

Dr. Rubens E. G. Machado

Curriculum Vitae

Personal Information

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date of birth: 11 February 1982

nationality: Brazilian

Current Position

2011 - present **Post-doctoral Researcher**, *Project: Numerical Simulations of Galaxy Cluster Mergers*, Department of Astronomy, University of São Paulo, Brazil.
supervisor: Prof. Dr. Gastão Lima Neto

Education

2006 - 2010 **PhD in Astronomy**, *Dynamics of Barred Galaxies in Triaxial Dark Matter Haloes*, Department of Astronomy, University of São Paulo (Brazil) & Laboratoire d'Astrophysique de Marseille, Université de Provence (France).
advisors: Prof. Dr. Ronaldo E. de Souza & Dr. Lia Athanassoula

2004 - 2006 **MSc in Astronomy**, *Triaxial Haloes and the Axis Ratios of Spiral Galaxies*, Department of Astronomy, University of São Paulo, Brazil.
advisor: Prof. Dr. Ronaldo E. de Souza

2000 - 2003 **BSc in Physics**, Institute of Physics, University of São Paulo, Brazil.

Research activities and visits

2013 **Research stay**, 1 month, Institut Henri Poincaré, Paris, collaborator: Dr. Thanos Manos.

2011 **Research stay**, 1 month, Laboratoire d'Astrophysique de Marseille, Université de Provence, France, supervision: Dr. Lia Athanassoula.

2007 - 2009 **PhD under co-supervision**, alternate periods of a few months in the Laboratoire d'Astrophysique de Marseille, Université de Provence, France, supervision: Dr. Lia Athanassoula.

2006 **Research stay**, 6 months, Max Planck Institut für Astrophysik, Garching, Germany, supervision: Dr. Volker Springel.

2005 **Research stay**, 1 month, Johns Hopkins University, Baltimore, USA, supervision: Dr. Tamás Budavari & Dr. Alexander Szalay.

Publications

Peer-reviewed Journals

1. Manos, T. & **Machado, R. E. G.**, 2014, *Chaos and dynamical trends in barred galaxies: bridging the gap between N-body simulations and time-dependent analytical models*, MNRAS, 438, 2201.
2. Krone-Martins, A., Ducourant, C., Teixeira, R., Galluccio, L., Gavras, P., dos Anjos, S., de Souza, R. E., **Machado, R. E. G.**, Le Campion, J.-F., 2013, *Pushing the limits of the Gaia space mission by analyzing galaxy morphology*, Astronomy and Astrophysics, A&A, 556, 102. (4 citations)
3. **Machado, R. E. G.** & Lima Neto, G. B., 2013, *Simulations of the merging galaxy cluster Abell 3376*, MNRAS, 430, 3249. (3 citations)
4. Athanassoula, E., **Machado, R. E. G.** & Rodionov, S., 2013, *Bar formation and evolution in disc galaxies with gas and a triaxial halo: morphology, bar strength and halo properties*, MNRAS, 429, 1949. (27 citations)
5. **Machado, R. E. G.** & Athanassoula, E. 2010, *Loss of halo triaxiality due to bar formation*, MNRAS, 406, 2386. (18 citations)

Conference Proceedings

6. Lima Neto, G. B. , Laganá, T. F. , Andrade-Santos, F . & **Machado, R. E. G.** *Structure in Galaxy Clusters* in “1st José Plínio Batista School of Cosmology: Structure Formation in an Expanding Universe”, 14-19 October 2012, Ubu, Brazil. J. Fabris, O. Piattella, D. Rodrigues, W. Zimdahl, eds, p 277.
7. **Machado, R. E. G.** & Lima Neto, G. B., 2012, *Simulations of galaxy cluster mergers: the dynamics of Abell 3376*, “Second Workshop on Numerical and Observational Astrophysics: From the First Structures to the Universe Today”, M. E. De Rossi, S. E. Pedrosa and L. J. Pellizza, eds, AAA Workshop Series. (refereed proceeding; 1 citation)
8. **Machado, R. E. G.**, Athanassoula, E. & Rodionov, S., 2011, *Simulations of Barred Galaxies in Triaxial Dark Matter Haloes: The Effects of Gas.*, “Advances in Computational Astrophysics: methods, tools and outcomes, Cefalù” v. 453. p. 363.

Conference Talks and Seminars

1. *The spiral structure in galaxy cluster Abell 2052: hydrodynamical simulations of gas sloshing* in “38th Meeting of the Brazilian Astronomical Society”, 01 September 2014, Búzios, Brazil.
2. *Collisions of galaxy clusters: simulating shocks and gas sloshing* in “12th Workshop of New Space Physics”, 25 February 2014, Campos do Jordão, Brazil.
3. *Cosmological Simulations* in “Astronomy at Noon”, 07 November 2013, Dept. Astronomy, USP.
4. *Cosmological Simulations* in “3rd SIFSC, São Carlos Institute of Physics” (**invited speaker**), 02 October 2013, São Carlos, Brazil.

5. *Cosmological N-body simulations* at Cosmology Group, Department of Physics, UFES, 27 September 2013, Vitória, Brazil.
6. *Numerical simulations of barred galaxies*, seminar at “Center for Applied Mathematics and Theoretical Physics”, 08 July 2013, University of Maribor, Slovenia.
7. *Collisions of galaxy clusters: simulating shocks and gas sloshing*, in “Seminars of the Dept. Astronomy”, 05 June 2013, USP.
8. *Simulating galaxies in the computer: practical aspects of research in extragalactic astronomy*, in “1st Workshop of advice to undergraduate students”, 17 May 2013, Dept. Astronomy, USP.
9. *Simulations of the merging galaxy cluster Abell 3376* in “USP Conference: Cosmology, Large Scale Structure and First Objects” (**invited speaker**), 05 February 2013, São Paulo, Brazil.
10. *Numerical simulations: galactic dynamics and galaxy clusters* in “Evolution, Cosmology and Gravitation: A Workshop in Honor of Professor Pacheco”, 22 November 2012, Dept. Astronomy, USP.
11. *Temperature maps of X-ray emitting gas in simulated galaxy cluster mergers: the bullet-shaped morphology of Abell 3376* in “37th Meeting of the Brazilian Astronomical Society”, 15 October 2012, Águas de Lindóia, Brazil.
12. *The Copernican Revolution* in “Astronomy at Noon”, 23 August 2012, Dept. Astronomy, USP.
13. *Offset between dark matter and X-ray emitting gas in galaxy cluster mergers: simulating Abell 3376* in “11th Workshop of New Space Physics”, 12 July 2012, Passa Quatro, Brazil.
14. *Numerical Simulations of Galaxy Cluster Mergers* in “Cosmology Workshops: Galaxy Clusters”, 09 April 2012, Institute of Physics, USP.
15. *Computer simulations: galaxies, dark matter and cosmology* in “Astronomy at Noon”, 17 May 2012, Dept. Astronomy, USP.
16. *Initial conditions for N-body/SPH simulations* in “1st Workshop of Advanced Scientific Computing (NAT-Unicsul)”, 02 June 2011, São Paulo, Brazil.
17. *Dark Matter Awareness Week*, 01 December 2010, Dept. Astronomy, USP.
18. *Dynamics of barred galaxies in non-spherical halos* in “Après-midi doctorants”, 20 October 2008, Laboratoire d’Astrophysique de Marseille, France.
19. *How to make a non-spherical halo* in “International School on Galactic and Cosmological N-Body Simulations”, 04 August 2006, Puebla, Mexico.
20. *Spiral Galaxies and Triaxial Haloes* in “Group of Student Seminars”, 11 November 2003, Institute of Physics, USP.

Conference Abstracts and Posters

1. **Machado, R. E. G.** & Lima Neto, G. B., *The merging galaxy cluster Abell 3376: numerical simulations* in “Tracing Cosmic Evolution with Clusters of Galaxies”, 01-05 July 2013, Sesto, Italy.
2. **Machado, R. E. G.**, Tissera, P., Lima Neto, G. B. & Sodr e, L., *The Gaseous Haloes in LCDM* in “The Physical Link between Galaxies and their Haloes”, 24-28 June 2013, Garching bei M nchen, Germany.

3. **Machado, R. E. G.** & Lima Neto, G. B., *Simulations of galaxy cluster mergers: the dynamics of Abell 3376* in “Second Workshop on Numerical and Observational Astrophysics: From the First Structures to the Universe Today”, 14-18 November 2011, Buenos Aires, Argentina.
4. **Machado, R. E. G.**, Athanassoula, E. & Rodionov, S., *Simulations of barred galaxies in triaxial dark matter haloes: the effects of gas* in “Advances in Computational Astrophysics: methods, tools and outcomes”, 13-17 June 2011, Cefalù, Italy.
5. **Machado, R. E. G.**, Athanassoula, E. & Rodionov, S., *Barred Galaxies and the Circularisation of Dark Matter Haloes* in “3rd Workshop Challenges of New Physics in Space”, 12-17 December 2010, Campos do Jordão, Brazil.
6. **Machado, R. E. G.** & Athanassoula, E., *Formation of bars in non-axisymmetric galaxies*, in “Journées de l’Ecole Doctorale”, 26 May 2008, Université de Provence, Marseille, France.
7. **Machado, R. E. G.** & de Souza, R. E., *Recent bursts of star formation and the morphological dependence of SDSS spiral galaxies color-color diagrams* in “33rd Meeting of the Brazilian Astronomical Society”, 02-06 September 2007, Passa Quatro, Brazil.
8. **Machado, R. E. G.** & de Souza, R. E., *Measurements of the axis ratio of SDSS spiral galaxies and the triaxiality of dark matter haloes* in “31st Meeting of the Brazilian Astronomical Society”, 01-04 August 2005, Águas de Lindóia, Brazil.
9. **Machado, R. E. G.** & de Souza, R. E., *Triaxiality of SDSS spiral galaxies* in “30th Meeting of the Brazilian Astronomical Society”, 08-12 August 2004, São Pedro, Brazil.
10. **Machado, R. E. G.** & de Souza, R. E., *Triaxiality of SDSS spiral galaxies* in “12th USP International Undergraduate Research Symposium”, 2004, São Paulo, Brazil.
11. **Machado, R. E. G.** & de Souza, R. E., *Triaxiality of SDSS spiral galaxies* in “9th IAG Undergraduate Research Symposium”, 2004, Dept. Astronomy, USP.
12. **Machado, R. E. G.** & de Souza, R. E., *Axial ratio of spiral galaxies and triaxial haloes* in “8th IAG Undergraduate Research Symposium”, 2003, Dept. Astronomy, USP.
13. **Machado, R. E. G.** & de Souza, R. E., *Axial ratio of spiral galaxies and triaxial haloes* in “11th USP International Undergraduate Research Symposium”, 2003, São Carlos, Brazil.
14. Guimarães-Filho, Z. O., Maciel, A., Orselli, M. I. V. & **Machado, R. E. G.**, *Vibrating strings on the guitar* in “National Symposium on Physics Education”, 2001, Natal, Brazil.

Other Courses and Schools

1. “2nd Workshop of Advanced Scientific Computing (NAT-Unicsul)”, 03-06 June 2014, São Paulo, Brazil.
2. “6th Seminar on the History and Philosophy of Science”, 06-08 May 2014, Dept. of Philosophy, USP.
3. “16th IAG/USP Advanced School on Astrophysics: Radioastronomy, Galaxies and clusters at high-z”, 04-09 November, 2012, Itatiba, Brazil.

4. “NAT Lectures on Astrophysics - Collapsing or colliding systems: solving the galactic puzzle”, 06-10 February 2012, São Paulo, Brazil.
5. “Open Science Grid school”, 06-10 December 2010, UNESP Center for Scientific Computing, São Paulo, Brazil.
6. “NVIDIA Compute Unified Device Architecture (CUDA)“, 16-19 November 2010, Dept. of Atmospheric Sciences, USP.
7. “13th IAG/USP Advanced School on Astrophysics: Formation of Structure in the Universe”, 06-12 April, 2006, Foz do Iguaçu, Brazil.
8. “INPE Advanced Course I - A Roadmap to Cosmology” 12-16 September 2005, São José dos Campos, Brazil.

Research Interests

- Extragalactic Astrophysics
- Galactic Dynamics
- Spiral Galaxies, Barred Galaxies
- Galaxy Clusters
- Numerical Simulations

Fellowships

- 2011 - 2014 **Post-doctoral fellowship**, São Paulo Research Foundation (FAPESP).
 2008 **PhD foreign exchange**, Brazilian Coordination for Higher Education (CAPES).
 2006 - 2010 **PhD scholarship**, São Paulo Research Foundation (FAPESP).
 2004 - 2006 **Master’s degree scholarship**, São Paulo Research Foundation (FAPESP).
 2002 - 2003 **Undergraduate research scholarship**, Brazilian Research Council (CNPq).

Awards

- 2013 **Research in Paris**, Institut Henri Poincaré.
 2009 **Eiffel Excellence Scholarship**, French Ministry of Foreign Affairs.
 2004 **Best astronomy poster**, *9th IAG Undergraduate Research Symposium*, Department of Astronomy, USP.

Teaching Experience

- 2012, 2013 **Lecturer**, *Sky, Solar System and Exoplanets*, UNIVESP & USP.
 2012, 2013 **Lecturer**, *Stars, Galaxies and Cosmology*, UNIVESP & USP.
 2011 **Teaching assistant**, *Classical Mechanics*, Dept. of Astronomy, USP.
 2005 **Teaching assistant**, *Extragalactic Astrophysics*, Dept. of Astronomy, USP.
 2004, 2005 **Teaching assistant**, *Fundamental Astronomy*, Dept. of Astronomy, USP.
 2001 **Teaching assistant**, *Calculus for Architecture*, Institute of Mathematics, USP.

Public Outreach and Media

- 2014 **TV interview**, *Carl Sagan*, TV Cultura, 23 February 2014.
- 2014 **TV interview**, *Comets*, TV Cultura, 26 January 2014.
- 2013 **TV interview**, *Cosmology*, TV Cultura, 15 September 2013.
- 2013 **TV interview**, *Exploration of Mars*, TV Cultura, 25 August 2013.
- 2012 **TV interview**, *Astronomer explains the leap year*, Globo News, 29 Feb 2012.
- 2012 **Newspaper comment**, in “Brazil and Spain join forces to explore dark matter” by Herton Escobar, O Estado de São Paulo, 16 September 2012.
- 2012 **Newspaper article**, about the situation of Brazilian popular science books, in the Russian scientific publication ‘Troitsky Variant’ No. 16 page 14, 14 August 2012.

Community Service

- present **Reviewer**, *Monthly Notices of the Royal Astronomical Society*.
- 2013 - 2014 **Co-organizer**, “Astronomy at Noon” seminar series, Dept. of Astronomy, USP.
- 2013 **Co-organizer**, *Weekly research seminars*, Dept. of Astronomy, USP.
- 2012 - 2014 **Co-organizer**, *University Outreach Course: Introduction to Astronomy and Astrophysics*, (field trips to observatories), Dept. of Astronomy, USP.
- 2013 **Evaluation of students**, oral presentations for the “Yvonne Mascarenhas Award” at the 3rd SIFSC, São Carlos.
- 2012 **Evaluation of undergraduate students**, abstracts for the 12th USP International Undergraduate Research Symposium.
- 2012 **Evaluation of undergraduate students**, posters and talks for the 17th IAG Undergraduate Research Symposium, Dept. of Astronomy, USP.
- 2012 **Evaluation of undergraduate students**, grading monographs, Dept. of Astronomy, USP.

Languages

Portuguese	native speaker
English	Cambridge Certificate of Proficiency
French	good
Spanish	good
German	basic level B1