

Michael Zingale / Publications and Talks

Refereed Publications

63. *Neural Networks for Nuclear Reactions in MAESTROeX*,
D. Fan, D. E. Willcox, C. DeGrendele, M. Zingale, & A. Nonaka 2022, submitted to ApJ
62. *An Improved Method for Coupling Hydrodynamics with Astrophysical Reaction Networks*,
M. Zingale, M. P. Katz, A. Nonaka, & M. Rasmussen 2022, accepted to ApJ
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
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
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, accepted to SC20
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
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
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
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
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
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
52. *AMReX: a framework for block-structured adaptive mesh refinement*,
W. Zhang, A. Almgren, V. Beckner, J. Bell, J. Blaschke, C. Chan, M. Day, B. Friesen, K. Gott,
D. Graves, M. P. Katz, A. Myers, T. Nguyen, A. Nonaka, M. Rosso, S. Williams, & M. Zingale,
2019, Journal of Open Source Software, 4, 37, 1370

51. *Numerical Stability of Detonations in White Dwarf Simulations*,
M. P. Katz & M. Zingale, 2019, ApJ, 874, 169
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
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
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
47. *Turbulence-driven thermal and kinetic energy in the atmospheres of hot Jupiters*,
T. Ryu, M. Zingale, & R. Perna, 2018, Monthly Notices of the Royal Astronomical Society, 481, 4, 5517–5531
46. *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; DOI: <https://doi.org/10.21105/joss.00588>
45. *Observatory science with eXTP*,
J. J. M. in 't Zand et al., 2018, Science China Physics, Mechanics & Astronomy, 62, 29506
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 Physics: Conference Series, 1031, 1, 012024
43. *Best Practices in Running Collaborative GPU Hackathons: Advancing Scientific Applications with a Sustained Impact*,
S. Chandrasekaran, G. Juckeland, M. Otten, M. Lin, J. E. Stone, M. Zingale, & F. Foerterm 2018, Computing in Science and Engineering, 20, 4, 95–106
42. *Toward Simulating Black Widow Binaries with Castro*,
P. Karpov, M. Barrios Sazo, M. Zingale, W. Zhang, & A. C. Calder, 2017, Journal of Computational Science Education, 8, 25–29
41. *Review: White paper on nuclear astrophysics and low energy nuclear physics Part 1: Nuclear astrophysics*,
A. Arcones, D. Bardayan, T. Beers, L. Berstein, 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
40. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs II: Bulk Properties of Simple Models*,
A. M. Jacobs, M. Zingale, A. Nonaka, A. S. Almgren, & J. B. Bell, 2016, *ApJ*, 827, 84
39. *Double White Dwarf Mergers on Adaptive Meshes I. Methodology and Code Verification*, M. P. Katz, M. Zingale, A. C. Calder, F. D. Swesty, A. S. Almgren, W. Zhang, 2016, *ApJ*, 819, 94
38. *Comparisons of Two- and Three-Dimensional Convection in Type I X-ray Bursts*
M. Zingale, C. M. Malone, A. Nonaka, A. S. Almgren, & J. B. Bell, 2015, *ApJ*, 807, 60
37. *On the Piecewise Parabolic Method for Compressible Flow with Stellar Equations of State*,
M. Zingale & M. P. Katz, 2015, *ApJS*, 216, 31
36. *pyro: A teaching code for computational astrophysical hydrodynamics*,
M. Zingale, 2014, *Astronomy & Computing*, 6, 52
35. *Multidimensional Modeling of Type I X-ray Bursts. II. Two-Dimensional Convection in a Mixed H/He Accretor*,
C. M. Malone, M. Zingale, A. Nonaka, A. S. Almgren, & J. B. Bell, 2014, *ApJ*, 788, 115
34. *The Deflagration Stage of Chandrasekhar Mass Models For Type Ia Supernovae: I. Early Evolution*,
C. M. Malone, A. Nonaka, S. E. Woosley, A. S. Almgren, J. B. Bell, S. Dong, & M. Zingale, 2014, *ApJ*, 782, 11
33. *Low-Mach Number Modeling of Core Convection in Massive Stars*,
C. Gilet, A. S. Almgren, J. B. Bell, A. Nonaka, S. E. Woosley, & M. Zingale, 2013, *ApJ*, 773, 137
32. *Low Mach Number Modeling of Convection in Helium Shells on Sub-Chandrasekhar White Dwarfs. I. Methodology*,
M. Zingale, A. Nonaka, A. S. Almgren, J. B. Bell, C. M. Malone, & R. J. Orvedahl, 2013, *ApJ*, 764, 97
31. *High-Resolution Simulations of Convection Preceding Ignition in Type Ia Supernovae Using Adaptive Mesh Refinement*,
A. Nonaka, A. J. Aspden, M. Zingale, A. S. Almgren, J. B. Bell, & S. E. Woosley, 2012, *ApJ*, 745, 73
30. *The Convective Phase Preceding Type Ia Supernovae*,
M. Zingale, A. Nonaka, A. S. Almgren, J. B. Bell, C. M. Malone, & S. E. Woosley, 2011, *ApJ*, 740, 8
29. *Multidimensional Modeling of Type I X-ray Bursts. I. Two-Dimensional Convection Prior to the Outburst of a Pure He Accretor*,
C. M. Malone, A. Nonaka, A. S. Almgren, J. B. Bell, & M. Zingale, 2011, *ApJ*, 728, 118

28. *CASTRO: A New Compressible Astrophysical Solver. I. Hydrodynamics and Self-Gravity*,
A. S. Almgren, V. E. Beckner, J. B. Bell, M. S. Day, L. H. Howell, C. C. Joggerst, M. J. Lijewski,
A. Nonaka, M. Singer, & M. Zingale, 2010, *ApJ*, 715, 1221
27. *MAESTRO: An Adaptive Low Mach Number Hydrodynamics Algorithm for Stellar Flows*,
A. Nonaka, A. S. Almgren, J. B. Bell, M. J. Lijewski, C. Malone, & M. Zingale, 2010, *ApJS*,
188, 358
26. *Low Mach Number Modeling of Type Ia Supernovae. IV. White Dwarf Convection*,
M. Zingale, A. S. Almgren, J. B. Bell, A. Nonaka, & S. E. Woosley, 2009, *ApJ*, 704, 196
25. *A New Low Mach Number Approach in Astrophysics*,
A. S. Almgren, J. B. Bell, A. Nonaka, & M. Zingale, 2009, *CiSE*, 11, 24
24. *Turbulence-Flame Interactions in Type Ia Supernovae*,
A. J. Aspden, J. B. Bell, M. S. Day, S. E. Woosley, & M. Zingale, 2008, *ApJ*, 689, 1173
23. *Low Mach Number Modeling of Type Ia Supernovae. III. Reactions*,
A. S. Almgren, J. B. Bell, A. Nonaka, & M. Zingale, 2008, *ApJ* 684, 449
22. *Propagation of the First Flames in Type Ia Supernovae*,
M. Zingale and L. J. Dursi, 2007, *ApJ*, 656, 333
21. *Low Mach Number Modeling of Type Ia Supernovae. II. Energy Evolution*,
A. S. Almgren, J. B. Bell, C. A. Rendleman, & M. Zingale, 2006, *ApJ*, 649, 927
20. *Low Mach Number Modeling of Type Ia Supernovae. I. Hydrodynamics*,
A. S. Almgren, J. B. Bell, C. A. Rendleman, & M. Zingale, 2006, *ApJ*, 637, 922
19. *Three-Dimensional Numerical Simulations of Rayleigh-Taylor Unstable Flames in Type Ia Supernovae*,
M. Zingale, S. E. Woosley, C. A. Rendleman, M. S. Day, & J. B. Bell, 2005, *ApJ*, 632, 1021
18. *Validating an Astrophysical Simulation Codes*,
A. C. Calder, L. J. Dursi, B. Fryxell, T. Plewa, V. G. Weirs, T. Dupont, H. F. Robey, R. P. Drake,
B. A. Remington, G. Dimonte, J. Hayes, J. M. Stone, P. M. Ricker, F. X. Timmes, M. Zingale,
& K. Olson, 2004, *CiSE*, 6, 10
17. *Direct Numerical Simulations of Type Ia Supernovae Flames II: The Rayleigh-Taylor Instability*,
J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, *ApJ*, 608, 883
16. *Direct Numerical Simulations of Type Ia Supernovae Flames I: The Landau-Darrieus Instability*,
J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, *ApJ*, 606, 1029
15. *On the Nonlinear Evolution of Wind-driven Gravity Waves*,
A. Alexakis, A. C. Calder, L. J. Dursi, R. Rosner, J. W. Truran, B. Fryxell, M. Zingale, F. X. Timmes,
K. Olson, & P. Ricker, 2004, *Phys. of Fluids*, 16, 9, 3256

14. *Adaptive Low Mach Number Simulations of Nuclear Flames*,
J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, & M. Zingale, 2004, JCP, 195, 2, 677
13. *A Comparative Study of the Turbulent Rayleigh-Taylor Instability Using High-Resolution Three-Dimensional Numerical Simulations: The Alpha-Group Collaboration*,
G. Dimonte, D. L. Youngs, A. Dimits, S. Weber, M. Marinak, S. Wunsch, C. Garasi, A. Robinson, M. J. Andrews, P. Ramaprabhu, A. C. Calder, B. Fryxell, J. Biello, L. Dursi, P. MacNeice, K. Olson, P. Ricker, R. Rosner, F. Timmes, H. Tufo, Y.-N. Young, & M. Zingale, 2004, Phys. of Fluids, 16, 5, 1668
12. *On Heavy Element Enrichment in Classical Novae*,
A. Alexakis, A. C. Calder, A. Heger, E. F. Brown, L. J. Dursi, J. W. Truran, R. Rosner, D. Q. Lamb, F. X. Timmes, B. Fryxell, M. Zingale, P. M. Ricker, & K. Olson, 2004, ApJ, 602, 931
11. *Morphology of Rising Hydrodynamic and Magneto-hydrodynamic Bubbles from Numerical Simulations*,
K. Robinson, L. J. Dursi, P. M. Ricker, R. Rosner, A. C. Calder, M. Zingale, T. Linde, A. Caceres, B. Fryxell, K. Olson, K. Riley, A. Siegel, J. W. Truran, & N. Vladimirova, 2004, ApJ, 601, 621
10. *Parallel netCDF: A High-Performance Scientific I/O Interface*,
J. Li, W.-k. Laio, A. Choudhary, R. Ross, R. Thakur, R., W. Gropp, R. Latham, A. Siegel, B. Gallagher, & M. Zingale, 2003, technical paper, SC2003
9. *The Response of Astrophysical Thermonuclear Flames to Curvature and Stretch*,
L. J. Dursi, M. Zingale, A. Calder, B. Fryxell, F. X. Timmes, N. Vladimirova, R. Rosner, A. Caceres, D. Q. Lamb, K. Olson, P. M. Ricker, K. Riley, A. Siegel, & J. W. Truran, 2003, ApJ, 595, 955
8. *Mapping Initial Hydrostatic Models in Godunov Codes*,
M. Zingale, L. J. Dursi, J. ZuHone, A. C. Calder, B. Fryxell, T. Plewa, J. W. Truran, A. Caceres, K. Olson, P. M. Ricker, K. Riley, R. Rosner, A. Siegel, F. X. Timmes, & N. Vladimirova, 2002, ApJS, 143, 539
7. *On Validating an Astrophysical Simulation Code*,
A. C. Calder, B. Fryxell, T. Plewa, R. Rosner, L. J. Dursi, V. G. Weirs, T. Dupont, H. F. Robey, J. O. Kane, B. A. Remington, R. P. Drake, G. Dimonte, M. Zingale, F. X. Timmes, K. Olson, P. Ricker, P. MacNeice, & H. M. Tufo, 2002, ApJS, 142, 201
6. *A Case Study in Application I/O on Linux Clusters*,
R. Ross, D. Nurmi, A. Cheng, & M. Zingale, 2001, technical paper, SC2001
5. *Helium Detonations on Neutron Stars*,
M. Zingale, F. X. Timmes, B. Fryxell, D. Q. Lamb, K. Olson, A. C. Calder, L. J. Dursi, P. Ricker, R. Rosner, P. MacNeice, & H. Tufo, 2001, ApJS, 133, 195

4. *High-Performance Reactive Fluid Flow Simulations Using Adaptive Mesh Refinement on Thousands of Processors*,
A. C. Calder, B. C. Curtis, L. J. Dursi, B. Fryxell, G. Henry, P. MacNeice, K. Olson, P. Ricker, R. Rosner, F. X. Timmes, H. M. Tufo, J. W. Truran, & M. Zingale, 2000, Gordon Bell Prize winner/Special category, technical paper, SC2000
3. *On the Cellular Structure of Carbon Detonations*,
F. X. Timmes, M. Zingale, K. Olson, B. Fryxell, P. Ricker, A. C. Calder, L. J. Dursi, J. W. Truran, & R. Rosner, 2000, ApJ, 543, 938
2. *FLASH: An Adaptive Mesh Hydrodynamics Code for Modeling Astrophysical Thermonuclear Flashes*,
B. Fryxell, K. Olson, P. Ricker, F. X. Timmes, M. Zingale, D. Q. Lamb, P. MacNeice, R. Rosner, & H. Tufo, 2000, ApJS, 131, 273
1. *Flash Code: Studying Astrophysical Thermonuclear Flashes*,
R. Rosner, A. Calder, J. Dursi, B. Fryxell, D. Q. Lamb, J. C. Niemeyer, K. Olson, P. Ricker, F. X. Timmes, J. Truran, H. Tufo, Y. Young, M. Zingale, E. Lusk, & R. Stevens, 2000, CiSE, 2, 33

Unrefereed / Conference Proceedings

25. *Practical Effects of Integrating Temperature with Strang Split Reactions*,
M. Zingale, M. P. Katz, D. E. Willcox, & A. Harpole, 2021, Research Notes of the AAS, 5, 4, 71
24. *The LOFT mission concept: a status update*,
M. Feroci et al., 2016, Proc. SPIE 9905, Space Telescopes and Instrumentation 2016: Ultraviolet to Gamma Ray, 99051R, July 25, 2016
23. *Understanding Ignition in Type Ia Supernovae*,
M. Zingale, A. Jacobs, A. S. Almgren, J. B. Bell, A. Nonaka, C. Malone, & S. Woosley, 2015, extended abstract for the 25th International Colloquium on the Dynamics of Explosions and Reactive Systems, Leeds, UK, Aug. 2–7, 2015
22. *Low Mach Number Modeling of Stratified Flows*,
A. S. Almgren, J. B. Bell, A. Nonaka, & M. Zingale, 2014, in Finite Volumes for Complex Applications VII: Methods, Theoretical Aspects—FVCA 7, Berlin, June 2014, ed. Fuhrmann, J., Ohlberger, M., & Rohde, C., 3–15; Proceedings of the FVCA7 - The International Symposium of Finite Volumes for Complex Applications VII Berlin, June 15–20, 2014
21. *From Convection to Explosion: End-to-End Simulation of Type Ia Supernovae*,
A. Nonaka, A. S. Almgren, J. B. Bell, H. Ma, S. E. Woosley, & M. Zingale, 2011, Proceedings of SciDAC 2011, Denver, CO, July 10–14, 2011, <http://press.mcs.anl.gov/scidac2011/>
20. *MAESTRO, CASTRO, and SEDONA — Petascale Codes for Astrophysical Applications*,
A. Almgren, J. Bell, D. Kasen, M. Lijewski, A. Nonaka, P. Nugent, C. Rendlement, R. Thomas, & M. Zingale, 2010, Proceedings of the 2010 Scientific Discovery through Advanced Computing (SciDAC) Conference. Chattanooga, Tennessee, July 11–15, 2010. Oak Ridge National Laboratory. <http://computing.ornl.gov/workshops/scidac2010/>

19. *Type Ia Supernovae: Advances in Large Scale Simulation*,
H. Ma, M. Zingale, S. E. Woosley, A. J. Aspden, J. B. Bell, A. S. Almgren, A. Nonaka, & S. Dong, 2010, Proceedings of the 2010 Scientific Discovery through Advanced Computing (SciDAC) Conference. Chattanooga, Tennessee, July 11–15, 2010. Oak Ridge National Laboratory. <http://computing.ornl.gov/workshops/scidac2010/>
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.
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.
16. *Type Ia supernovae*,
S. E. Woosley, A. Almgren, J. B. Bell, G. Glatzmaier, D. Kasen, A. R. Kerstein, H. Ma, P. Nugent, F. Röpke, V. Sankaran, & M. Zingale, 2007, Proceedings of SciDAC 2007, Journal of Physics: Conference Series, 78, 012081.
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.
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.
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.
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
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
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.
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.
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.
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.
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.

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 Books2. *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, submitted to Journal of Physics G

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. Rózańska, 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

- 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 Astronomy 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, University 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 (ICDERS)*, 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.ubic.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.