

Bini Donato

Position: Reasercher Istituto per le Applicazioni del Calcolo, CNR

Period covered: 1995 -today.



I Scientific Work

The main topic of my interest is General Relativity with special attention to 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 quadrupolar structure), gravitational perturbations, gravitational waves.

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 many 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.

Other Teaching Duties

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

Work With Postdocs

I'm continuously working with A Geralico, post-doc student at the University of Rome "La Sapienza."

III Service activities

Scientific collaboration with:

Prof. R. Ruffini (University of Rome, Italy and ICRANet);

Prof. R.T. Jantzen (Villanova University, USA and ICRANet);

Prof. B. Mashhoon (University of Missouri-Columbia and ICRANet);

Prof. S. Filippi (University Campus Biomedico, Rome, Italy and ICRANet).

Dr. C. Cherubini (University Campus Biomedico, Rome, Italy and ICRANet).

Outside ICRANet

Scientific collaboration with:

Prof. F. de Felice (University of Padova, Italy);

Prof. G. Ferrarese (University of Rome, Italy);

Prof. L. Lusanna (INFN Florence, Italy);

Prof. A. Tartaglia (Politecnico of Turin, Italy)

IV 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'm 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'm leader of young researchers projects of INDAM (Istituto Nazionale di Alta Matematica). Title of the project: *Sistemi di Posizionamento Globale relativistici*

V 2007-2008 List of Publications

Bini D., Geralico A., Ruffini R. J.

Charged massive particle at rest in the field of a Reissner-Nordstrom black hole,
Phys. Rev. D, 75, 044012, 2007.

Bini D., Geralico A., Ruffini R. J.

On the equilibrium of a charged massive particle in the field of a Reissner-Nordstrom black hole,
Physics Letters A, vol. 360, 515-517, 2007.

Bini D., de Felice F., Geralico A.

Strains and axial outflows in the field of a rotating black hole,
Phys. Rev. D, 76, 047502, 2007.

Bini D., Cherubini, C., Geralico A., Jantzen R.T.

Circular motion in accelerating black hole spacetimes,
International Journal of Modern Physics D, vol. 16, 2007.

G. Ferrarese, Bini D.

Introduction to relativistic continuum mechanics,
Lecture Notes in Physics 727, Ed. Springer, 2007.

Bini D., Cherubini, C., Jantzen R.T.

The speciality index and the Lifshitz-Khalatnikov Kasner index parametrization,
Class. and Quantum Gravit., vol. 24, 5627-5636, 2007.

Bini D., Fortini, F., Geralico, A., Ortolan, A.

Quadrupole effects on the motion of extended bodies in Schwarzschild spacetime
Class. and Quantum Gravity, vol. 25, 035005 (9pp), 2008.

Bini D., Cherubini, C., Geralico A., Jantzen R.T.

Physical frames along circular orbits in stationary axisymmetric spacetimes,
Gen. Rel. and Gravit., vol. 40, 985-1012, 2008.

Bini D., Lusanna L.

- Spin-rotation couplings: spinning test particles and Dirac field*,
Gen. Rel. and Gravit., vol. 40, 1145-1177, 2008.
- Bini D., Geralico A., Ruffini R.
Charged massive particle at rest in the field of a Reissner-Nordstrom black hole II. Analysis of the electric field lines,
Phys. Rev. D, vol. 77, 064020, 2008.
- Bini D., Fortini, F., Geralico, A., Ortolan, A.
Quadrupole effects on the motion of extended bodies in Kerr spacetime,
Class. and Quantum Gravity, vol. 25, 125007, 2008.
- Bini D., Succi S.
Analogy between capillary motion and Friedmann-Robertson-Walker cosmology,
Europhysics Letters, vol. 82, 34003, 2008.
- Bini D., Geralico, A., Ruggiero, M. L., Tartaglia A.,
Emission vs Fermi coordinates: applications to relativistic positioning systems,
Classical and Quantum Gravity, vol. 25, 205011, 2008.
- Bini D., Cherubini, C., Geralico A.,
Massless field perturbations of the spinning C metric
JMP, vol. 49, 062502, 2008.
- Bini D., Fortini, F., Geralico, A., Ortolan, A.,
Dixon's extended bodies and impulsive gravitational waves,
Physics Letters A, vol. 372, 6221-6225, 2008.
- Bini D., Cherubini C., Filippi S.,
On the effective geometries in classical selfgravitating systems
Phys. Rev. D, vol. 78, 064024, 2008.
- Bini D., Geralico A., Ruffini R.,
On the linearization of the Belinski-Alekseev exact solution for two charged masses in equilibrium,
IJMPA, vol. 23, 1226 - 1230, 2008.
- Bini D., Cherubini, C., Chicone, C., Mashhoon, B.
Gravitational induction
Classical and Quantum Gravity, vol 25, 2008 (to appear).
- Bini D., .Cherubini, C., Geralico, A., Ortolan, A.
Dixon's extended bodies and weak gravitational waves
GRG, 2008 (to appear).
- Bini D., Capozziello S., Esposito G.

Gravitational waves about curved backgrounds: a consistency analysis in De Sitter spacetime,
International Journal of Geometric Methods in Modern Physics, 2008 (to appear).

Bini D., **Geralico A.**, Ruggiero, M. L., Tartaglia A.,
Emission vs Fermi coordinates: applications to relativistic positioning systems,
Classical and Quantum Gravity, vol. 25, 205011, 2008.

Bini D., Cherubini C., **Geralico A.**,
Massless field perturbations of the spinning C metric,
Journal of Mathematical Physics, vol. 49, 062502, 2008.

Bini D., Fortini P., **Geralico A.**, Ortolan A.,
Dixon's extended bodies and impulsive gravitational waves,
Physics Letters A, vol. 372, 6221, 2008.