

ALLEGATO 7

Procedura di valutazione comparativa per il conferimento, ai sensi dell'art. 23, comma 2, della Legge n. 240/2010, per il primo semestre dell'Anno Accademico 2024/2025, dell'incarico di insegnamento a titolo oneroso di "Fluidodinamica per l'Astrofisica", Settore Scientifico-disciplinare FIS/05 da erogare nel Corso di Laurea in Fisica (L-30), indetta dalla Facoltà di Scienze MFN, con decreto n. 41/2024 pubblicata in data 28/10/2024 sul sito web di Ateneo, codice bando 24/2024

Roberto Angelo CAPUZZO DOLCETTA

Curriculum Vitae privo di dati sensibili

Part I – General Information

Full Name	Roberto Angelo CAPUZZO DOLCETTA
Date of Birth	
Place of Birth	
Citizenship	
Permanent Address	
Mobile Phone Number	
E-mail	
Spoken Languages	Italian, English, French

Part II – Education

Type	Year	Institution	Notes (Degree, Experience,...)
University graduation	1977	Università di Roma La Sapienza	
Post-graduate studies	1977-1980	CNR fellowship	
PhD	--		Still not existent at that time
Fellowship	1979	Fulbright Hays fellowship winner	
Pre-laurea training	1976-1977	CNR pre-laurea fellowship	
Licensure 01			
Licensure 02			

Part III – Appointments

IIIA – Academic Appointments

Start	End	Institution	Position
1/8/1980	31/10/2000	Istituto di Astronomia (Sapienza)	Ricercatore a tempo indeterminato
1/11/2000	today	Dip. di Fisica (Sapienza)	Professore associato confermato
1/4/1980	31/7/1980	SISSA (Trieste)	Contributo di ricerca

IIIB – Other Appointments

Start	End	Institution	Position
1/11/2007	15/6/2012	Dip. di Fisica (Sapienza)	Coordinator of the PhD in Astronomia
16/6/2012	27/1/2014	Dip. di Fisica (Sapienza)	Coordinator of the PhD in Astronomy, Astrophysics and Space Science in English in official agreement with university of Tor Vergata and INAF
28/1/2014	17/11/2017	Dip. di Fisica (Sapienza)	Vice coordinator of the PhD in Astronomy, Astrophysics and Space Science in English in official agreement with university of Tor Vergata and INAF
22/12/1997	31/12/2013	Consiglio Universitario Nazionale (CUN)	Member (area 02, Fisica) of the Consiglio Universitario Nazionale (CUN) and president of the area since 1998 to 2006
1/1/2007	31/12/2013	Consiglio Universitario Nazionale (CUN)	Member of the Presidential Committee of the CUN
1/1/2010	31/12/2012	Commissione Nazionale del Ministero degli Affari Esteri per la Promozione della cultura italiana all'estero	Member of the Commissione Nazionale of the Ministero degli Affari Esteri for the promotion of the Italian Culture in foreign countries
1/7/2006	31/7/2006	Dep. of Physics, Boston University (USA)	Visiting prof. and teacher of a short PhD course.
1/3/1995	15/9/1995	Dep. of Phys. and Astr., univ. of Washington (Seattle, USA)	Visiting prof. and teacher of A323

1/11/2012	30/10/2019	Dep. of Mathematics (Sapienza)	Member of the scientific council of 2nd level Master in Calcolo Scientifico
20/12/2017	today	Comitato Nazionale Angelo Secchi, istituito dal Ministero per i Beni e le Attività Culturali ed il Turismo	Member and promotor of the Committee
1/4/2011	31/3/2015	PRACE (Partnership for Advanced Computing in Europe)	Chief panelist of the panel Universe Sciences panel in PRACE
1/1/2005	31/12/2010	CINECA-INAF	Member of the Comitato di gestione of the INAF-CINECA 2005-2010 agreement

Part IV – Teaching experience

Year	Institution	Lecture/Course
1994	Dep. of Mathematics (Sapienza)	Titolare del Corso di Geodesia
1996-1999	Dep. of Mathematics (Sapienza)	Titolare del Corso di Fisica della Gravitazione
2001	Dep. of Physics (Sapienza)	Titolare del corso di Dinamica Stellare
2000	Dep. of Physics (Sapienza)	Titolare del Corso di Metodi Matematici dell'Astronomia
	Dep. of Physics (Sapienza)	Titolare del Corso di Metodi Numerici dell'Astronomia
	Dep. of Physics (Sapienza)	Titolare del Corso di Meccanica Superiore
	Dep. of Physics (Sapienza)	Titolare del Corso di Astrofisica Teorica
	Dep. of Physics (Sapienza)	Official teacher of the course Theoretical Astrophysics (in English)
	Dep. of Physics (Sapienza)	Titolare del Corso di Fluidodinamica per l'Astrofisica
	Dep. of Physics and Astronomy, Univ. of Washington (Seattle, USA)	Official teacher of the course A323 Extragalactic Astronomy and Cosmology, 1195 spring term
2006	Dep. of Physics and Astronomy, Boston University (Boston, USA)	Teacher of a PhD course in the 2006 summer term

Part V - Society memberships, Awards and Honors

Year	Title
Since 1990	Membro dell'International Astronomical Union and of Divisions A, B, H
1998 - today	Pesident of the association La gravità for promoting science popularization

S i n c e 2019	Membro del comitato editoriale di GW Notes (Gravitational Waves Notes: Notes & News for GW science)
2020	Guest Editor per la edizione speciale del giornale open access Universe (ISSN 2218-1997), dal titolo 'Stellar Clusters throughout Cosmic Space and Time
2021	Co-editor dello special issue "Binary Evolution in galactic Nuclei" dell'open access Journal Universe
2 0 1 7 - today	Partecipazione ufficiale al consorzio nell'ambito del progetto CTA-Cherenkov Telescope Array
2 0 1 7 - today	Responsabile scientifico presso Dip. di Fisica di Sapienza (Univ. di Roma) della convenzione con ENEA, Dipartimento Fusione e tecnologie per la sicurezza nucleare (FSN) del progetto "Processi di trasporto in sistemi di plasma" di cui il responsabile dell' accordo da parte ENEA è Giovanni Montani.
2 0 1 7 - today	Partecipazione ufficiale al gruppo di ricerca GAPS-Global Architecture of Planetary Systems
2 0 1 9 - today	Partecipazione ufficiale al gruppo di ricerca/organizzativo della missione euclid (ESA-Agenzia Spaziale Europea)
2 0 1 2 - today	Membro della Gaia-ESO Public Spectroscopic Survey
2 0 1 7 - today	Partecipazione ufficiale al gruppo di ricerca GAPS-Global Architecture of Planetary Systems
2018	Membro del board scientifico del progetto PLUS di fisica dei plasmi

Part VI - Funding Information [grants as PI-principal investigator or I-investigator]

Year	Title	Program	Grant value
1998-2000	Investigator in STRUTTURA ED EVOLUZIONE DELLE GALASSIE	PRIN 1998	300 ML (lire)
2001-2003	Local PI "Interazione tra il sistema degli ammassi globulari e la galassia" in the project L'ORIGINE E SUCCESSIVA EVOLUZIONE DELLE POPOLAZIONI STELLARI NELLO SFEROIDE GALATTICO, whose PI was R. Gratton (INAF, Padova)	PRIN 2001	euro 46.481
2003-2005	Local PI "L'evoluzione della antica popolazione degli ammassi globulari." in the project whose PI was R. Gratton (INAF, Padova)	PRIN 2003	Euro 35200
2006	PI of the project "Evoluzione di sistemi stellari e galassie"	Facoltà-Sapienza	Euro 4000
2007	PI of "Evoluzione di sistemi stellari e galassie"	Ateneo Federato-Sapienza	Euro 4000

2007	PI of the project to finance the International School Frontiers in numerical gravitational astrophysics (Erice, 2008)	Congressi e convegni-Sapienza	Euro 4000
2008	PI of the project "Fisica dei sistemi stellari"	Ateneo Federato-Sapienza	Euro 6000
2009	PI of the project "Dinamica classica e relativistica di sistemi stellari"	Ateneo Federato-Sapienza	Euro 9000
2011	PI of the project "Astrofisica dei nuclei galattici: aspetti teorici e osservativi Astrophysics of galactic nuclei: theoretical and observational aspects"	Progetti Universitari-Sapienza	Euro 12000
2012	PI of the project "Astrophysics of the central galactic regions Astrofisica delle regioni centrali galattiche"	Progetti Universitari-Sapienza	Euro 4000
2010-2011	I in the 3-year project EVOLUZIONE CHIMICA E DINAMICA DELLA NOSTRA GALASSIA E DELLE GALASSIE DEL GRUPPO	PRIN 2010-2011	Euro 800000
	LOCALE whose PI was F. Matteucci (Un. di Trieste)		
2013	PI of the project "Compact Massive Objects in Galactic Centers"	Progetti Universitari-Sapienza	Euro 2000
2015	PI of the subproject 3) "Sviluppo di simulazioni numeriche di traiettorie di sonde a quote stratosferiche" within the project FATA-FAcility di test e sviluppo di Tecnologie Avanzate per ambiente spaziale (PI P. de Bernardis, Sapienza, Univ. di Roma).	FILAS-Regione Lazio	Euro 249.990
2015	PI of the project "Buchi neri supermassicci e ammassi nucleari in galassie (Super Massive Black Holes and Nuclear Star Clusters in Galaxies)"	Progetti Universitari-Sapienza	Euro 4000
2016	PI of the project "Dinamica gravitazionale su ampio intervallo di scale spazio-temporali. Gravitational dynamics over a wide range of space-time scales"	Progetti Universitari-Sapienza	Euro 5000

2017	PI of the project "Dynamics of exoplanetary systems. Dinamica di sistemi planetari extrasolari"	Progetti Universitari-Sapienza	Euro 3400
2018	Co-PI of the research project hhd28 "Dynamical Evolution of Dense Star Clusters with and without central black holes"	Gauss Center for Supercomputing) Juelich (Germania).	1 Million core hours on the Juwels system
2018	PI of the project "The Physics and Astrophysics of Galactic Nuclei- Fisica e Astrofisica dei Nuclei Galattici"	Progetti Universitari-Sapienza	Euro 4000
2019	Co-PI of the prolongation of the research project hhd28 "Dynamical Evolution of Dense Star Clusters with and without central black holes"	Gauss Center for Supercomputing) Juelich (Germania)	0.75 Million core hours on the Juwels system
2020	Co-PI of the prolongation of the research project hhd28 "Dynamical Evolution of Dense Star Clusters with and without central black holes"	Gauss Center for Supercomputing) Juelich (Germania)	1 Million core hours on the Juwels system
1998-2010	PI of science popularization projects	MIUR	40.000 euros

Part VII – Research Activities

Keywords

Brief Description

1. Theoretical Astrophysics	The scientific contribution of the applicant to the points indicated in the keyword fields is shown in his publications. Here I limit to say that, since its begin, the scientific activity of the applicant concerned theoretical physics aspects of astronomy and astrophysics with a specific orientation toward numerical applications to the classical N-body problem in physics and astrophysics. He has obtained internationally recognized results in the applications of supercomputing and he has been one of the first to introduce the use of hybrid computing platforms (GPU+CPU systems) in astrophysics and physics. His deep knowledge of classical mechanics and potential theory is also certified by his book “Classical Newtonian Gravity” published by Springer Nature (2019). At present he is writing the book “Physics of fluids” to be published by Springer Nature. Among specific scientific results the discovery of one mechanism of formation of very dense stellar systems (galactic nuclei) as well as that of super massive black formation.
2. Gravitation: classic and relativistic	
3. Numerical methods	
4. Super computing	

Part VIII – Summary of Scientific Achievements

Product type	Number	Data Base	Start	End
Papers [international]	249 (124 in IF publications ; 115 refereed)	ads.harvard.edu (most reliable and updated even for years before 1990).	1980	2024
Papers [national]				
Books [scientific]	2	ads.harvard.edu	2019	2024
Books [popular]	1	Published in 4 languages by Mondadori pub.	1999	2000

Total Impact factor	393.36
Total Citations	3876
Average Citations per Product	15.6 (total); 22.0 (refereed)

Hirsch (H) index	31
Normalized H index*	0.70

*H index divided by the academic seniority = time span from graduation (or first publication, in years).

Part IX– Selected Publications

Battinelli, P., Capuzzo-Dolcetta, R., 1991, *Formation and evolutionary properties of the galactic open cluster system*, Monthly Notices of the Royal Astronomical Society, Vol. 249, 76, IF = 3.383, cit. 84

Capuzzo Dolcetta, R., 1993, *The Evolution of the Globular Cluster System in a Triaxial Galaxy: Can a Galactic Nucleus Form by Globular Cluster Capture?* The Astrophysical Journal v.415, p.616, IF = 2.948, cit. 134. It had press release and various media releases.

Capuzzo Dolcetta, R, Di Matteo, P., Miocchi, P., 2005, *Formation and evolution of clumpy tidal tails around globular clusters*, The Astronomical Journal, Volume 129, Issue 4, pp. 1906-1921, IF = 5.377, cit. 55

Capuzzo Dolcetta, R., Miocchi, P., 2008, *Self-consistent simulations of nuclear cluster formation through globular cluster orbital decay and merging*, Monthly Notices of the Royal Astronomical Society: Letters, v. 388, Issue 1, pp. L69-L73, IF = 5.185, cit. 74

Capuzzo Dolcetta, R., Miocchi, P., 2008, *Merging of Globular Clusters in Inner Galactic Regions. II. Nuclear Star Cluster Formation*, The Astrophysical Journal, Volume 681, Issue 2, pp. 1136-1147, IF = 6.331, cit. 66

Antonini, F., Capuzzo-Dolcetta, R., Merritt, D., 2009, *A counterpart to the radial-orbit instability in triaxial stellar systems*, Monthly Notices of the Royal Astronomical Society, Volume 399, Issue 2, pp. 671-682, IF = 5.103, cit. 12

Antonini, F., Capuzzo Dolcetta, R., Mastrobuono Battisti, A., Merritt, D., 2012, *Dissipationless Formation and Evolution of the Milky Way Nuclear Star Cluster*, The Astrophysical Journal, v. 750, Issue 2, article id. 111, 14 pp., IF = 6.733, cit. 152. It had press and media releases.

Gilmore, G, Randich, S.& the GAIA-ESO coll. Including Capuzzo Dolcetta R., 2012, *The Gaia-ESO Public Spectroscopic Survey*, The Messenger, vol. 147, p. 25-31, IF n.a., cit. 821

Capuzzo-Dolcetta, R, Spera, M., Punzo, D., 2013, *A fully parallel, high precision, N-body code running on hybrid computing platforms*, Journal of Computational Physics, v. 236, p. 580-593, IF = 2.485, cit. 59

Arca Sedda, M., Capuzzo Dolcetta, R., 2014, *Dynamical friction in cuspy galaxies*, The Astrophysical Journal, Volume 785, Issue 1, article id. 51, 17 pp., IF = 5.993, cit. 49

Tailo, M., D'Antona, F., Vesperini, E. di Criscienzo, M., Ventura, P., Milone, A.P., Bellini, A., Dotter, A., Decressin, T., D'Ercole, A., Caloi, V., Capuzzo-Dolcetta, R., 2015, *Rapidly rotating second-generation progenitors for the 'blue hook' stars of ω Centauri*, Nature, v. 523, Issue 7560,

pp. 318-321, IF = 38.138, cit. 44. It had press release

Fragione, G., Capuzzo-Dolcetta, R., 2016, *High-velocity stars from the interaction of a globular cluster and a massive black hole binary*, Monthly Notices of the Royal Astronomical Society, Volume 458, Issue 3, p.2596-2603, IF = 4.961, cit. 32

Parisi, V., Capuzzo-Dolcetta, R., 2019, *A new method to integrate newtonian N-body dynamics*, Journal of Physics A: Mathematical and Theoretical, Volume 52, Issue 45, id.454001, IF = 2.132, cit. n.a.

Pinto, L. D., Capuzzo-Dolcetta, R., Magni, G., 2019, *Self-gravitating disks in binary systems: an SPH approach. I. Implementation of the code and reliability tests*, Astronomy & Astrophysics, Volume 628, id.A82, 21 pp., IF = 5.636, cit. 1

Sylos Labini, F., Capuzzo-Dolcetta, R., 2020, *Properties of self-gravitating quasi-stationary states*, Astronomy & Astrophysics, Volume 643, id.A118, 12 pp., IF = 5.803, cit. 2. It had press and media releases.

Chassonnery, P., Capuzzo-Dolcetta, R., 2021, *Dynamics of a superdense cluster of black holes and the formation of the Galactic supermassive black hole*, Monthly Notices of the Royal Astronomical Society, v. 504, Issue 3, pp.3909-3921, IF = 5.287, cit. 2. It had press and media releases.

Note curriculari aggiuntive

The candidate has been teaching the course of Fluidodinamica per l'astrofisica since its first year of activation.

Personal site of the candidate <https://sites.google.com/a/uniroma1.it/robertocapuzzodolcetta-eng/>

The scientific activity of the candidate has been developed in small groups, thing that naturally implies a production with a much more limited number of citations with respect to large groups. This is not considered by usual quantitative parameters (like citations number or Hirsch factor) which are not normalized by individual scientific "property".

Much of his scientific activity concerns themes proper to FIS/05 (02/C1) and FIS/02 (02/A2) for which he obtained ASN habilitation to full professor.

Roberto Capuzzo Dolcetta followed as supervisor about 15 PhD students, 85% of whom has pursued a scientific career in prestigious international organizations. RCD has been also scientific director of several post docs.

RCD presented talks at more than 100 international Meetings and Conferences (35 upon invitation), 95 of which have been published (see MIUR official site).

RCD has been for 10 years collaborator of RAI 3 TV channel in the Geo&Geo program as text writer and participated in TV to more than 20 presences.

RCD, in the frame of MIUR financing ex lege 113 del 28/3/1991 for Diffusione della cultura

scientifica, held more than 100 talk and seminars in high schools and cultural associations, as president of the cultural association la Gravità, <http://lagravita.altervista.org/>

Co-chairman of the International Workshop “Physical Processes in fragmentation and star formation” (Monteporzio Catone, 5-11 1989) as well as co-editor of the Proceedings, Kluwer (NL), ASSL Ser., vol. 162, 1990.

Chairman of the Meeting “Scientific and parallel computing”, Univ. di Roma La Sapienza, 16-17 gennaio 1997

Chairman of the Meeting “Simulation of astrophysical self-gravitating systems: theory and high performance computing”, Univ. di Roma La Sapienza, 10-11 gennaio 2000

Chairman of the international Conference “Computational Astrophysics in Italy: methods and tools”, Univ. di Bologna, 4-5 luglio 2002, as well as editor of the Proceedings, Mem. SAIIt, Supp., v. 1, 2003

Co-chairman of the 2nd Course della Intl. School J.A. Wheeler titled “Frontiers in numerical gravitational astrophysics” held at the E. Majorana Center in Erice, 27 June-5 July 2007, as well as editor of the Proceedings published on line

Co-chairman of the international Conference “Advances in computational Astrophysics: methods, tools and outcomes”, Cefalù, 13-17 giugno 2011, as well as co-editor of the Proceedings, ASP Conf. Ser. (USA) v. 453, 2012

Co-chairman dell’ Aspen Summer school “A window on the formation of the Milky Way”, Aspen Center for Physics, 20 maggio – 10 giugno 2021

Member of the Scientific Committee of the international Meeting “The unquiet universe: Celebrating the 10th anniversary of Astronomy Workshops in Cefalù”, Cefalù, 12 – 14 June 2014

Co-chairman of the international Conference “Perspectives of GPU computing in Physics and Astrophysics”, dep. of Physics, Sapienza, 15 – 17 September 2014

Co-chairman and organizer of the 631 Heraeus seminar on “Stellar aggregates over mass and spatial scales”, Physikzentrum in Bad Honnef (DE), 5-9 December 2016

Co-chairman of the international Conference “Perspectives of GPU computing in Science”, dep. of Physics, Sapienza, 26 – 29 September 2016

Roma, 2/11/2024