

# Jesús Misráyim Rueda-Becerril

*PhD candidate*

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## Education

- 2011– **PhD in Physics**, *Universitat de València*, Valencia, Spain.  
Supervisors: Prof. Miguel Ángel Aloy Torás and Dr. Petar Mimica  
Thesis: *Radiation Transport in Relativistic Magnetized Fluids — Applications to Relativistic Outflows*
- 2009–2011 **MSc in Physics**, *Instituto de Física y Matemáticas, Universidad Michoacana de San Nicolás de Hidalgo*, Morelia, Michoacan, Mexico.  
Supervisor: Prof. José Antonio González Cervera  
Thesis: *Study of TOV stars with the SPH method*
- 2004–2009 **BSc in Physics**, *Universidad Autónoma del Estado de México*, Toluca, State of Mexico, Mexico.  
Supervisor: Prof. Francisco S. Guzmán Murillo  
Thesis: *Numerical solution of null geodesics for the generation of gravitational lenses in spherically symmetric space-times*

## Computer skills

- Proficient Unix (Linux, macOS), FORTRAN (77, 90, 95, 2003), Python, Shell, Mathematica,  $\text{\LaTeX}$ , gnuplot, grace, OpenMP, GeoGebra, Emacs, HDF5, Makefile, Git
- Intermediate C, C++, R, Julia, Elisp, MPI, SageMath, yEd, OpenOffice, Microsoft Office, iWork, DOT, TikZ/PGF
- Basic HTML, Matlab, Maple, Java, Swift, Perl

## Publications

### Articles

3. J. M. Rueda-Becerril, P. Mimica, and M. A. Aloy. On the influence of a hybrid thermal-non-thermal distribution in the internal shocks model for blazars. *Mon. Not. R. Astron. Soc.*, 468:1169–1182, June 2017.
2. J. M. Rueda-Becerril, P. Mimica, and M. A. Aloy. The influence of the magnetic field on the spectral properties of blazars. *Mon. Not. R. Astron. Soc.*, 438:1856–1869, February 2014.
1. F. S. Guzmán and J. M. Rueda-Becerril. Spherical boson stars as black hole mimickers. *Phys. Rev. D*, 80(8):084023, October 2009.

### Proceedings

3. J. Rueda-Becerril, P. Mimica, and M. A. Aloy. Numerical simulations of the internal shock model in magnetized relativistic jets of blazars. In *Proceedings of Swift: 10 Years of Discovery (SWIFT 10)*, page 159, Rome, Italy, December 2014.
2. J. M. Rueda-Becerril, P. Mimica, M. A. Aloy, and C. Aloy. Numerical study of broadband spectra caused by internal shocks in magnetized relativistic jets of blazars. In *The Innermost Regions of Relativistic Jets and Their Magnetic Fields*, volume 61 of *European Physical Journal Web of Conferences*, page 02007, June 2013.
1. P. Mimica, M. A. Aloy, J. M. Rueda-Becerril, S. Tabik, and C. Aloy. Numerical simulations of dynamics and emission from relativistic astrophysical jets. In *24th IUPAP Conference on Com-*

## Interests

- High energy physics around black holes
  - Theory and observation of high energy radiation in different scenarios where black holes are involved.
    - Radiation transport.
    - Radiation source and source region.
    - Particles acceleration processes.
  - Active galactic nuclei.
    - Blazars.
      - Acceleration processes in the emission region.
      - Location of the emission region.
      - The spectral effects due to different constituents of the material in the emission region.
    - Radio galaxies.
    - Quasars.
  - Tidal disruption events.
  - Microquasars.
  - Gamma-ray bursts.
- Numerical Astrophysics
  - Numerical solutions to the radiation transport equation with astrophysical applications.
  - Numerical treatment of the microphysics involved in the emission of high energy radiation.
  - Numerical hydrodynamics and magnetohydrodynamics
  - Performance, stability, convergence and accuracy of numerical codes.

## Meetings and conferences

### Oral presentations

- 2014 **Rueda-Becerril, J.M.**; Mimica, P.; Aloy, M.A., *Numerical simulations of the internal shock model in magnetized relativistic jets of blazars*, IVICFA's Fridays: Computation in Physics, Paterna, Spain, 17 October.
- 2014 **Rueda-Becerril, J.M.**; Mimica, P.; Aloy, M.A., *Influence of the magnetic field on the spectral properties of blazars in the internal shocks scenario*, Extreme-Astrophysics in an Ever-Changing Universe: Time-Domain Astronomy in the 21st Century, Ierápetra, Greece, 16–20 June.
- 2013 **Rueda-Becerril, J.M.**; Mimica, P.; Aloy, M.A., *Numerical study of broadband spectra caused by internal shocks in magnetized relativistic jets*, XXXIV Biennial meeting of the Royal Spanish Society of Physics, Valencia, Spain, 15–19 July.
- 2009 **Rueda-Becerril, J.M.**, *¿Decía Einstein la verdad?*, weekly colloquium of Physics students *Café Ciencias*, Toluca, Mexico, 11 March.

### Poster presentations

- 2014 **Rueda-Becerril, J.M.**; Mimica, P.; Aloy, M.A., *Numerical simulations of the internal shock model in magnetized relativistic jets of blazars*, Swift: 10 years of Discovery, Rome, Italy, 2–5 December.
- 2013 **Rueda-Becerril, J.M.**; Mimica, P.; Aloy, M.A., *Numerical study of broadband spectra caused by internal shocks in magnetized relativistic jets of blazars*, The Innermost Regions of Relativistic Jets and Their Magnetic Fields, Granada, Spain, 10–14 June.
- 2007 **Rueda-Becerril, J.M.**; Leyte González, R.; García Santibañez, F.; Rosendo-Francisco, P., *Analysis of the superficial structure of graphite samples submitted to an electric arc*, L National Physics Meeting, Boca del Río, Mexico, 29 October–2 November.
- 2006 **Rueda-Becerril, J.M.**; Leyte González, R.; García Molina, N.; Rosendo-Francisco, P., *Modifications on the superficial structure of graphite samples*, XLIX National Physics Meeting, San Luis Potosí, Mexico, 16–19 October.

2005 **Rueda-Becerril, J.M.**; Gómez Díaz, A.; Rosendo-Francisco, P., *Studies of microwave effects of graphite samples*, XLVIII National Physics Meeting, Guadalajara, Mexico, 17–21 October.

#### Attendance only

2016 CoCoNuT Meeting 2016, Burjassot, Spain, 14–16 December

2008 LI National Physics Meeting, Zacatecas, Mexico, 20–24 October

#### Organization

2012 Contribution to the organization of the X Scientific Meeting of the Spanish Astronomical Society, Valencia, Spain, 14–16 December

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### Professional development

7–16 Feb **Data Analysis and Machine Learning with Python**, UV, Burjassot, Spain.

2017 No. of hours: 8

23–16 May **The Universe in the light of PLANCK and BICEP2**, UV, Burjassot, Spain.

2014 No. of credits: 2

23–27 Sep **Dark Matter**, UV, Burjassot, Spain.

2013 No. of credits: 2

23 Apr–8 May **International Cargèse School on Cosmic Accelerators**, *Institut d'Études Scientifiques de Cargèse*, Cargèse, France.

2013

9–12 Apr **Introduction to C++ Programming**, UV, Burjassot, Spain.

2012 No. of credits: 6

27 Mar–4 Apr **Numerical Relativistic Astrophysics**, UV, Burjassot, Spain.

2012 No. of hours: 9

5–9 March **Fortran for Scientific Computing**, *High Performance Computing Center Stuttgart*, Stuttgart, Germany.

2012 No. of hours: 33

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### Awards and Scholarships

2014–2016 **Fellowship** from the Mexican Federal Government to study abroad awarded by the National Council of Science and Technology (CONACyT).

2011–2014 **Fellowship** “Santiago Grisolia” awarded by the Council of Education, Research, Culture and Sport of the Valencian Community.

2009–2011 **Fellowship** for academic training for MSc studies granted by the Mexican Council of Science and Technology (CONACyT).

2009 **Award** “Lic. Juan Josafat Pichardo Cruz”, granted by the UAEMéx, for finishing the BSc thesis and graduating within a year after completing the undergraduate credits.

25 Jun–24 Aug 2007 **Fellowship** for a temporary stay in a national research center under the XVII summer of scientific investigation program awarded by the Mexican Academia of Science.

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### Other activities

2007–2009 Physics students representative at the Governing Council of the Faculty of Sciences of the UAEMéx

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### Languages

Spanish Mother tongue

English Proficient

Catalan Basic

French Basic

German Basic