DANIEL CASTRO

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EDUCATIONAL BACKGROUND

Doctor in Physics (Honors)
Universidad Simón Bolívar, Caracas, Venezuela (2011)
Advisor: Patrick Slane, Harvard-Smithsonian Center for Astrophysics

Master in Physics (Honors) in Astrophysics
University of Edinburgh, Edinburgh, United Kingdom (2002)

EXPERIENCE, HONORS & AWARDS

- Astrophysicist at the Chandra X-ray, Harvard-Smithsonian Center for Astrophys. (2017-date)
- NASA Postdoctoral Program Fellow, NASA Goddard Space Flight Center (2016-2017)
- Research Assistant Professor, George Mason University (2016)
- Visiting Scientist, NASA Goddard Space Flight Center (2015-2016)
- National Research Council Associate Fellowship, Naval Research Laboratory (2015-**declined**)
- MKI-HETG Postdoctoral Research Associateship, MIT-Kavli (2011-2015)
- Smithsonian Postdoctoral Associateship, Harvard-Smithsonian Center for Astrophys. (2011)
- Smithsonian Predoctoral Fellowship, Harvard-Smithsonian Center for Astrophys. (2008-2011)
- Fellowship of the Academy of Physical, Math. and Nat. Sciences, Venezuela (2008-2011)
- Physics Department Fellowship, Universidad Simón Bolívar, Venezuela (2003-2008)
- Galileo Scholarship Award, Fundacion Gran Mariscal de Ayacucho, Venezuela (1994-1996)

TEACHING AND MENTORING EXPERIENCE

Universidad Simón Bolívar, Caracas, Venezuela (2003-2008)
- Lecturer - Physics I, Physics Laboratory I, Physics Laboratory II, and Physics Laboratory III
- Course Coordinator - Physics Laboratory I, and Physics Laboratory II
- Assistant Lecturer - Waves and Optics

Massachusetts Institute of Technology (2011-date)
- MIT Bridge Program Research Advisor Antonio Hernandez (MIT, 2012-date)
- Senior Thesis Advisor for Timothy Joubert (MIT, 2013)
- Master Thesis Co-Advisor for Sarah Pearson (University of Copenhagen, 2013)
- Research Science Institute Project Advisor for Robert Jones (MLW Governor School, VA)
- PhD Thesis Co-Advisor for Sarah Trowbridge-Heine (MIT, 2014)
- Predoctoral Research Review Committee member – Katie Auchettl (CfA, 2013-2015)

SCIENTIFIC CONFERENCES

- 2 Invited Plenary Talks – IV Fermi Symposium, Monterey, CA (2012)

TeVPA, Irvine, CA (2013)

- 36 Scientific conference and seminar presentations (15 Invited, 21 Contributed)
- Scientific Organizing Committee – V Fermi Symposium, Nagoya, Japan (2014)
  VI Fermi Symposium, Arlington, VA (2015)
- 8 Public and Education Talks
- Fermi Summer School 2014 – Instructor

RESEARCH GRANTS & OBSERVING TIME

Co-I – *XMM-Newton* Guest Observer Program (Cycle 16, PI: T. Temim) **2016**
"*Understanding the Evolution of Composite SNRs: An XMM Study of MSH 15-56*"

Co-I – *NuSTAR* Guest Observer Program (Cycle 2, PI: T. Temim) **2016**
"*Spectral Evolution of Crushed Pulsar Wind Nebulae*"

Co-I – *National Science Foundation* - Astronomy and Astrophysics Research Grant (PI: L. Lopez) **2015**
"*Probing the Explosive Origins, Evolution, and Interactions of Supernova Remnants*"

Co-I – *Magellan* Telescopes (Observing Time 3 half-nights, PI: S. Trowbridge-Heine) **2015**
"*Searching for Balmer-Dominated Shocks in the Supernova Remnant G296.1-0.5*"

Co-I – *Chandra* Guest Observer Program (Cycle 16, PI: H. Yamaguchi) **2014**
"*(Re-)Constraining the Cosmic-Ray Acceleration Efficiency and Magnetic Field Strength in the Northeast Rims of RCW 86*"

Co-I – *Chandra* Guest Observer Program (Cycle 16, PI: P. Slane) **2014**
"*Changes In Latitude: A Chandra Study of G296.5+10.0*"

Co-I – *XMM-Newton* Guest Observer Program (Cycle 13, PI: L. Lopez) **2013**
"*Mapping the Overionized Plasma of W49B with XMM-Newton*"

Co-I – *XMM-Newton* Guest Observer Program (Cycle 13, PI: K. Auchettl) **2013**
"*X-ray study of mixed morphology SNR HB9*"

PI – *Chandra* Guest Observer Program (Cycle 14) **2012**
"*Studying Particle Acceleration and Ejecta in the NW Rim of the SNR RCW 86*"

Co-I – *Chandra* Guest Observer Program (Cycle 14, PI: P. Slane) **2012**
"*A Detailed Study of the Composite Supernova Remnant MSH 11-62*"

Co-I – NASA Astrophysics Research and Analysis (PI: E. Figueroa-Feliciano) **2012**
"*Observing Supernova Remnants With Micro-X*"

Co-I – *XMM-Newton* Guest Observer Program (Cycle 11, PI: J. Gelfand) **2012**
"*What is accelerating particles in SNR G5.7-0.1?*"

PI (Science) – *Magellan* Telescopes (Observing Time 1 night) **2011**
"*The Collapse of a Massive Star: Observing SNR G296.1-0.5 with Magellan*"

Co-I – *Fermi* Guest Observer Program (Cycle 04, PI: P. Slane) **2011**
"*Fermi Constraints on Particle Spectra in Pulsar Wind Nebulae*"

PI – *Fermi* Guest Observer Program (Cycle 03) **2010**
"*Fermi LAT Observations of Supernova Remnants Interacting with Molecular Clouds*"

Co-I – *Fermi* Guest Observer Program (Cycle 03, PI: D. J. Patnaude) **2010**
"*The Origin of the Very High Energy Emission in Cassiopeia A*"

Co-I – *Chandra* Science Program (Cycle 12, PI: P. Slane) **2010**
"*Clumpy Winds and a Bursting X-ray Source: A Chandra Study of G296.1-0.5*"

Co-I – *Suzaku* Guest Observer Program (Cycle 05, PI: J. D. Gelfand) **2009**
"*The Origin of the Hard X-ray and GeV Emission of SNR G304.6+0.1*"

PI – *RXTE Guest Observer Program* – (Cycle 14) **2009**
"*A Possible New Anomalous X-ray Pulsar Near the Supernova Remnant G296.1-0.5*"

Co-I – *Fermi* Guest Observer Program (Cycle 02, PI: P. Slane) **2009**
"*A Fermi Study of Particle Acceleration in G347.3-0.5*"

PEER REVIEWED PUBLICATIONS

23. "Cosmic-ray electron+positron spectrum from 7 GeV to 2 TeV with the Fermi Large Area Telescope"
Abdollahi et al., 2017, PRD, *Accepted for Publication*

22. "The Refined Shock Velocity of the X-Ray Filaments in the RCW 86 Northeast Rim"
Yamaguchi, H., Katsuda, S., **Castro, D.**, Williams, B. J., Lopez, L. A., Slane, P. O., Smith, R. K., Petre , R. 2016, ApJL, 820, L3

21. "Fermi-LAT Observations of Supernova Remnant G5.7-0.1, Believed to be Interacting with Molecular Clouds"
Joubert, T., **Castro, D.**, Slane, P. O., Gelfand, J. 2015, ApJ, 816, 63

20. "Sensitivity of a Dark Matter Search with the Micro-X and XQC Rocket Payloads"
Figueroa-Feliciano, E., Anderson, A.J., **Castro, D.**, Goldfinger, D.C., Rutherford, J., Eckart, M.E., Kelley, R.L., Kilbourne, C.A., McCammon, D., Morgan, K., Porter, F.S. & Szymkowiak, A.E. 2015, ApJ, 814, 82

19. "Multi-wavelength analysis of supernova remnant MSH 11-61A"
Auchettl, K., Slane, P. O., & **Castro, D.**, Foster, A. R., Smith, R. K. 2015, ApJ, 810, 12

18. "The Role of Stellar Feedback in the Dynamics of H II Regions"
Lopez, L. A., Krumholz, M., Bolatto, A., Prochaska, J., Ramirez-Ruiz, E., & **Castro, D.** 2014, ApJ, 795, 121

17. "Supernova Remnants Interacting with Molecular Clouds: X-Ray and Gamma-Ray Signatures"
Slane, P. O., Bykov, A., Ellison, D. C., Dubner, G., **Castro, D.**, 2014, Space Science Reviews, July Issue

16. "Identification Of A Jet-Driven Supernova Remnant In The Small Magellanic Cloud: Evidence For The Enhancement Of Bipolar Explosions At Low Metallicity"
Lopez, L. A., **Castro, D.,** Slane, P. O., Ramirez-Ruiz, E. 2014, ApJ, 788, 5

15. "Discriminating The Progenitor Type Of Supernova Remnants With Iron K-Shell Emission"
Yamaguchi, H., Badenes, C., Petre, R., Nakano, T., **Castro, D.**, Enoto, T., Hiraga, J. S., Hughes, J. P., Maeda, Y., Nobukawa, M., Safi-Harb, S., Slane, P. O., Smith, R. K., & Uchida, H., 2014, ApJL, 785, L27

14. "A CR-hydro-NEI Model of the Structure and Broadband Emission from Tycho's SNR"
Slane, P. O., Lee, S-H., Ellison, D. C., Patnaude, D. J., Hughes, J. P., Eriksen, K. A., **Castro, D.**, Nagataki, S. 2014, ApJ, 783, 10

13. "Fermi-LAT Observations of Supernova Remnant Kesteven 79"
Auchettl, K., Slane, P. O., & **Castro, D.** 2014, ApJ, 783, 13

12. "A Chandra View of Nonthermal Emission in Northwestern Region of Supernova Remnant RCW 86: Particle Acceleration and Magnetic Fields"

Castro, D., Lopez, L. A., Ramirez-Ruiz, E., Yamaguchi, H., Slane, P. O., Figueroa-Feliciano E. 2013, ApJ, 779, 49

11. "Supernova Remnant Kes 17: Efficient Cosmic Ray Accelerator Inside a Molecular Cloud"
Gelfand, J. D., **Castro, D.**, Slane, P. O., Temim, T., Hughes, J. P. 2013, ApJ, 777, 48

10. "Unraveling the Origin of Overionized Plasma in the Galactic Supernova Remnant W49B"
Lopez, L. A., Pearson, S., Ramirez-Ruiz, E., **Castro, D.,** Yamaguchi, H., Slane, P. O., Smith, R., 2013, ApJ, 777, 145

9. "Fermi-LAT Observations of Supernova Remnants Interacting with Molecular Clouds: W41, MSH 17-39, and G337.7-0.1"
Castro, D., Slane, P. O., Carlton, A., & Figueroa-Feliciano, E. 2013, ApJ, 774, 36

8. "The Supernova Remnant W49B Originates From A Jet-Driven Core-Collapse Explosion"
Lopez, L. A., Ramirez-Ruiz, E., **Castro, D.**, Pearson, S. 2013, ApJ, 764, 50

7. "High-Energy Emission from the Composite Supernova Remnant MSH 15-5*6*"
Temim, T., Slane, P. O., Plucinsky, P., Gelfand, J. D., **Castro, D.** 2013, ApJ, 768, 61

6. "Fermi-LAT Observations and a Broadband Study of Supernova Remnant CTB 109"
Castro, D., Slane, P. O., Ellison, D. C., & Patnaude, D. J. 2012b, ApJ, 756, 88

5. "A Broadband Study of the Emission from the Composite Supernova Remnant MSH 11–6*2*"
Slane, P. O., Hughes, J. P., Temim, T., Rousseau, R., **Castro, D.**, Foight, D., Gaensler, B. M., Funk, S., Lemoine-Goumard, M., Gelfand, J. D., Moffett, D. A., Dodson, R. G., Bernstein, J. P., 2012, ApJ 749 131

4. "An XMM-Newton Study of the Bright, Nearby Supernova Remnant G296.1-0.5"
Castro, D., Slane, P. O., Gaensler, B., Hughes, J. P., & Patnaude, D. J. 2011a, ApJ, 734, 86

3. "The Impact of Efficient Particle Acceleration on the Evolution of Supernova Remnants in the Sedov-Taylor Phase"
Castro, D., Slane, P. O., Patnaude, D. J., & Ellison, D. C. 2011b, ApJ, 734, 85

2. "Fermi Detection of the Pulsar Wind Nebula HESS J1640-465"
Slane, P. O., **Castro, D.**, Funk, S., Uchiyama, Y., Lemiere, A., Gelfand, J. D., & Lemoine-Goumard, M. 2010, ApJ, 720, 266

1. "Fermi LAT Observations of Supernova Remnants Interacting with Molecular Clouds"
Castro, D., & Slane, P. O. 2010, ApJ, 717, 372