Rettore Università di Roma “La Sapienza” n 2182/2019 del 27/08/2019.

MARCO DRAGO Curriculum Vitae

L’Aquila 20/09/2019

Part I – Education

Type	Year	Institution	Notes (Degree, Experience,...)
University Graduation	2004	Università degli Studi di Padova	Bachelor degree
University Graduation	2006	Università degli studi di Padova	Master Science Degree
PhD	2010	Università degli studi di Padova	

Part II – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
2010	2012	Università degli Studi di Trento	Post-doc
2012	2014	Università degli Studi di Trento	Post-doc
2014	2016	Albert Einstein Institut Hannover	Post-doc
2016	2017	Albert Einstein Institut Hannover	Mitarbeiter
2017	today	Gran Sasso Science Institute	Post-doc

Part III – Teaching experience

Year	Institution	Lecture/Course
2014	Università degli Studi di Trento	Laboratorio Fisica 1 (Assistant)
2015	Gran Sasso Science Institute / EGO	Lessons at 2nd Graviton School
2017	Scuola Superiore Liceo De Sanctis (Trani)	Physics Lessons
2018	Laboratorio ragazzi Plusdotati (Padova)	Physics Lessons
2019	Gran Sasso Science Institute	Gravitational Wave Data Analysis

Part IV - Society memberships, Awards and Honors

Year	Title
2016	Padovani Eccellenti 2016
2016	Alumni of the Year Padova
2016	SIGRAV Prize
2016	Niccolò Copernico for Physics
2010	Honoralbe mention for GWIC Thesis Prize
2016	Breakthrough special prize for Physics (All LIGO-Virgo collaborations)

Part V – Abilitazione Nazionale

Inizio	Fine	Settore Concorsuale	Fascia
16/05/2019	16/05/2025	O2/C1	II
11/04/2018	11/04/2024	O2/A1	II

Part VI – Research Activities

Keywords

Gravitational Wave
Data analysis
Low latency analysis
Noise characterization
GW detection
Signal extraction from noise
GW parameter estimation
Identification of specific GW signals

Brief Description

My scientific formation focuses on the data analysis for Gravitational Wave (GW) search, in the extraction of signal from noise. My work is principally focused on the search of signal with limited duration and unknown waveform (burst search) using **coherent Waveburst** (cWB [10]), the main pipeline of the Advanced LIGO-Virgo collaborations for this search type. This includes the following aspects:

- **Signal detection:** cWB is an un-modeled algorithm applying a maximum likelihood approach on time-frequency excesses powers that has been used in many LIGO-Virgo official searches [2,7,8,9,11,13, 14, 19]
- **Sky localization:** The algorithm scans the all sky extracting the probability over all the possible directions [16,17]
- **Waveform reconstruction:** From the time-frequency estimation, in order to identify the original process [1,5]
- **Neural network:** pattern recognition in the time-frequency domain for identification of dedicated sources [4, 6]
- **Detector characterization:** Characterization of noise features that can mimic gravitational wave signatures and implementation of possibility to subtract from data [12,18]
- **Multi-messenger:** Since 2014, I am responsible on the low-latency analysis using cWB [10], the first algorithm that alerted the collaboration of the arrival of GW150914, the first gravitational wave [9]. I also had the honor to be on shift duty and therefore perform the first validation tests. I still have a reference role in the cWB low-latency analysis. [3,15, 16]

Part VII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	179	Scopus	2007	2019

Total Impact factor	903,22
Total Citations	20945
Average Citations per Product	123.84
Hirsch (H) index	58

Part VIII– Selected Publications

	Title	Authors	Journal	Cit
1	Wider look at the gravitational-wave transients from GWTC-1 using an unmodeled reconstruction method.	F. Salemi, E. Milotti, G. A. Prodi, G. Vedovato, C. Lazzaro, S. Tiwari, S. Vinciguerra, M. Drago, and S. Klimenko	Phys. Rev. D 100(4), 042003, 2019	0
2	All-sky search for short gravitational-wave bursts in the second Advanced LIGO and Advanced Virgo run	B. P. Abbott et al (LIGO-Virgo)	Phys. Rev., D 100(2) 024017, 2019	4
3	Low-Latency Gravitational Wave Alerts for Multi-Messenger Astronomy During the Second	B. P. Abbott et al. (LIGO-Virgo)	Astrophys. J., 875(2): 161,	13

	Advanced LIGO and Virgo Observing Run.		2019	
4	New method to observe gravitational waves emitted by core collapse supernovae.	P. Astone, P. Cerdá-Durán, I. Di Palma, M. Drago, F. Muciaccia, C. Palomba, and F. Ricci	Phys. Rev. D 98(12) 122002, 2018	2
5	Estimation of the gravitational wave polarizations from a nontemplate search	I. Di Palma and M. Drago	Phys. Rev. D 97(2), 023011, 2018	2
6	Enhancing the significance of gravitational wave bursts through signal classification	S. Vinciguerra, M. Drago, G. A. Prodi, S. Klimenko, C. Lazzaro, V. Necula, F. Salemi, V. Tiwari, M. C. Tringali, and G. Vedovato	Class. Quant. Grav., 34(9) 094003, 2017	5
7	All-sky search for short gravitational-wave bursts in the first Advanced LIGO run	B. P. Abbott et al (LIGO-Virgo)	Phys. Rev. D 95(4), 042003, 2017	38
8	Observing gravitational-wave transient GW150914 with minimal assumptions	B. P. Abbott et al (LIGO-Virgo)	Phys. Rev. D 93(12), 122004, 2016	109
9	Observation of Gravitational Waves from a Binary Black Hole Merger	B. P. Abbott et al (LIGO-Virgo)	Phys. Rev. Lett, 116(6), 061102, 2016	4203
10	Method for detection and reconstruction of gravitational wave transients with networks of advanced detectors	S. Klimenko, G. Vedovato, M. Drago, F. Salemi, V. Tiwari, G. A. Prodi, C., K. Ackley, S. Tiwari, C. F. Da Silva, G. Mitselmakher	Phys. Rev. D 93(4), 042004, 2016	105
11	Leveraging waveform complexity for confident detection of gravitational waves	J. B. Kanner, T. B. Littenberg, N. Cornish, M. Millhouse, E. Xhakaj, F. Salemi, M. Drago, G. Vedovato, and S. Klimenko	Phys. Rev. D 93(2), 022002, 2016	24
12	Regression of Environmental Noise in LIGO Data	V. Tiwari, M. Drago, V. Frolov, S. Klimenko, G. Mitselmakher, V. Necula, G. Prodi, V. Re, F. Salemi, G. Vedovato, I. Yakushin	Class. Quant. Grav., 32(16), 165014, 2015	14
13	Prospects for intermediate mass black hole binary searches with advanced gravitational-wave detectors	G. Mazzolo, F. Salemi, M. Drago, V. Necula, C. Pankow, G. A. Prodi, V. Re, V. Tiwari, G. Vedovato, I. Yakushin, S. Klimenko	Phys. Rev. D 90(6), 063002, 2014	4
14	All-sky search for gravitational-wave bursts in the second joint LIGO-Virgo run	J. Abadie et al. (LIGO-Virgo)	Phys. Rev. D 85 122007, 2012	103
15	First Low-Latency LIGO+Virgo Search for Binary Inspirals and their Electromagnetic Counterparts.	J. Abadie et al. (LIGO-Virgo)	Astron. Astrophys. 541: A155, 2012.	74
16	Implementation and testing of the first prompt	B. P. Abbott et al	Astron.	106

	search for gravitational wave transients with electromagnetic counterparts	(LIGO-Virgo)	Astrophys. 539: A124, 2012	
17	Localization of gravitational wave sources with networks of advanced detectors	S. Klimenko, G. Vedovato, M. Drago, G. Mazzolo, G. Mitselmakher, C. Pankow, G. Prodi, V. Re, F. Salemi, and I. Yakushin	Phys. Rev.D 83: 102001, 2011	63
18	Tools for noise characterization in Virgo	T. Accadia et al (Virgo)	J.Phys.Conf.Ser. 243:012004,2010	1
19	All-sky search for gravitational-wave bursts in the first joint LIGO-GEO-Virgo run.	J. Abadie et al. (LIGO-Virgo)	Phys. Rev. D 81: 102001, 2010	116
20	A Burst search for gravitational waves from binary black holes	C. Pankow, S. Klimenko, Guenakh Mitselmakher, I. Yakushin, G. Vedovato, M. Drago, R. A. Mercer, and P. Ajith	Class. Quant. Grav., 26: 204004, 2009	12

Part IX – Organization or participation at conferences

LOC	2
Invited Colloquia	10
Presentation at international conferences	11
Presentation at LIGO-Virgo meetings	24
Presentation at Virgo weeks	11

Organization

- **SIF 2019**, Società Italiana di Fisica, L'Aquila, September 2019
- **Core-collapse Supernovae in the Multi-messenger Era**, Satellite Workshop of NIC2018 Conference, L'Aquila, July, 2018

Invited Colloquia

Title	Conference	Place, Year
Osservazione di onde gravitazionali	Forum internazionale del Gran Sasso	Teramo, 2017
An overview of the Gravitational Wave detections	CNOC X	Padova, 2016
LIGO Gravitational wave detections: the transient search	JGRG	Osaka, 2016
LIGO GW detections: the burst point of view	SIGRAV	Cefalù 2016
The first LIGO gravitational wave detections	V Italian-Pakistani Workshop for Relativistic Astrophysics	Lecce 2016
From an Image to a Binary Black Hole: the History	Image as Vortex	Oxford

of the First Detected Gravitational Wave		2016
The LIGO discovery and data analysis	Gravitational Waves: The Discovery and Outlook	Bruxelles 2016
Gravitational wave transient search in preparation for the Advanced Detector Era	SIF	Pisa 2011
Waves of gravitation	FLAP Seminar	Padova 2010
Burst Search using a coherent algorithm with a network of detectors	Gainesville University Seminar	Gainesville 2010

Presentation at international conference

Title	Conference	Place, Year
Search For Gravitational Waves With Short Time Duration In The Advanced LIGO And Advanced Virgo data	Amaldi XXII	Valencia 2019
Entering the multi-messenger Era of Astronomy	IFAE	Napoli 2019
A New Method to Observe Gravitational Waves emitted by Core Collapse Supernovae	SIF	Cosenza 2018
Un-modeled search for stellar mass binary black hole mergers in LIGO-VIRGO interferometers	GRASS	Padova 2018
Prospects for Advanced gravitational wave detector network	GW170817 It. contr. dawn of multi-messenger astronomy	L'Aquila 2017
Low latency gravitational wave searches for prompt multimessenger followups	SIF	Trento 2017
Low latency gravitational wave searches for prompt multimessenger followups	EPS	Venice 2017
Gravitational wave detectors with invariant topologies	Marcell Grossman	Roma 2014
Sky localization and amplitude reconstruction of transient gravitational waves in future gravitational wave detectors networks	Marcell Grossman	Stockholm 2012
Preliminary results of noise canceling on searches for continuous gravitational waves	GWPAW	Hannover 2012
Reconstruction of Gravitational Wave Burst with Ligo-Virgo network	Amaldi 8	New York 2009

Part X – Third mission

Public lectures at organized events	11
Specific public lectures	8
Middle and high school lectures	25

Scientific consultant for the outreach book (in italian):

Il mondo secondo la fisica quantistica, Fabio Fracas, edited by Sperling & Kupfer, 2017, ISBN: 9788820062477

Public lectures at organized events

- IFuture, nuovi orizzonti della scienza e della tecnica, II edizione, Osimo, 2019
- ExpoScuola, Padova, 2018
- Pint of Science, L'Aquila, 2018
- La settimana del Bambino, Sant'Antonio Abate (NA), 2018
- Particelle, Fisicità, Trento (Video), 2017
- Festival della Scienza, Genova, 2016
- Dialoghi di Trani, 2016
- Wired Next Fest, Firenze, 2016
- Wired Next Fest, Milano, 2016
- TEDx Padova, 2016
- Rotary Club Padova, 2016

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