

Michael Zingale / Publications and Talks

Refereed Publications

74. *Hydrodynamical simulations of proton ingestion flashes in Type I X-ray Bursts*, S. Guichandut, M. Zingale, & A. Cumming, 2024, submitted to *Astrophysical Journal*
73. *Strong Coupling of Hydrodynamics and Reactions in Nuclear Statistical Equilibrium for Modeling Convection in Massive Stars*, M. Zingale, Z. Chen, E. T. Johnson, M. P. Katz, & A. Smith Clark 2024, submitted to *Astrophysical Journal*
72. *Sensitivity of Simulations of Double Detonation Type Ia Supernova to Integration Methodology*, M. Zingale, Z. Chen, M. Rasmussen, A. Polin, M. Katz, A. Smith Clark, & E. T. Johnson, 2024, *ApJ*, 966, 150
DOI: 10.3847/1538-4357/ad3441
71. *Simulating Lateral H/He Flame Propagation in Type I X-ray Bursts*, E. Johnson & M. Zingale 2024, *Journal of Physics: Conference Series*, 2742, 1, p. 012005
DOI: 10.1088/1742-6596/2742/1/012005
70. *pynucastro 2.1: an update on the development of a python library for nuclear astrophysics*, A. Smith Clark, E. T. Johnson, Z. Chen, K. Eiden, M. Zingale, B. Boyd, P. Johnson, & L. Rangel DaCosta, 2024, *Journal of Physics: Conference Series*, 2742, 1, p. 012003
DOI: 10.1088/1742-6596/2742/1/012003
69. *Sensitivity of 3D Convective Urca Simulations to Changes in Urca Reactions*, B. Boyd, A. Smith Clark, A. C. Calder, D. M. Townsley, & M. Zingale, 2024, *Journal of Physics: Conference Series*, 2742, 1, p. 012001
DOI: 10.1088/1742-6596/2742/1/012001
68. *A Framework for Exploring Nuclear Physics Sensitivity in Numerical Simulations*, Z. Chen, E. Johnson, M. Katz, A. Smith Clark, B. Boyd, & M. Zingale, 2024, *Journal of Physics: Conference Series*, 2742, 1, p. 012021
10.1088/1742-6596/2742/1/012021
67. *MESA-Web: A cloud resource for stellar evolution in astronomy curriculum*, C. E. Fields, R. H. D. Townsend, A. L. Dotter, & M. Zingale, 2023, *Astronomy Education Journal*, 3, 1, 047ra
DOI: 10.32374/AEJ.2023.3.1.047ra
66. *Sensitivity of He Flames in X-ray Bursts to Nuclear Physics*, Z. Chen, M. Zingale, & K. Eiden, 2023, *ApJ*, 955, 128
DOI: 10.3847/1538-4357/acec72
65. *Comparing Early Evolution of Flames in X-ray Bursts in Two and Three Dimensions*, M. Zingale, K. Eiden, & M. Katz, 2023, *ApJ*, 952, 160
DOI: 10.3847/1538-4357/ace04e
64. *pynucastro: A Python Library for Nuclear Astrophysics*, A. Smith Clark, E. T. Johnson, Z. Chen, K. Eiden, D. E. Willcox, B. Boyd, L. Cao, C. J. DeGrendele, & M. Zingale, 2023, *ApJ*, 947, 65
DOI: 10.3847/1538-4357/acbaff

63. *Neural Networks for Nuclear Reactions in MAESTROeX*,
D. Fan, D. E. Willcox, C. DeGrendele, M. Zingale, & A. Nonaka, 2022, ApJ, 940, 134
DOI: 10.3847/1538-4357/ac9a4b
62. *An Improved Method for Coupling Hydrodynamics with Astrophysical Reaction Networks*,
M. Zingale, M. P. Katz, A. Nonaka, & M. Rasmussen, 2022, ApJ, 936, 6
DOI: 10.3847/1538-4357/ac8478
61. *Dynamics of Laterally Propagating Flames in X-ray Bursts. II. Realistic Burning & Rotation*,
A. Harpole, N. M. Ford, K. Eiden, M. Zingale, A. D. Willcox, Y. Cavecchi, & M. P. Katz, 2021, ApJ, 912, 36
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60. *CASTRO: A Massively Parallel Compressible Astrophysics Simulation Code*,
A. Almgren, M. Barrios Sazo, J. Bell, A. Harpole, M. Katz, J. Sexton, D. Willcox, W. Zhang, & M. Zingale, 2020, Journal of Open Source Software, 5, 54, 2513
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59. *Preparing Nuclear Astrophysics for the Exascale*,
M. Katz, A. Almgren, M. Barrios Sazo, K. Eiden, K. Gott, A. Harpole, J. Sexton, D. Willcox, W. Zhang, & M. Zingale, 2020, SC '20: Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 91, 1
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58. *Dynamics of Laterally Propagating Flames in X-ray Bursts. I. Burning Front Structure*,
K. Eiden, M. Zingale, A. Harpole, D. Willcox, Y. Cavecchi, & M. P. Katz, 2020, ApJ, 894, 6
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57. *The Castro AMR Simulation Code: Current and Future Developments*,
M. Zingale, A. S. Almgren, M. Barrios Sazo, J. B. Bell, K. Eiden, A. Harpole, M. P. Katz, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2020, Journal of Physics: Conference Series, 1623, 012021, 14th Int. Conf. on Numerical Modeling of Space Plasma Flows: ASTRONUM-2019 1-5 July 2019, Paris, France
DOI: 10.1088/1742-6596/1623/1/012021
56. *Modelling low Mach number stellar hydrodynamics with MAESTROeX*
A. Harpole, D. Fan, M. P. Katz, A. J. Nonaka, D. E. Willcox, & M. Zingale, 2020, Journal of Physics: Conference Series, 1623, 012015, 14th Int. Conf. on Numerical Modeling of Space Plasma Flows: ASTRONUM-2019 1-5 July 2019, Paris, France
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55. *MAESTROeX: A Massively Parallel Low Mach Number Astrophysical Solver*, D. Fan, A. Nonaka, A. S. Almgren, A. Harpole, & M. Zingale, 2019, ApJ, 887, 212
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54. *Improved Coupling of Hydrodynamics and Nuclear Reactions via Spectral Deferred Corrections*, M. Zingale, M. P. Katz, J. B. Bell, M. L. Minion, A. J. Nonaka, & W. Zhang, 2019, ApJ, 886, 105
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53. *MAESTROeX: A Massively Parallel Low Mach Number Astrophysical Solver*,
D. Fan, A. Nonaka, A. Almgren, D. Willcox, A. Harpole, & M. Zingale, 2019, Journal of Open Source Software, 4, 43, 1757
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52. *AMReX: a framework for block-structured adaptive mesh refinement*,
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51. *Numerical Stability of Detonations in White Dwarf Simulations*,
M. P. Katz & M. Zingale, 2019, ApJ, 874, 169
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50. *pyro: a framework for hydrodynamics explorations and prototyping*,
A. Harpole, M. Zingale, I. Hawke, & T. Chegini, 2019, Journal of Open Source Software, 4, 34, 1265
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49. *Toward Resolved Simulations of Burning Fronts in Thermonuclear X-ray Bursts*,
M. Zingale, K. Eiden, Y. Cavecchi, A. Harpole, J. B. Bell, M. Chang, I. Hawke, M. P. Katz, C. M. Malone, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2019, Journal of Physics: Conference Series, 1225, 012005
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48. *Thermonuclear (Type Ia) Supernovae and Progenitor Evolution*,
A. C. Calder, D. E. Willcox, C. J. DeGrendele, D. Shangase, M. Zingale, & D. M. Townsley, 2019, Journal of Physics: Conference Series, 1225, 012002
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47. *Observatory science with eXTP*,
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46. *Turbulence-driven thermal and kinetic energy in the atmospheres of hot Jupiters*,
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45. *pynucastro: an interface to nuclear reaction rates and code generator for reaction network equations*,
D. E. Willcox & M. Zingale, 2018, Journal of Open Source Software, 3 (23), 588
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44. *Meeting the Challenges of Modeling Astrophysical Thermonuclear Explosions: Castro, Maestro, and the AMReX Astrophysics Suite*,
M. Zingale, A. S. Almgren, M. G. Barrios Sazo, V. E. Beckner, J. B. Bell, B. Friesen, A. M. Jacobs, M. P. Katz, C. M. Malone, A. J. Nonaka, D. E. Willcox, & W. Zhang, 2018, Journal of

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43. *Best Practices in Running Collaborative GPU Hackathons: Advancing Scientific Applications with a Sustained Impact*,
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 42. *Toward Simulating Black Widow Binaries with Castro*,
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 41. *Review: White paper on nuclear astrophysics and low energy nuclear physics Part 1: Nuclear astrophysics*,
A. Arcones, D. Bardayan, T. Beers, L. Bernstein, J. Blackmon, M. Bronson, A. Brown, E. Brown, C. Brune, A. Champagne, A. Chieffi, A. Couture, P. Danielewicz, R. Diehl, M. El-Eid, J. Escher, B. Fields, C. Frohlich, F. Herwig, W. R. Hix, C. Iliadis, W. Lynch, G. McLaughlin, B. Meyer, A. Mezzacappa, F. Nunes, B. O'Shea, M. Prakash, B. Pritychenko, S. Reddy, E. Rehm, G. Rogachev, R. Rutledge, H. Schatz, M. Smith, I. Stairs, A. Steiner, T. Strohmayer, F. Timmes, D. Townsley, M. Wiescher, R. Zegers, & M. Zingale, 2017, Progress in Particle and Nuclear Physics, 94, 1
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 40. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs II: Bulk Properties of Simple Models*,
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 39. *Double White Dwarf Mergers on Adaptive Meshes I. Methodology and Code Verification*,
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 38. *Comparisons of Two- and Three-Dimensional Convection in Type I X-ray Bursts*
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 36. *pyro: A teaching code for computational astrophysical hydrodynamics*,
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35. *Multidimensional Modeling of Type I X-ray Bursts. II. Two-Dimensional Convection in a Mixed H/He Accretor*,
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34. *The Deflagration Stage of Chandrasekhar Mass Models For Type Ia Supernovae: I. Early Evolution*,
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33. *Low-Mach Number Modeling of Core Convection in Massive Stars*,
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32. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs. I. Methodology*,
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31. *High-Resolution Simulations of Convection Preceding Ignition in Type Ia Supernovae Using Adaptive Mesh Refinement*,
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30. *The Convective Phase Preceding Type Ia Supernovae*,
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29. *Multidimensional Modeling of Type I X-ray Bursts. I. Two-Dimensional Convection Prior to the Outburst of a Pure He Accretor*,
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28. *CASTRO: A New Compressible Astrophysical Solver. I. Hydrodynamics and Self-Gravity*,
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27. *MAESTRO: An Adaptive Low Mach Number Hydrodynamics Algorithm for Stellar Flows*,
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23. *Understanding Ignition in Type Ia Supernovae*,
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19. *Type Ia Supernovae: Advances in Large Scale Simulation*,
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18. *Type Ia Supernovae: Advances in Large Scale Simulation*,
S. E. Woosley, A. S. Almgren, A. J. Aspden, J. B. Bell, D. Kasen, A. R. Kerstein, H. Ma, A. Nonaka, & M. Zingale, 2009, Proceedings of SciDAC 2009, Journal of Physics: Conference Series, 180, 012023.
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17. *Astrophysical Applications of the Maestro Code*,
M. Zingale, A. S. Almgren, J. B. Bell, C. M. Malone, & A. Nonaka, 2008, Proceedings of SciDAC 2008, Journal of Physics: Conference Series, 125, 012013.
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15. *MAESTRO: A Low Mach Number Stellar Hydrodynamics Code*,
A. S. Almgren, J. B. Bell, & M. Zingale, 2007, Proceedings of SciDAC 2007, Journal of Physics: Conference Series, 78, 012085.
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14. *New Approaches for Modeling Type Ia Supernovae*,
M. Zingale, A. S. Almgren, J. B. Bell, M. S. Day, C. A. Rendleman, & S. E. Woosley, 2006, Proceedings of SciDAC 2006, Journal of Physics: Conference Series, 46, 385.
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13. *Efficiency Gains from Time Refinement on AMR Meshes and Explicit Timestepping*,
L. J. Dursi & M. Zingale, 2005, Adaptive Mesh Refinement—Theory and Applications, Proceedings of the Chicago Workshop on Adaptive Mesh Refinement Methods, Sept. 3–5, 2003 Series: Lecture Notes in Computational Science and Engineering, Vol. 41 Plewa, Tomasz; Linde, Timur; Weirs, V. Gregory (Eds.) 2005, XIV, 554
12. *The Physics of Flames in Type Ia Supernovae*,
M. Zingale, S. E. Woosley, J. B. Bell, M. S. Day, & C. A. Rendleman, 2005, Proceedings of SciDAC 2005, Journal of Physics: Conference Series, 16, 405.
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11. *Simulations of Rising Hydrodynamic and Magnetohydrodynamic Bubbles*,
P. M. Ricker, K. Robinson, L. J. Dursi, R. Rosner, A. C. Calder, M. Zingale, J. W. Truran, T. Linde, A. Caceres, B. Fryxell, K. Olson, K. Riley, K. A. Siegel, & N. Vladimirova, 2004, Proceedings of The Riddle of Cooling Flows in Galaxies and Clusters of Galaxies, held in Charlottesville, VA, May 31–June 4, 2003, Eds. T. Reiprich, J. Kempner, and N. Soker.
10. *Investigations of Pointwise Ignition of Helium Deflagrations on Neutron Stars*,
M. Zingale, S. E. Woosley, A. Cumming, A. Calder, L. J. Dursi, B. Fryxell, K. Olson, P. Ricker, R. Rosner, & F. X. Timmes, 2002, 3D Stellar Evolution, ASP Conference Proceedings, Vol. 293, 22–26 July 2002 at UC Davis, Livermore, CA, Ed. by S. Turcotte, S. C. Keller, & R. M. Cavallo.
9. *Onset of Convection on a Pre-Runaway White Dwarf*,
L. J. Dursi, A. C. Calder, A. Alexakis, J. W. Truran, M. Zingale, B. Fryxell, P. Ricker, F. X. Timmes, & K. Olson, 2002, Classical Nova Explosions: International Conference on Classical Nova Explosions. AIP Conference Proceedings, Vol. 637. Sitges, Spain, 20–24 May, 2002. Edited by M. Hernanz & J. Jose
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8. *Mixing by Non-linear Gravity Wave Breaking on a White Dwarf Surface*,
A. C. Calder, A. Alexakis, L. J. Dursi, R. Rosner, J. W. Truran, B. Fryxell, P. Ricker, M. Zingale, K. Olson, F. X. Timmes, & P. MacNeice, 2002, Classical Nova Explosions: International Conference on Classical Nova Explosions. AIP Conference Proceedings, Vol. 637. Sitges, Spain, 20–24 May, 2002. Edited by M. Hernanz & J. Jose
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7. *Mixing by Wave Breaking at the Surface of a White Dwarf*,

- J. W. Truran, A. Alexakis, A. C. Calder, L. J. Dursi, M. Zingale, B. Fryxell, P. Ricker, F. X. Timmes, K. Olson, & R. Rosner, 2002, Proceedings of the 11th Workshop on “Nuclear Astrophysics”, Ringberg Castle, Tegernsee, Germany, February 11–16, 2002 / Wolfgang Hillebrandt and Ewald Müller (Eds.). MPA/P13, Garching b. München, Germany: Max-Planck-Institut für Astrophysik, 186.
6. *Numerical Simulations of Thermonuclear Flashes on Neutron Stars*,
B. Fryxell, M. Zingale, F. X. Timmes, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, J. W. Truran, P. MacNeice, & H. Tufo, 2001, Nuclear Physics A, 688, 172.
DOI: 10.1016/S0375-9474(01)00692-3
5. *Quenching Processes in Flame-Vortex Interactions*,
M. Zingale, J. C. Niemeyer, F. X. Timmes, L. J. Dursi, A. C. Calder, B. Fryxell, D. Q. Lamb, K. Olson, P. Ricker, R. Rosner, J. W. Truran, & P. MacNeice, 2001, 20th Texas Symposium on Relativistic Astrophysics, Austin, Texas, 10–15 Dec. 2000, Melville, NY: AIP Conference Proceedings, Vol. 586. Edited by J. C. Wheeler & H. Martel, also AIP Conference Series 586, 490–492.
DOI: 10.1063/1.1419598
4. *Simulations of Astrophysical Fluid Instabilities*,
A. C. Calder, B. Fryxell, R. Rosner, L. J. Dursi, K. Olson, P. M. Ricker, F. X. Timmes, M. Zingale, P. MacNeice, & H. M. Tufo, 2001, 20th Texas Symposium on Relativistic Astrophysics, Austin, Texas, 10–15 Dec. 2000, Melville, NY: AIP Conference Proceedings, Vol. 586. Edited by J. C. Wheeler & H. Martel.
DOI: 10.1063/1.1419596
3. *Adaptive Mesh Simulations Of Astrophysical Detonations Using the ASCI Flash Code*,
B. Fryxell, A. C. Calder, L. J. Dursi, D. Q. Lamb, P. MacNeice, K. Olson, P. M. Ricker, R. Rosner, F. X. Timmes, J. W. Truran, H. M. Tufo, & M. Zingale, Proceedings of the VII International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT 2000), Fermilab, October 16–20, 2000.
DOI: 10.1063/1.1405310
2. *Large-Scale Simulations of Clusters of Galaxies*,
P. M. Ricker, A. C. Calder, L. J. Dursi, B. Fryxell, D. Q. Lamb, P. MacNeice, K. Olson, R. Rosner, F. X. Timmes, J. W. Truran, H. M. Tufo, & M. Zingale, Proceedings of the VII International Workshop on Advanced Computing and Analysis Techniques in Physics Research (ACAT 2000), Fermilab, October 16–20, 2000.
DOI: 10.1063/1.1405337
1. *Helium Detonations on Neutron Stars*,
B. Fryxell, M. Zingale, F. X. Timmes, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, J. W. Truran, P. MacNeice, & H. Tufo, Proceedings of the 10th Workshop on “Nuclear Astrophysics”, Ringberg Castle, Tegernsee, Germany, March 20–25 2000.

Open Books

2. *Teaching and Learning with Jupyter*,

L. A. Barba, L. J. Barker, D. S. Blank, J. Brown, A. B. Downey, T. George, L. J. Heagy, K. T. Mandli, J. K. Moore, D. Lippert, K. E. Niemeyer, R. R. Watkins, R. H. West, E. Wickes, C. Willing, & M. Zingale

<https://jupyter4edu.github.io/jupyter-edu-book/>

1. *Introduction to Computational Astrophysical Hydrodynamics,*

M. Zingale

https://github.com/Open-Astrophysics-Bookshelf/numerical_exercises

White Papers

7. Horizons: Nuclear Astrophysics in the 2020s and Beyond,

H. Schatz et al., 2022, Journal of Physics G Nuclear Physics, 49, 11, 110502

6. *MMA SAG: Thermonuclear Supernovae,*

M. Zingale, C. Fryer, A. Hungerford, S. Safi-Harb, R. Trappitsch, R. Fisher, A. Calder, & K. Shen, Astro2020: Decadal Survey on Astronomy and Astrophysics, science white papers, no. 259; Bulletin of the American Astronomical Society, Vol. 51, Issue 3, id. 259 (2019)

5. *Nuclear Physics Exascale Requirements Review: An Office of Science review sponsored jointly by Advanced Scientific Computing Research and Nuclear Physics,*

J. Carlson et al. 2017, US Department of Energy, Washington, DC (United States). Advanced Scientific Computing Research and Nuclear Physics

4. *The Importance of Computation in Astronomy Education,*

M. Zingale, F. X. Timmes, R. Fisher, & B. W. O'Shea, 2016, white paper submitted to the AAS Education Taskforce call

(<https://aas.org/posts/opportunity/2016/04/aas-task-force-education-begins-its-work>)

3. *White Paper on Nuclear Astrophysics,*

A. Arcones et al. 2016, Community white paper based on 2012 JINA Town Meeting in Detroit, MI, and 2014 APS Town Meeting in College Station, TX

2. *Modeling Astrophysical Explosions with Sustained Exascale Computing,*

M. Zingale, A. C. Calder, C. M. Malone, & F. X. Timmes, 2015, Response to RFI NOT-GM-15-122: Science Drivers Requiring Capable Exascale High Performance Computing

1. *The LOFT perspective on neutron star thermonuclear bursts,*

J. J. M. in 't Zand, D. Altamirano, D. R. Ballantyne, S. Bhattacharyya, E. F. Brown, Y. Cavocchi, D. Chakrabarty, J. Chenevez, A. Cumming, N. Degenaar, M. Falanga, D. K. Galloway, A. Heger, J. José, L. Keek, M. Méndez, S. Mahmoodifar, M. Linares, C. M. Malone, M. C. Miller, F. B. S. Paerels, J. Poutanen, A. Różańska, H. Schatz, M. Serino, V. F. Suleimanov, T. E. Strohmayer, F.-K. Thielemann, A. L. Watts, N. N. Weinberg, S. E. Woosley, W. Yu, S. Zhang, & M. Zingale, 2015, White Paper in Support of the Mission Concept of the Large Observatory For x-ray Timing

Invited Lectures / Seminars / Colloquia

- 04/15/2024 Colloquium at Temple University, *Modeling Stellar Explosions*
- 03/06/2024 Invited minisymposium talk in the Performance Optimization for Multiphysics Applications on Structured Mesh with Particles minisymposium at the 2024 SIAM Conference on Parallel Processing for Scientific Computing, *Modeling Astrophysical Reactive Flows with Castro at the Exascale*
- 11/04/2023 Invited talk at APS-MAS, University of Delaware, *Engaging Students in Computational (Astro)Physics Courses and Research*
- 10/23/2023 Invited talk at the Interfaces and Mixing, Exploration Conference, 23-26 Oct 2023, Kavli Institute for Theoretical Physics, *Convective Mixing in Stellar Reactive Flows*
- 06/28/2023 Invited talk at AstroNum 2023–15th International Conference on Numerical Modeling of Space Plasma Flows, Pasadena, CA, USA, *Coupling Hydrodynamics and Astrophysical Reaction Networks*
- 11/21/2022 Invited talk in *Astrophysical Turbulence: Current Understanding and Modeling Challenges* minisymposium at the APS/Division of Fluid Dynamics 2022 meeting, *Modeling Astrophysics Reactions in Turbulent Environments*
- 11/14/2022 Invited talk a HPC session of the Computing Working Group at the Argonne Town Meeting on Nuclear Structure, Reactions, and Astrophysics, *Blowing Up Stars Over the Next Decade*
- 07/28/2022 Universiti Malaya (Kuala Lumpur, Malaysia), Department of Physics Colloquium, *Modeling Astrophysical Thermonuclear Explosions*
- 05/20/2022 FastMath seminar, *Algorithmic Improvements for Coupling Hydrodynamics and Reactions in Astrophysical Flows*
- 05/04/2022 Invited speaker in the AMReX Breakout Session of the 2022 ECP Annual Meeting, *Castro Developments for Exascale Platforms*
- 03/16/2022 Invited Focus Session Speaker in *Extreme-Scale Computational Science Discovery in Fluid Dynamics and Related Disciplines*, APS March Meeting, *The Challenges of Modeling Astrophysical Reactive Flows*
- 11/17/2021 Invited panelist for KITP Transport in Stars workshop on convection (KITP, Santa Barbara, CA)
- 10/19/2021 Astronomy Society of Ireland Colloquium, *The Challenges of Modeling Astrophysical Reactive Flows*
- 10/18/2021 Michigan State University, Department of Computational Mathematics, Science and Engineering Colloquium, *The Challenges of Modeling Astrophysical Reactive Flows*
- 03/02/2021 Invited talk in the *Computational Methods in Explosive Nuclear Astrophysics* session at the SIAM Computational Science and Engineering 2021 meeting, *Modeling Astrophysical Reacting Flows*
- 01/30/2020 Princeton University, Department of Astrophysical Sciences Thunch talk, *Modeling Stellar Explosions*

- 01/09/2020 Invited presentation at Texas Advanced Computing Center *Workshop on Future Directions in Extreme Scale Computing for Scientific Grand Challenges on Challenges in Modeling Astrophysical Thermonuclear Explosions*
- 11/06/2019 Stony Brook University, Department of Physics and Astronmomy Colloquium, *Modeling Thermonuclear X-ray Bursts*
- 07/05/2019 Invited talk at AstroNum 2019—14th International Conference on Numerical Modeling of Space Plasma Flows, Paris, France, *Improved Coupling of Hydrodynamics and Nuclear Burning in Astrophysical Flows using SDC*
- 02/26/2019 Invited talk in the *Spectral Deferred Correction Methods for Temporal Integration* session at the SIAM Computational Science and Engineering 2019 meeting, *Improved Coupling of Hydrodynamics and Nuclear Burning in Astrophysical Flows using SDC*
- 10/12/2018 Flatiron Institute Center for Computational Astrophysics Colloquium, *Algorithmic Demands for Modeling X-ray Bursts and Type Ia Supernovae*
- 08/23/2018 Talk at the TEAMS Collaboration meeting, *StarKiller Microphysics*
- 06/26/2018 Invited talk at AstroNum 2018—13th International Conference on Numerical Modeling of Space Plasma Flows, Panama City, Florida, *Modeling X-ray Bursts with the AMReX Astrophysics Suite*
- 08/10/2017 Seminar at LLNL High Energy Density Science Center, LLNL, *Modeling Stellar Explosions with the AMReX Astrophysics Suite*
- 07/27/2017 Seminar at Computational Science Initiative, BNL, *The AMReX Astrophysics Suite: Simulating the Stars at the Exascale*
- 06/30/2017 Invited talk at AstroNum 2017—12th International Conference on Numerical Modeling of Space Plasma Flows, St. Malo, France, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 06/02/2017 Invited participant / overview talk at Stellar Hydro Days, Univesity of Victoria, *Modeling Stellar Convection and Explosions with Maestro, Castro, and the BoxLib/AMReX Astrophysics Suite*
- 04/05/2017 Astronomy Seminar at Michigan State University, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 02/23/2017 Seminar at Stony Brook Institute for Advanced Computational Science, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 06/15/2016 Case study talk at DOE Nuclear Physics / ASCR Exascale Requirements Review, Gaithersburg, MD, *Thermonuclear Transients*
- 04/29/2016 Seminar at Oak Ridge National Laboratory, *Modeling Stellar Explosions with Maestro, Castro, and the BoxLib Astrophysics Suite*
- 03/17/2016 Talk at the *18th Workshop on Nuclear Astrophysics*, Ringberg Castle, Tegernsee, Germany, *Models of convection in X-ray bursts and pre-SNe Ia white dwarfs*
- 02/26/2016 Seminar at the U. S. Naval Research Laboratory, *Computational Challenges of Modeling X-ray Bursts and Type Ia Supernovae*
- 08/02/2015 Invited talk at the *International Colloquium on the Dynamics of Explosions and Reactive Systems (ICDEERS)*, Leeds, UK, *Understanding Ignition in Type Ia Supernovae*

- 06/22/2015 Invited talk at the *OLCF User's Meeting*, ORNL, Oak Ridge, TN, *Computation Challenges of Modeling Astrophysical Explosions*
- 06/03/2015 Invited talk at the *Fifty One Ergs* meeting, NCSU, *Modeling the Early Phases of Type Ia Supernovae*
- 05/24/2015 "Setting the Stage" talk on *Stellar Hydrodynamics* at the JINA GNASH: *The anomalous metal-poor stars and convective-reactive nuclear astrophysics workshop*, Victoria, BC, Canada, <http://jina-cee.phys.uvic.ca/gnash-workshop/talks-and-contributions/monday/setting-the-stage>
- 04/08/2015 Seminar at U Mass Dartmouth, *Algorithmic Developments for Modeling Stellar Explosions*
- 01/15/2015 CCS-2 Seminar at Los Alamos National Laboratory, *The Challenges of Modeling Type Ia Supernovae and X-ray Bursts*
- 09/15/2014 Invited talk at the *Type Ia Supernovae: progenitors, explosions, and cosmology* conference, Chicago, IL, *Modeling the Early Phases of SNe Ia*, <https://kicp-workshops.uchicago.edu/sn2014/presentations.php>
- 04/30/2014 Invited presentation at *Large Scale Computing and Storage Requirements for Nuclear Physics (NP): Target 2017* meeting, *Convection in X-ray Bursts*
- 02/28/2014 Astronomy Seminar at the Center for Cosmology and Particle Physics, New York University, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 09/27/2013 Nuclear Theory Seminar at Brookhaven National Lab, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 07/09/2013 Seminar at the Flash Center, University of Chicago, *Modeling Convective Burning in Type Ia Supernovae and X-ray Bursts*
- 10/10/2012 Astro Computation working group at 2012 *Nuclear Astrophysics Town Meeting*, *Thermonuclear Driven Events*
- 04/04/2012 Nuclear Astrophysics Seminar at Ohio University entitled *The Challenges of Modeling Explosive Phenomena*
- 07/28/2010 Invited talk at the Lorentz Center Workshop on *X-ray Bursts and Burst Oscillations* entitled *The Algorithmic Challenges of Multidimensional Models of X-ray Bursts*, <http://www.lorentzcenter.nl/lc/web/2010/408/info.php3?wsid=408>
- 05/13/2010 Joint NRAO / UVa Dept. of Astronomy Colloquium (Charlottesville, VA) entitled *Modeling Convection and Ignition in Type Ia Supernovae*
- 03/31/2010 Center for the Study of Cosmic Evolution Seminar, Dept. of Physics and Astronomy, Michigan State University (E. Lansing, MI), entitled: *Modeling Convection and Ignition in Type Ia Supernovae*
- 05/12/2009 Astronomy Seminar at the American Museum of Natural History (New York, NY), entitled: *Modeling Convection and Ignition in Type Ia Supernovae*
- 09/30/2008 Astronomy Seminar at the Institute for Advanced Studies (Princeton, NJ), entitled: *New Methods for Modeling Type Ia Supernovae*

- 07/15/2008 Invited Poster at the *SciDAC 2008* conference (Seattle, WA), entitled: *Astrophysical Applications of the Maestro Code* (with co-authors: A. S. Almgren, J. B. Bell, C. M. Malone, & A. J. Nonaka)
- 04/06/2007 Astronomy Seminar at Rutgers University (New Brunswick, NJ), entitled: *The Challenges of Modeling Type Ia Supernova*
- 10/31/2006 Astronomy Colloquia at McGill University (Montreal, CA), entitled: *Understanding Type Ia Supernovae*
- 06/27/2006 Invited talk at the *SciDAC 2006* conference (Denver, CO), entitled: *The Challenges of Modeling Type Ia Supernovae*
- 10/03/2005 T-13 Seminar, Los Alamos National Laboratory, entitled: *Simulations of Thermonuclear Flames in Type Ia Supernovae*
- 06/26/2005 Invited poster at the *SciDAC 2005* conference (San Francisco, CA), *The Physics of Thermonuclear Flames in Type Ia Supernovae*
- 03/01/2005 Astronomy Seminar at SUNY Stony Brook, *Flame Instabilities in Type Ia Supernovae*
- 02/23/2005 N Division Seminar, Lawrence Livermore National Laboratory, *Flame Instabilities in Type Ia Supernovae*
- 12/17/2003 Astrophysics Seminar, Institute for Advanced Study, Princeton, NJ, *Flame Instabilities in Type Ia Supernovae*

Popular Press Features

How Stars Explode, Forbes.com, Oct. 1, 2009

(<http://www.forbes.com/2009/09/30/supernovae-universe-science-technology-breakthroughs-stars.html>)

Unveiled: The First Full 3-D Model of a Star Going Supernova, Popular Science Online, Sept. 24, 2009

(<http://www.popsci.com/military-aviation-amp-space/article/2009-09/first-3-d-models-white-dwarf-supernova>)

Flash Upon a Neutron Star, American Scientist, Sept.–Oct. 2000, vol. 88, no. 5, p. 400.

Popular Press Mentions

Stars Go Kaboom, Spilling Cosmic Secrets, Science News, 2009, Vol. 176, #4 (Aug. 15, 2009)

(see also http://www.sciencenews.org/view/feature/id/46029/title/Stars_go_kaboom,_spilling_cosmic_secrets)

Supernova explosion simulated in exquisite detail, New Scientist Online, July 2006

(<http://www.newscientist.com/article/dn9604-supernova-explosion-simulated-in-exquisite-detail.html>)

Life-or-Death Question: How Supernovas Happen? NY Times, Nov. 9, 2004.

Physics Today cover, Feb. 2002.