

José, M., Ramírez Velasquez | CV

Date of birth: November 7th of 1975. Caracas, Venezuela.

+58(212)5041664 +593(099)2814569

josem.ramirez@gmail.com

Current position and address

Head of the Laboratory.

Astrophysicist: Atomic Physics, X-ray spectroscopist.
Laboratory for Computational Physics,
Physics Center, Venezuelan Institute for Scientific Research (IVIC)
Apdo. 21827, Caracas 1020A, Venezuela.

Invited Professor.

Escuela Superior Politécnica del Litoral (ESPOL)
Physics Department
Campus Gustavo Galindo, Km 30.5 Vía Perimetral
Guayaquil, Ecuador

Invited Researcher.

SuperComputer Center (CINVESTAV)
Km 30 Vía la Marquesa
Mexico City, Mexico

Education

Ph.D. in Physics

September 2000 - February 2006

Physics Center, Venezuelan Institute for Scientific Research. Caracas, Venezuela

Thesis: “Spectroscopic survey on the physical structure and dynamics of Active Galactic Nuclei”.

Licentiate in Physics

(5-year undergraduate degree)

January 1995 - January 2000

First place of the class, score: 17/20
Carabobo University. Valencia, Venezuela

Thesis: “Relativistic radiative data for highly ionized ions of Iron (Use of superstructure / r-matrix atomic codes)”.

First place on the ranking of the class, out of four. score: 17/20

Research experience

Venezuelan Institute for Scientific Research (July 2012 to present)
Professor Associate

- Analysis of X-ray high resolution spectra of active galactic nuclei (AGNs).
- Photoionization modeling of AGNs.
- SPH simulation of 3D spherical accretion onto supermassive black holes.

Astrophysikalisches Institut Potsdam (AIP), Potsdam-Germany (2008-2011)
Post-Doctorate in Extragalactic Astrophysics

- Played major role in enhancing 1 of main tools astronomers use for research, XMM-Newton catalogue, improving the modelling of passage of photons through telescope mirrors.
- Uncovered multiple important improvement opportunities, conducting accurate simulations, and recalibrating model to successfully remove up to 40% of spurious detection sources.
- Authored and published major scientific report on entire survey; results lay foundation for creation of new X-ray catalogue.

Max-Planck-Institut für Extraterrestrische Physik (MPE), Garching-Germany (2006-2008)
Post-Doctorate in Astrophysics

- Achieved 1 of Institutes major goals, completing and publishing results of both projects in high-profile scientific journals, The Astrophysical Journal, and Astronomy & Astrophysics.
- Captured accurate reading of signal from galaxies away and its ionisation state, overcoming weakness of signal by applying special spectroscopic techniques and advanced statistical methods.

Contact Point:

- International Year of Light (2015):
<http://www.light2015.org/Home/About/Country/Venezuela.html>

Researcher PEI:

A2

- Programa de Estímulo a la Innovación e Investigación (PEI), October (2016), Caracas, Venezuela (ONCTI).

NEBULATOM:

Professor/Organizer

- A capacity development workshop for Latin American astronomers on emission-line objects in the Universe, Choroni, Venezuela (2013).

Summer School IVIC/UC:

Professor/Organizer

- Altos de Pipe, Venezuela • Summer (2012)

IMPRS SCHOOL FOR ASTRONOMY & COSMIC PHYSICS

Assistant

- Statistical Inferences from Astrophysical Data • University of Heidelberg, Germany – (2009)

CECALCULA / UNIVERSIDAD DE LOS ANDES
Scientific Computational Researcher

- High-Performance Supercomputing Centre • Merida, Venezuela – (2006)

VENEZUELAN INSTITUTE FOR SCIENTIFIC RESEARCH (IVIC)

Intern

- Intern Laboratory of Computational Physics – (1998–1999) • Intern Vocational School of Physics – (1999) • Caracas, Venezuela – (1998–1999)

UNIVERSITY OF CARABOBO

Teachers Assistant

- General Physics I and II (Theory) • Carabobo, Venezuela – (1996–2000)

VENEZUELAN INSTITUTE FOR SCIENTIFIC RESEARCH (IVIC)

Assistant Student

- Laboratory of Computational Physics • Caracas, Venezuela – (1999–2000)

Languages

English: Fluent; Italian: Intermediate level; German: Intermediate level; Spanish: Native language.

Skills:

1. **Computer skills**

SO: Windows • Linux • Unix • MacOS.

Programming: Fortran • C • C++ • Visual Basic • Bash-Tc Shell • S-Lang • R • Mathematica.

X-ray Analysis Codes: XSPEC • XSTAR • ISIS • SHERPA.

Interpreted Programming: • Python • Jupiter notebook environment • SQL databases.

Photoionisation Codes: XSTAR • CLOUDY.

X-ray Data Reduction Software: CIAO • SAS.

SPH Software: GADGET-2, GIZMO.

2. **X-ray telescopes**

High-Energy Transmission Grating Spectrometer (HETGS) on board Chandra

Low-Energy Transmission Grating Spectrometer (LETGS) on board Chandra

Reflection Grating Spectrometer (RGS) on board XMM-Newton

European Photon Imaging Camera (EPIC, PN MOS1 and MOS2) on board XMM-Newton.

Advanced CCD Imaging Spectrometer (ACIS) on board Chandra

Publications

Book Chapters with peer review process:

Ramírez-Velasquez, J.M., Jaime Klapp, Russland Gabbasov, Fidel Cruz and Leonardo Di G. Sigalotti (2016): The impetus project: Using abacus for the high performance computation of radiative tables for accretion onto a galaxy black hole. Communications in Computer and Information Science. CCIS is abstracted/indexed in: DBLP, Google Scholar, EI-Compendex, Mathematical Reviews, SCImago, Scopus. (Accepted, in Press.).

Ramírez-Velasquez, José M., (2016): Astrophysical Fluids of Novae: High resolution Pre-decay X-ray spectrum of V4743 Sagitarii. In: Recent Advances in Fluid Dynamics with Environmental Applications. Editors: Jaime Klapp, Leonardo Di G. Sigalotti, Abraham Medina, Lpez Abel, Gerardo Ruiz-Chavarra Springer International Publishing. p365-390. DOI: 10.1007/978-3-319-27965-7_27

Ramírez-Velasquez, José M., (2016): X-ray outflows of active galactic nuclei warm absorbers: A 900 ks Chandra simulated spectrum. In: Recent Advances in Fluid Dynamics with Environmental Applications. Editors: Jaime Klapp, Leonardo Di G. Sigalotti, Abraham Medina, Lpez Abel, Gerardo Ruiz-Chavarra Springer International Publishing. p391-409. DOI: 10.1007/978-3-319-27965-7_28

Ramírez, J.M., Rojas, S. (2014): Reproducing the X-Ray Soft Step @ 0.9 keV Observed in the Spectrum of Ark 564 Using Reflection Models. In: Computational and Experimental Fluid Mechanics with Applications to Physics, Engineering and the Environment, Environmental Science and Engineering, Springer International Publishing, p529-534. DOI: 10.1007/978-3-319-00191-3_38

Pérez, L.F., **Ramírez, J.M.** (2014): Statistical Methods for the Detection of Flows in Active Galactic Nuclei Using X-Ray Spectral Lines. In: Computational and Experimental Fluid Mechanics with Applications to Physics, Engineering and the Environment, Environmental Science and Engineering, Springer International Publishing, p521-527. DOI: 10.1007/978-3-319-00191-3_37

Publications with peer review process:

Leonardo Di G. Sigalotti, Russland Gabbasov, Fidel Cruz, Jaime Klapp and **Ramírez-Velasquez, J.M.**. (2017): From large-scale to protostellar disk fragmentation into close binary star. Science Advanced (submitted).

Russland Gabbasov, Leonardo Di G. Sigalotti, Fidel Cruz, Jaime Klapp and **Ramírez-Velasquez, J.M.**. (2017): Consistent SPH Simulations of Protostellar collapse. The Astrophysical Journal, Vol 835, p25.

Ramírez-Velasquez, J.M., Jaime Klapp, Russland Gabbasov, Fidel Cruz and Leonardo Di G. Sigalotti (2017): Impetus: Consistent Smoothed particle hydrodynamics Simulations of Black Hole 3D Spherical Accretion. The Astrophysical Journal, (submitted).

Ramírez-Velasquez, J.M., Jaime Klapp, Russland Gabbasov, Fidel Cruz and Leonardo Di G.

Sigalotti (2016): Impetus: “New Cloudys radiative tables for accretion onto a galaxy black hole”. The Astrophysical Journal Supplementary, Vol 226, p13.

Ramírez, J.M. (2013): Chandra LETGS observation of the variable NLS1 galaxy Ark 564. In: Astronomy & Astrophysics, Volume 551, A95, 1-12.

Ramírez, J.M., Tombesi F. (2012): On the X-ray low- and high-velocity outflows in active galactic nuclei. In: Monthly Notices of the Royal Astronomical Society: Letters, Volume 419, Issue 1, L64-L68.

Ramírez, J.M. (2011): Kinematics from spectral lines for AGN outflows based on time-independent radiation-driven wind theory. In: Revista Mexicana de Astronomia y Astrofisica Vol. 47, 385-399.

Read, A.M., Rosen, S.R., Saxton, R.D., **Ramírez J.M.** (2011): A new comprehensive 2D model of the point spread functions of the XMM-Newton EPIC telescopes: spurious source suppression and improved positional accuracy. In: Astronomy & Astrophysics, Volume 534, A34, 1-13.

García, J., **Ramírez, J.M.**, Kallman, T.R., Witthoef, M., Bautista, M.A., Mendoza, C., Palmeri, P., Quinet, P. (2011): Modeling the Oxygen K Absorption in the Interstellar Medium: An XMM-Newton View of Sco X-1. In: The Astrophysical Journal Letters, Volume 731, Issue 1, L15, 1-6.

Ramírez, J.M. (2008): Physical and kinematical properties of the X-ray absorber in the broad absorption line quasar APM 08279+5255. In: Astronomy and Astrophysics, Volume 489, Issue 1, 2008, 57-68.

Ramírez, J.M., Komossa, S., Burwitz, V., Mathur, S. (2008): Chandra LETGS Spectroscopy of the Quasar MR 2251-178 and Its Warm Absorber. In: The Astrophysical Journal Letters, Volume 681, Issue 2, 965-981.

Ramírez, J.M., Bautista, M.A., Kallman T.R. (2005): Line Asymmetry in the Seyfert Galaxy NGC 3783. In: Astronomy and Astrophysics, Volume 627, Issue 1, 2008, 166-176.

Ramírez, J.M., Bautista, M.A. (2002): Resolving resonances in R-matrix calculations. In: Journal of Physics B: Atomic, Molecular, and Optical Physics, Volume 35, Issue 20, 4139-4146.

Ramírez, J.M., Komossa S. (2010): High resolution observation of Ark 564: I. Time-average spectrum. In: International Conference on X-ray Astronomy-2009: Present Status, Multi-Wavelength Approach and Future Perspectives; AIP conference proceedings, Vol. 1248, 499-500.

Ramírez, J.M., Komossa, S., Burwitz, V., Mathur, S. (2008): Chandra LETGS spectroscopy of ionized absorbers: The quasar MR2251-178. In: Symposium on the Nuclear Region, Host Galaxy and Environment of Active Galaxies; Huatulco, Oaxaca; Revista Mexicana de Astronomia y Astrofisica: Serie de Conferencias, Vol .32, 120-122.

Other Publications

Ramírez, J.M. (2013): Reduced co-added LETGS spectrum of Ark 564. In: VizieR Online Data Catalog 355, 19095.

Ramírez, J.M., Bautista, M.A. (2011): Kinematics from spectral lines for AGN outflows based on time-independent radiation-driven wind theory. In: The X-ray Universe 2011, Vol 1. Held at Berlin, Germany 2011, 272.

Ramírez, J.M. (2008): X-ray physical properties of the quasar APM 08279-5255. In: Mem. S.A.It.

Vol. 79, 1197.

Ramírez, J.M. (2012): Reviewing the possible link between X-ray low- and high-velocity outflows in AGNs. In Proceedings of Nuclei of Seyfert galaxies and QSOs - Central engine & conditions of star formation (Seyfert 2012). 6-8 November, 2012. Max-Planck-Institut für Radioastronomie (MPIfR), Bonn, Germany. Online at <http://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=169>, id.72

Short term research stays

1. ASTRONOMY INSTITUTE/UNAM

Invited Professor – Professorships

Jose M Ramirez, Elena Jimenez-Bailon. **Rescaling energy conserving winds for low momentum flux AGNs.** Jan-April **2017**.

2. ININ/CINVESTAV

Invited Professor – Professorships

Jose M Ramirez, Jaime Klapp, and Leonardo Sigalotti, Súper Cálculos intensivos de acreción esférica alrededor de agujeros negros super masivos y colapso estelar, Estancia de Investigación ININ/CINVESTAV, September 1 - 31 Noviembre **2015** , DF Ciudad de Mexico, Mexico.

Jose M Ramirez, Jaime Klapp, and Alejandro Aviles, Súper Cálculos intensivos de la época de re-ionización del Universo y Choques de Clusters de Galaxias, Estancia de Investigación ININ/CINVESTAV, 8-18 Noviembre **2014**, DF Ciudad de Mexico, Mexico.

3. GODDARD SPACE FLIGHT CENTER / **NASA, Maryland**

Intern

USA - 2000 & 2002, 2003, 2004

Internships Laboratory for High-Energy Astrophysics (Spring 2004, Fall 2003, Summer 2002, Summer 2000)

Awards and fellowships

- I was selected for a Post-Doc at MPE, under the prize given to Dr. Günther Hasinger, Leibniz Prize of the German Research Foundation, 2005.
- PhD Excellence Grant from National Research Council (FONACIT), 2001–2005.
- Level A2, Researcher Encouragement Program (PEI), Venezuela, from March 2013 until now.
- Excellence Fellow, given for the Instituto Venezolano de Investigaciones Científicas to PhD students with outstanding academic performance (Grade point average greater than 17 over 20 points). Venezuela, from September 2000 to September 2005.
- High Academic Performance Award (second place). Carabobo University, Valencia, Venezuela. Award given for the high academic performance during the realization of the licentiate studies in physics. 1999.
- High Academic Performance Award (first place). Carabobo University, Valencia, Venezuela. Award given for the high academic performance during the realization of the licentiate studies in physics. 1998.

- High Academic Performance Award (second place). Carabobo University, Valencia, Venezuela. Award given for the high academic performance during the realization of the licentiate studies in physics. 1997.
- High Academic Performance Award (first place). Carabobo University, Valencia, Venezuela. Award given for the high academic performance during the realization of the licentiate studies in physics. 1996.
- Gran Mariscal de Ayacucho Fellow. Venezuela, from January 1995 to December 2000.

Workshops and Conferences

1. **Jose M., Ramirez-Velasquez**, Invited Talks (**2018**): SPH+Photoionization, theoretical and observational Toolbox for accretion of matter onto Black Holes:
Universidad de los Andes (UniAndes) Grupo de Gravitación, Bogota, Colombia (Online).
2. **Jose M., Ramirez-Velasquez**, Invited Talks (**2018**): Astrophysical Fluids - Shading light on the evolution of cosmic object:
Escuela Superior Politécnica del Litoral (ESPOL), Guayaquil, Ecuador.
3. **Jose M., Ramirez-Velasquez**, Invited Talks (**2017**): SPH+Photoionization, theoretical and observational Toolbox for accretion of matter onto Black Holes:
Instituto de Astronomia (UNAM) Sede Ensenada, Mexico.
4. **Jose M., Ramirez-Velasquez**, Invited Talks (**2017**): Astrophysical Fluids - Shading light on the evolution of cosmic object:
Centro de Investigaciones de Nanotecnologias y Nanociencias (UNAM) Sede Ensenada, Mexico.
5. Ramirez-Velasquez, J.M., Jaime Klapp, **Russland Gabbasov**, Fidel Cruz and Leonardo Di G. Sigalotti (**2016**): The impetus project: Using abacus for the high performance computation of radiative tables for accretion onto a galaxy black hole. Latin American High Performance Computing Conference. ABACUS-CINVESTAV Mexico City, Mexico August 29 - September 2, 2016.
6. **Jose M., Ramirez-Velasquez**, Invited Talks (2015): Astrophysical Fluids - Shading light on the evolution of cosmic object:
Universidad Autonoma Metropolitana (UAM) de Azcapotzalco, Mexico.
XXI Congreso de la División de Dinamica de Fluidos de Mexico (Puebla, Mexico),
Instituto Nacional de Astronomia, ptica y Electronica (INAOE, Puebla), Mexico.
7. **Jose M Ramirez**, Explorando al Universo a gran escala Rayos X Vs. Optico, Ciencia Contigo, 5 de Junio 2015, UCV Caracas, Venezuela.
8. **Jose M Ramirez**, Universo a Gran Escala, Ciencia Contigo, 5 de Junio 2014, UCV Caracas, Venezuela.
9. **Jose M Ramirez**, Asistente, First ICTP-IVIC Latin-American Advanced Workshop on Numerical, Instrumentation and Measurement Methods in Fluid Dynamics, 11-22 de Agosto 2014, Altos de Pipe, Venezuela (Otorgado por el International Centre for Theoretical Physics).

10. **Jose M Ramirez**, Curso de 48 horas completado, First ICTP-IVIC Latin-American Advanced Workshop on Numerical, Instrumentation and Measurement Methods in Fluid Dynamics, 11-22 de Agosto 2014, Altos de Pipe, Venezuela (Otorgado por la Sociedad Venezolana de Fluidos).
11. **Jose M Ramirez**, Jaime Klapp, Alejandro Aviles, Súper Cálculos intensivos de la época de re-ionización del Universo y Choques de Clusters de Galaxias, Estancia de Investigación ININ/CINVESTAV, 8-18 Noviembre 2014, DF Ciudad de Mexico, Mexico.
12. **Jose M Ramirez**, Patrick Palmeri, Javier Garcia, Jaime Forero, X-ray Absorption Lines Atlas for Active Galactic Nuclei Warm Absorber Outflows, XX Congreso de la División Mexicana de Dinámica de Fluidos, 18-20 Noviembre 2014, Tuxtla-Guitierrez Chiapas, Mexico.
13. **Jose M Ramirez**, Patrick Palmeri, Javier Garcia, Jaime Forero, X-ray Absorption Lines Atlas for Active Galactic Nuclei Warm Absorber Outflows: The Case of NGC 3783, VIII Congreso Nacional de Física 2014, 1-5 Diciembre 2014, Tucacas, Venezuela.
14. **Leonardo Sulbaran** y Jose M Ramirez, Simulaciones del Universo a Gran Escala: Modelo Lambda-CDM $0 < z < 2$, VIII Congreso Nacional de Física 2014, 1-5 Diciembre 2014, Tucacas, Venezuela.
15. **Jose M Ramirez**, On the low- and high-velocity X-ray outflows in AGN, in the Workshop on: Latinamerican workshop for Astronomers , 1-5 July 2013, Bogota, Colombia.
16. **Jose M Ramirez**, About the low- and high-velocity X-ray outflows in AGN, in the Workshop on: Latinamerican workshop for Astronomers , 15-16 July 2013, Altos de Pipe, Venezuela.
17. **Jose M Ramirez**, About the connection of low- and high- velocity outflow in active galactic nuclei. Bonn, Germany, 2012.
18. **Jose M Ramirez**, Acerca de la posible conexión entre flujos de baja y alta velocidad en núcleos de galaxias activas: Venezuelan Astronomy Meeting, Merida, Venezuela, 2012.
19. **Jose M Ramirez**, Chandra Pre-decay LETGS spectrum of V4743 Sagittarii. High Energy View of Accreting Objects: AGN and X-ray Binaries. Crete, Greece 2010
20. **Jose M Ramirez**, X-ray High-Resolution observation of Ark 564. High-Resolution X-ray Spectroscopy: past, present and future, Utrecht, Holland 2010
21. **Jose M Ramirez**, Chandra LETGS observation of the variable NLS1 galaxy Ark 564. Astronomische Gesellschaft - Annual Fall Meeting and 82nd General Assembly Deciphering the Universe through Spectroscopy. Potsdam Germany 2009
22. **Jose M Ramirez**, In flight Calibration of the 2D XMM-Newton Point-Spread function: Impact on source detection. XXIII SSC Consortium Meeting - Osservatorio Astronomico di Brera, Milano, Italy 2009
23. **Jose M Ramirez**, Chandra LETGS observation of the Seyfert 1 galaxy Ark 564. X-RAY Astronomy 2009 - Present status, multi-wavelength approach and future perspectives. Lucia, Bologna, Italy 2009
24. **Jose M Ramirez**, Physical and Kinematical properties of the X-ray absorber in the Broad Absorption Lines Quasar APM 08279+5255. The Central Kiloparsec Active Galactic Nuclei and their Hosts. Crete, Greece 2008

25. **Jose M Ramirez**, Chandra LETGS spectroscopy of the Quasar MR2251-178 and its warm absorber. The Nuclear Region, Host Galaxy and Environment of Active Galaxies. Huatulco, Mexico 2007
26. **Jose M Ramirez**, Spectroscopic survey of the physical structure and dynamics of ngc 3783. III Scientific Meeting of Astronomy and Astrophysics, to celebrate the 30th Anniversary of CIDA. Merida, Venezuela 2006
27. **Jose M Ramirez**, Computation of recombination rates for li-like ions. III Venezuelan Physics Meeting. Caracas, Venezuela. 2001
28. **Jose M Ramirez**, Resolving resonances in collisional and radiative cross sections. Iron Project Meeting and Alan Burgess Workshop. University of Cambridge, England. 2001
29. **Jose M Ramirez**, Computation of recombination rates for li-like ions. I Scientific Meeting of Astronomy and Astrophysics, to celebrate the 25th Anniversary of CIDA. Merida, Venezuela. 2001
30. **Jose M Ramirez**, Relativistic radiative data for highly ionized ions of iron. II Venezuelan Physics Meeting. Cumana, Venezuela. 2000
31. **Jose M Ramirez**, Design of an electronic analogic computer to solve the Schrödinger equation. 49th Annual Convention of ASOVAC. Maracay, Venezuela. 1999

Professional Development:

- IV Symposium of Spectroscopy of Laser and Optics • IV Meeting of Students of Science.
- VII Latin American Workshop on Plasma Physics • C++ Programming Course (40 hours).
- Physics Principles of Laser Holography (4 hours) • III Meeting of Students of Science.
- Operator of Micro-Computer (100 hours) • National Seminar of Modern Management (16 hours).

Affiliations:

- Member of the International Astronomical Union (IAU).
- Member of the Venezuelan Society of Physics.

Supervision of undergraduate and postgraduate students

- **Paul Calderon**: November 2017. Instituto Venezolano de Investigaciones Cientificas (IVIC). Centro de Física. Magister en Física.

Estudio del origen circunestelar o interestelar del grupo de líneas espectrales Ne IX en las transiciones K_α , K_β , K_γ , Fe XVII, O VI y O VII en las estrellas binarias 4U 1636-53, 4U 1735-44, 4U 1820-30, Cyg X-1, Cyg X-2, GX 9+9, Sco X-1, XTE J1817-330.

- **Vázquez Prieto, Favio André:** November 2014. Universidad del Zulia. Facultad Experimental de Ciencias. Departamento de Física.
Determinación del Parámetro de Densidad Bariónico Ω_b^{WHIM} del Medio Intergaláctico Tibio-Caliente del Sculptor Wall de la Red Cósmica del Universo a partir de un Análisis Espectroscópico de Rayos-X de Alta Resolución (Mención Honorífica).
- **Sulbaran, Leonardo:** November 2015 to present. Universidad del Zulia. Facultad Experimental de Ciencias. Departamento de Física.
Simulaciones del Universo a Gran Escala: Modelo Lambda-CDM $0 < z < 2$ (supervising).
- **Jovanna Moya:** November 2015 to present. Universidad Central de Venezuela. Facultad de Ciencias. Departamento de Física. **Caracterización de Ondas Gravitacionales** (supervising).
- **Blanca Morillo:** November 2015 to present. Universidad Central de Venezuela. Facultad de Ciencias. Departamento de Física. **Cálculos de modelos de fotoionización para acreción en AGNs** (supervising).

Teaching experience

1. Escuela Superior Politécnica del Litoral (ESPOL). **From May 2017 to present.**
Physics I.
2. Venezuelan Institute for Scientific Research (IVIC). **From July 2012 to present.**
Lecturer of Electromagnetism.
High Resolution X-ray spectroscopy.
Astrostatistic.
3. Astronomy for the General public. Ciencia contigo. Caracas. **2014-2016.**
4. Teaching Assistant, General Physics I and II. Carabobo University. Physics Department. **From 1996 to 2000.**

Research fundings

- **About the Low and High velocity outflow in AGNs:** Funding institution IVIC, under the project 2013000259, in the Lab of Computational Physics, IVIC, Caracas, Venezuela.
- **The Impetus project:** under grant EDOMEX-2011-C01-165873, ABACUS/Cinvestav, Mexico, Mexico.

Relevant courses:

- **Introduction to Astrophysics:** PhD course by professor Claudio Mendoza, IVIC, Venezuela.
- **Electromagnetism:** PhD course by professor Leonardo Sigalotti, IVIC, Venezuela.
- **Fluids Mechanics:** PhD course by professor Leonardo Sigalotti, IVIC, Venezuela.

- **General Relativity Theory:** PhD course by professor Richard Stark, IVIC, Venezuela.
- **Statistical mechanics:** PhD course by professor Ernesto Medina, IVIC, Venezuela.
- **Quantum mechanics:** PhD course by professor Manuel Bautista, IVIC, Venezuela.
- **Advanced quantum mechanics:** PhD course by professor Ernesto Medina, IVIC, Venezuela.
- **Stellar Evolution:** PhD course by professor Jaime Klapp, IVIC, Venezuela.