Bini Donato

Position: Reasercher (permanent position) at
Istituto per le Applicazioni del Calcolo,
"M. Picone," CNR
Via dei Taurini, 19 I-00185 Roma
Period covered: 1995 -today.

I Scientific Work

The main topic of my interest is General Relativity with special attention to several classical aspects, like the analysis and the interpretation of exact solutions of Einstein's field equations.
In particular, I'm interested in spacetime splitting techniques, measurement process and the role of the observer in General Relativity, particle dynamics in certain fixed gravitational backgrounds (either test particles with scalar structure: the mass, or particles with internal structure: spinning test particles and particles with multipolar structure, quadrupolar and beyond), gravitational perturbations, gravitational waves. Currently, the main topics of interest for my research activities involve the PN approximation of General Relativity, gravitational self-force, effective-one-body model, with applications to binary systems.

I'm an expert user of MAPLE™ tensor calculus package.

II Conferences and educational activities

Conferences and Other External Scientific Work

Since 1988 I have participated in all the international meetings of the Marcel Grossmann series as well as all the conferences of the ICRA- ICRANet series.

Diploma thesis supervision

I've been supervisor of the Diploma thesis of several students at the University of Rome "La Sapienza", since 1995:
G. Spoliti, A. Merloni, C. Germani, C. Cherubini, G. Miniutti, G. Cruciani, A. Geralico, A. Lunari, M. De Mattia, D. Gregoris.

Ph.D thesis supervision

Dr. V. Montaquila, Physics departments of the University of Naples "Federico II.," year 2011.
Dr. M. Haney, IRAP Ph.D, University of Rome "Sapienza," year 2013.
Gabriel G. Carvalho (CAPES, Brazil and ICRANet)

Teaching experiences

I'm Contract Professor of Physics since 2004 at the faculty of Medicine of the University Campus Biomedico, in Rome. From 2007-2009 I have also been Contract Professor of Physics at the Nursery School of the same university.

Work With Postdocs
A Geralico (University of Rome "La Sapienza" and ICRANet)

III Service activities
Scientific collaboration with:
Prof. R. Ruffini (University of Rome, Italy and ICRANet);
Prof. R.T. Jantzen (Villanova Univesity, USA and ICRANet);

Outside ICRANet
Scientific collaboration with:
Prof. T. Damour (IHES, Paris, France).
Prof. F. de Felice (University of Padova, Italy);
Dr. A. Ortolan (INFN Legnaro, Padova, Italy);

Other
I'm currently doing referee activity for a large number of international journals in the field of General Relativity and I'm a reviewer for Mathreview.
For the years 2002-2004 I have been the leader of a collaboration project between the Italian Research Council (CNR) and the analogous institution in Venezuela. Title of the project: *Construction of 3d numerical models for the study of magnetohydrodynamics in gravitational physics and astrophysics*.
For the years 2007-2008 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Light coordinates and spacetime topography*.
For the years 2008-2009 I have been the leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

2017 List of publications

1) Bini D., Geralico A., Jantzen R.T.,
Gyroscope precession along general timelike geodesics in a Kerr black hole spacetime
Phys. Rev. D 95, 124022 (2017)
DOI: 10.1103/PhysRevD.95.124022
e-print arXiv:1703.09525 [gr-qc].

2) Bini D., Geralico A., Ortolan A.,
Deviation and precession effects in the field of a weak gravitational wave
Phys. Rev. D 95, 104044 (2017)
DOI: 10.1103/PhysRevD.95.104044

3) Bini D., Chicone C., Mashhoon B.,
Relativistic Tidal Acceleration of Astrophysical Jets
Phys. Rev. D 95, 104029 (2017)
DOI: 10.1103/PhysRevD.95.104029

4) Bini D., Geralico A.

Hyperbolic-like elastic scattering of spinning particles by a Schwarzschild black hole
Gen. Rel. Gravit. 49, 84 (2017)
DOI:10.1007/s10714-017-2247-2

5) Kavanagh C., Bini D., Damour T., Hopper S., Ottewill A.C., Wardell B.,
Spin-orbit precession along eccentric orbits for extreme mass ratio black hole binaries and its effective-one-body transcription
Phys. Rev. D 96, 064012 (2017)
DOI:10.1103/PhysRevD.96.064012
e-print arXiv:1706.00459 [gr-qc].

6) Bini D., Damour T.,
Gravitational scattering of two black holes at the fourth post-Newtonian approximation
Phys. Rev. D, 96, 064021 (2017)
DOI:10.1103/PhysRevD.96.064021
e-print arXiv:1706.06877v1 [gr-qc]

7) Bini D., Geralico A., Jantzen R.T.,
Position determination and strong field parallax effects for photon emitters in the Schwarzschild spacetime
Gen. Rel. Grav. 49, no. 12, 151 (2017)
[arXiv:1707.00955 [gr-qc]].

8) Bini D., Geralico A., Vines J.,
Hyperbolic scattering of spinning particles by a
Kerr black hole
Phys. Rev. D 96, no. 8, 084044 (2017)
doi:10.1103/PhysRevD.96.084044
[arXiv:1707.09814 [gr-qc]].

9) Bini D., Chicone C., Mashhoon B.,
Anisotropic gravitational collapse and cosmic Jets
Phys. Rev. D 96, no. 8, 084034 (2017)
doi:10.1103/PhysRevD.96.084034
[arXiv:1708.01040 [gr-qc]].

10) Bini D., Damour T.,
Gravitational spin-orbit coupling in binary systems, post-Minkowskian approximation and effective one-body theory
Phys. Rev. D, 96, 104038 (2017)
doi:10.1103/PhysRevD.96.104038
e-print arXiv: 1709.00590 [gr-qc]