

Alexei Y. Poludnenko

Department of Aerospace Engineering ◊ 3141 TAMU ◊ Texas A&M University ◊ College Station, TX 77843

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Research Fields

- Computational fluid dynamics and modeling of complex multi-scale, multi-physics flows
- Combustion, chemical and thermonuclear flames and detonations
- Turbulence in reacting and nonreacting flows
- Numerical methods for reactive and nonreactive computational hydro- and magnetohydrodynamics
- Large-eddy simulation (LES) models for fluid dynamics and turbulent combustion
- High-performance computing

Education

- **2004 Ph.D.** Dept. of Physics and Astronomy, Laboratory for Laser Energetics, Univ. of Rochester
- **2000 M.A.** Dept. of Physics and Astronomy, University of Rochester
- **1999 Specialist (Physics, Degree with Honors)** Department of Physics and Mathematics, National University “Kyiv-Mohyla Academy”, Ukraine
- **1998 B.Sc. (Physics, Degree with Honors)** Department of Physics and Mathematics, National University “Kyiv-Mohyla Academy”, Ukraine

Professional Experience

- **09/2016 – present**, Associate professor, *Texas A&M University*
- **06/2010 – 08/2016**, Research physicist, *Naval Research Laboratory*
- **10/2009 – 06/2010**, Research physicist, *Berkeley Research Associates, Inc.*
- **10/2007 – 09/2009**, National Research Council research associate, *Naval Research Laboratory*
- **08/2004 – 09/2007**, Research associate/scientist, *University of Chicago*
- **06/1999 – 08/2004**, Research assistant, Laboratory for Laser Energetics, *University of Rochester*
- **08/1998 – 06/1999**, Teaching assistant, *University of Rochester*

Awards

- **2016 François Frenkiel Award, American Physical Society Division of Fluid Dynamics**
- **2015 Alan Berman Research Publication Award**, Naval Research Laboratory, Washington, D.C.
- **Frank J. Horton Fellowship**, Laboratory for Laser Energetics, Rochester, NY, 1999 - 2004

Funding Awards

- **AFOSR, 2015 – 2018** Principal Investigator, ~\$1M (total)
- **DoD SERDP, 2016 – 2018** Co-Investigator, ~\$73K (total)
- **DoD HPCMP, 2014 – 2018** Principal Investigator (Frontier award), ~750 million CPU hours & \$400K (total)
- **DoD HPCMP, 2016** Principal Investigator, ~\$48K (HPC HIP intern support)
- **DoD HPCMP, 2015** Principal Investigator, ~\$24K (HPC HIP intern support)

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- **NRL/NRC, 2014 – 2016** National Research Council postdoctoral research associateship (postdoctoral adviser for Dr. Andrey Beresnyak), ~\$200K (total)
- **AFOSR, 2012 – 2015** Co-Principal/Principal Investigator, ~\$700K (total)
- **NASA, 2012 – 2014** Principal Investigator, ~\$400K (total)
- **NSF, 2007** Co-Principal Investigator, ~\$900K (total)

Professional Service

- **ICDERS, 2015** Scientific organizing committee member / special session organizer
- **Progress in Energy and Combustion Science, 2015 - 2018** Member of the Editorial Board
- **AFOSR, 2011 – present** Proposal reviewer
- **NASA, 2012 – 2014** Panel review member
- **NSF, 2013 – present** Panel review member
- **Journal refereeing:** Physical Review Letters, Physics of Fluids, Journal of Computational Physics, Journal of Fluid Mechanics, Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Combustion and Flame, Astrophysics and Space Science, High Energy Density Physics, Combustion Science and Technology, Proceedings of the Combustion Institute, Fuel, New Journal of Physics, International Colloquium on the Dynamics of Explosions and Reactive Systems

Supervision and Advising

- **Andrey Beresnyak (NRL) 2014 – 2016** Postdoctoral adviser
- **Colin Towery (NRL / UColorado, Boulder) 2015, 2016** HPCMP HIP internship adviser
- **Ryan Darragh (NRL / UColorado, Boulder) 2016** HPCMP HIP internship adviser
- **Aaron Jackson (NRL) 2011 – 2013** Postdoctoral co-adviser

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List of Publications and Presentations

Refereed Publications

1. *The Cross-Scale Physical-Space Transfer of Kinetic Energy in Turbulent Premixed Flames*, O'Brien, J., Towery, C.A.Z., Hamlington, P.E., Ihme, M., **Poludnenko, A.Y.**, Urzay, J., *Proceedings of the Combustion Institute*, 2016, in press
2. *Spectral Kinetic Energy Transfer in Turbulent Premixed Reacting Flows*, Towery, C.A.Z., **Poludnenko, A.Y.**, Urzay, J., O'Brien, J., Ihme, M., Hamlington, P.E., *Physical Review E*, 2016, 93, 053115
3. *Pulsating Instability and Self-acceleration of Fast Turbulent Flames*, **Poludnenko, A.Y.**, 2015, *Physics of Fluids*, 27, 014106
4. *Transverse Waves Resulting from Pulsating Instability of Two-Dimensional Flames*, Gamezo, V.N., **Poludnenko, A.Y.**, Oran, E.S., Williams, F.A., 2014, *Combustion and Flame*, 161, 950
5. *Intermittency in Premixed Turbulent Reacting Flows*, Hamlington, P.E., **Poludnenko, A.Y.**, Oran, E.S., 2012, *Physics of Fluids*, 24, 075111
6. *Interactions Between Turbulence and Flames in Premixed Reacting Flows*, Hamlington, P.E., **Poludnenko, A.Y.**, Oran, E.S., 2011, *Physics of Fluids*, 23, 125111
7. *Spontaneous Transition of Turbulent Flames to Detonations in Unconfined Media*, **Poludnenko, A.Y.**, Gardiner, T. A., Oran, E.S., 2011, *Physical Review Letters*, 107, 054501
8. *The Interaction of High-Speed Turbulence with Flames: Turbulent Flame Speed*, **Poludnenko, A.Y.**, Oran, E.S., 2011, *Combustion and Flame*, 158, 301
9. *The Interaction of High-Speed Turbulence with Flames: Global Properties and Internal Flame Structure*, **Poludnenko, A.Y.**, Oran, E.S., 2010, *Combustion and Flame*, 157, 995
10. *Computation of Fluid Flows in Non-inertial Contracting, Expanding, and Rotating Reference Frames*, **Poludnenko, A.Y.**, Khokhlov, A.M., 2007, *Journal of Computational Physics*, 220, 678
11. *Shock Propagation in Deuterium-Tritium-Saturated Foam*, Collins, T.J.B., **Poludnenko, A.Y.**, Cunningham, A., Frank, A., 2005, *Physics of Plasmas*, 12, 062705
12. *Evolution and Fragmentation of Wide-Angle Wind Driven Molecular Outflows*, Cunningham, A., Frank, A., Varnière, P., **Poludnenko, A.Y.**, Mitran, S., Hartmann, L., 2005, *Astrophysics and Space Science*, 298, 317
13. *Strings in the η Carinae Nebula: Hypersonic Radiative Cosmic Bullets*, **Poludnenko, A.Y.**, Frank, A., Mitran, S., 2004, *Astrophysical Journal*, 613, 387
14. *A Laboratory Investigation of Supersonic Clumpy Flows: Experimental Design and Theoretical Analysis*, **Poludnenko, A.Y.**, Dannenberg, K.K., Drake, R.P., Frank, A., Knauer, J., Meyerhofer, D.D., Furnish, M., Asay, J.R., 2004, *Astrophysical Journal*, 604, 213
15. *Hydrodynamic Interaction of Strong Shocks with Inhomogeneous Media. I. Adiabatic Case*, **Poludnenko, A.Y.**, Frank, A., Blackman, E.G., 2002, *Astrophysical Journal*, 576, 832

Conference Proceedings and Circulars

1. *Turbulent Chemical and Thermonuclear Flames: Intrinsic Instability and Anisotropic Turbulence Amplification*, **Poludnenko, A.Y.**, Taylor, B.D., Proceedings of the 9th International Symposium on Turbulence and Shear Flow Phenomena, Melbourne, Australia, Jun. 2015

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List of Publications and Presentations

2. *Spectral energy dynamics in premixed flames*, Towery, C.A.Z., **Poludnenko, A.Y.**, Urzay, J., Ihme, M., and Hamlington, P.E., Center for Turbulence Research Proceedings of the 2014 Summer Program, Stanford University, pp. 159-168
3. *Counter-gradient subgrid-scale transport and energy backscatter in turbulent deflagrations*, O'Brien, J., Urzay, J., **Poludnenko, A.Y.**, Hamlington, P.E., and Ihme, M., Center for Turbulence Research Proceedings of the 2014 Summer Program, Stanford University, pp. 147-157
4. *Pulsating Flame Instability in Two Dimensions*, Gamezo, V.N., **Poludnenko, A.Y.**, Oran, E.S., Williams, F.A., 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, Jan. 2013, paper AIAA 2013-0292
5. *Intermittency and Premixed Turbulent Reacting Flows*, Hamlington, P., **Poludnenko, A.Y.**, Oran, E.S., 49th AIAA Aerospace Sciences Meeting, Orlando, FL, Jan. 2011, paper AIAA 2011-113
6. *Turbulence and Scalar Gradient Dynamics in Premixed Reacting Flows*, Hamlington, P., **Poludnenko, A.Y.**, Oran, E.S., 40th AIAA Fluid Dynamics Conference, Chicago, IL, June 2010, paper AIAA 2010-5027
7. *AstroBEAR: AMR for Astrophysical Applications - I: Methods*, **Poludnenko, A.Y.**, Varnière, P., Frank, A., Mitran, S., 2004, in *Chicago Workshop on Adaptive Mesh Refinement Methods*, eds. T. Plewa, T. Linde, and V.G. Weirs (Lecture Notes in Computational Sciences and Engineering (LNCSE): Springer), vol. 41
8. *AstroBEAR: AMR for Astrophysical Applications - II: Tests and Applications*, Varnière, P., **Poludnenko, A.Y.**, Cunningham, A., Frank, A., Mitran, S., 2004, in *Chicago Workshop on Adaptive Mesh Refinement Methods*, eds. T. Plewa, T. Linde, and V.G. Weirs (Lecture Notes in Computational Sciences and Engineering (LNCSE): Springer), vol. 41
9. *Clumpy Flows in Protoplanetary and Planetary Nebulae*, **Poludnenko, A.Y.**, Frank, A., Mitran, S., 2004, in *Asymmetric Planetary Nebulae III*, eds. M. Meixner, J.H. Kastner, B. Balick, and N. Soker (in ASP Conference Series: San Francisco), vol. 313, pp. 434-437
10. *Stellar Outflows with New Tools: Advanced Simulations and Laboratory Experiments*, Frank, A., **Poludnenko, A.Y.**, Gardiner, T.A., Lebedev, S.V., Drake, R.P., 2003, *RevMexAA (Serie de Conferencias)*, 15, 85; *Winds, Bubbles, & Explosions: A Conference to Honor John Dyson*, Pátzcuaro, Michoacán, México, eds. S.J. Arthur, W.J. Henney
11. *Hydrodynamics of Clumpy Flows: Application to the PNe*, **Poludnenko, A.Y.**, Frank, A., Blackman, E.G., 2003, in *Planetary Nebulae: Their Evolution and Role in the Universe*, eds. S. Kwok, M. Dopita, R. Sutherland (in IAU Proceedings: ASP), vol. 209, pp. 201-202
12. *Strong Shocks and Supersonic Winds in Inhomogeneous Media*, **Poludnenko, A.Y.**, Frank, A., Blackman, E.G., 2002, in *Mass Outflow in Active Galactic Nuclei: New Perspectives*, eds. D.M. Crenshaw, S.B. Kraemer, I.M. George (in ASP Conference Series: San Francisco), vol. 255, pp. 285-290
13. *Problems of the Solar Turbulent Dynamo*, Kryvodubsky, V.N., **Poludnenko, A.Y.** 1998, *Scientific Notes of the National University "Kiev-Mohyla Academy"* (KM Academia: Kiev) , vol. 5, pp. 15-26

Invited Seminars and Talks

1. *High-Speed Turbulent Reacting Flows: Intrinsic Flame Instability and its Effects on the Turbulent Cascade*, François Frenkiel Award Lecture, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, November, 2016

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2. *Turbulent Combustion: From a Jet Engine to an Exploding Star*, Department of Applied Mechanics, Chalmers University of Technology, Gothenburg, Sweden, September 2016
 3. *Inter-Scale Energy Transfer in High-Speed Reacting Flows*, Physics of Turbulent Combustion, Nordic Institute for Theoretical Physics (NORDITA), Stockholm, Sweden, September 2016
 4. *Direct Numerical Simulations of High-Speed Hydrocarbon Combustion*, 2nd International Workshop on Combustion Chemistry Models of Real Liquid Fuels, AFOSR, Arlington, VA, June 2016
 5. *Turbulent Combustion: From a Jet Engine to an Exploding Star*, Department of Aerospace and Mechanical Engineering, University of Southern California, Los Angeles, CA, October 2015
 6. *Turbulent Combustion: From a Jet Engine to an Exploding Star*, Department of Mechanical Engineering, University of Connecticut, Storrs, CT, September 2015
 7. *Astrophysical Combustion: From a Laboratory Flame to a Thermonuclear Supernova*, Invited review talk, International Colloquium on the Dynamics of Explosions and Reactive Systems, Leeds, UK, August 2015
 8. *Direct Numerical Simulations of n-Dodecane Flames in the Presence of High-Intensity Turbulence*, Workshop on Jet Fuel Chemistry, AFOSR, Arlington, VA, April 2015
 9. *Turbulent Combustion: From a Jet Engine to an Exploding Star*, Department of Mechanical Engineering, University of Colorado, Boulder, CO, October 2014
 10. *Turbulent Combustion: Needs & Requirements*, Workshop “Development of modeling frameworks for heterogeneous high performance computing platforms”, Naval Research Laboratory, Washington, DC, September 2014
 11. *First-Principles Modeling of Spontaneous Detonation Formation in Thermonuclear Flames*, Type Ia Supernovae Workshop, Institute for Advanced Study, Princeton, NJ, February, 2014
 12. *Scale-Space Dynamics of Fast Turbulent Flames*, Workshop on Interactions Between Small and Large Scales in Turbulent Combustion, San Antonio, TX, April, 2013
 13. *Turbulent Combustion: From a Jet Engine to an Exploding Star*, Department of Mechanical Engineering, University of Colorado, Boulder, CO, March, 2013
 14. *Deflagration-to-Detonation Transition in Unconfined Media*, International Colloquium on the Dynamics of Explosions and Reactive Systems, University of California, Irvine, CA, July, 2011
 15. *Turbulent Combustion: Myths, Legends, and the Type Ia Supernova Problem*, University of Rochester, Department of Physics and Astronomy, Rochester, NY, October 2010
 16. *Turbulent Combustion: Myths, Legends, and the Type Ia Supernova Problem*, SUNY Stony Brook, Department of Physics and Astronomy, Stony Brook, NY, April 2010
 17. *Modeling Late-Time Stages of Type Ia Supernovae Explosions*, University of Virginia, Department of Astronomy, Charlottesville, VA, June 2006
 18. *Numerical Modeling of Astrophysical Inhomogeneous Media with AstroBEAR Code*, Academia Sinica Institute of Astronomy and Astrophysics, Taipei, Taiwan, March 2004
 19. *Modeling of Astrophysical Inhomogeneous Media with AstroBEAR Code*, ASC Alliances Flash Center / Dept. of Astronomy and Astrophysics, University of Chicago, Chicago, IL, January 2004
 20. *Modeling of Astrophysical Inhomogeneous Media with AstroBEAR Code*, Department of Physics and Astronomy, Michigan State University, Lansing, MI, January 2004
 21. *Numerical Modeling of Astrophysical Inhomogeneous Media with AstroBEAR Package*, Department of Physics and Astronomy, McMaster University, Hamilton, Canada, May 2003
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22. *Hydrodynamics of Astrophysical Inhomogeneous Media: Theoretical and Numerical Aspects*, Department of Mathematics, University of North Carolina, Chapel Hill, NC, October 2002

Contributed Talks

1. *Turbulent chemical and thermonuclear flames: Intrinsic instability and anisotropic turbulence amplification*, 9th Symposium on Turbulence and Shear Flow Phenomena (TSFP-9), Melbourne, Australia, June 2015
 2. *Pulsating Instability of Turbulent Thermonuclear Flames in Type Ia Supernovae*, 223rd Meeting of the American Astronomical Society, National Harbor, MD, January 2014, #316.06
 3. *Spontaneous Deflagration-to-Detonation Transition in Thermonuclear Supernovae*, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, November 2013
 4. *Pulsating Flame Instability in Two Dimensions*, 14th International Conference on Numerical Combustion, San Antonio, TX, April 2013
 5. *Spontaneous Deflagration-to-Detonation Transition in Thermonuclear Supernovae*, 14th International Conference on Numerical Combustion, San Antonio, TX, April 2013
 6. *Spontaneous Deflagration-to-Detonation Transition in Thermonuclear Supernovae*, 9th International Conference on High Energy Density Laboratory Astrophysics, Tallahassee, FL, May 2012
 7. *Deflagration-to-Detonation Transition in Unconfined Media*, 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, MD, November 2011
 8. *Spontaneous Transition of Turbulent Flames to Detonations in Thermonuclear Supernovae*, Supernovae and Their Host Galaxies, Sydney, Australia, June 2011
 9. *Deflagration-to-Detonation Transition in Unconfined Media*, 13th International Conference on Numerical Combustion, Corfu, Greece, April 2011
 10. *The Interaction of High-Speed Turbulence with Flames: Turbulent Flame Speed*, 63rd Annual Meeting of the APS Division of Fluid Dynamics, Long Beach, CA, November 2010, Bulletin of the APS, vol. 55, #16, #MU.00007
 11. *The Interaction of High-Speed Turbulence with Flames*, Turbulent Combustion program, Nordic Institute for Theoretical Physics, Stockholm, Sweden, May 2010
 12. *The Interaction of High-Speed Turbulence with Flames*, 62nd Annual Meeting of the APS Division of Fluid Dynamics (abstract #AM.006), Minneapolis, MN, November 2009, Bulletin of the APS, vol. 54, #19, p. 41
 13. *Formation and Properties of Distributed Flames*, 61st Annual Meeting of the APS Division of Fluid Dynamics (abstract #AQ.009), San Antonio, TX, November 2008, Bulletin of the APS, vol. 53, #15, p. 46
 14. *Modeling of Post-Explosion Evolution of Type Ia Supernovae Explosions*, Grand Challenge Problems in Computational Astrophysics. Reunion Conference I, Institute for Pure and Applied Mathematics / UCLA, Lake Arrowhead, CA, December 2006
 15. *Modeling Late-Time Stages of Type Ia Supernovae Explosions*, Type Ia Supernovae and Dark Energy Workshop, University of Chicago, Chicago, IL, September 2006
 16. *Fluid Flows with High Degree of Expansion and Contraction*, Grand Challenge Problems in Computational Astrophysics. Workshop I: Astrophysical Fluid Dynamics, Institute for Pure and Applied Mathematics / UCLA, Los Angeles, CA, April 2005
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17. *Radiative Bullets and Clumps in Astrophysics*, 5th International Conference on High Energy Density Astrophysics, Tucson, AZ, March 2004
18. *Astrophysical Inhomogeneous Media: Theoretical and Experimental Studies*, 45th Annual Meeting of the APS Division of Plasma Physics (abstract #FO1.013), Albuquerque, NM, October 2003, Bulletin of the APS, vol. 48, #7, p. 89
19. *AstroBEAR: Astrophysical Fluid and Magnetofluid Dynamics with BEARCLAW*, Chicago Workshop on Adaptive Mesh Refinement Methods, University of Chicago, Chicago, IL, September 2003
20. *Clumpy Flows in Proto-Planetary and Planetary Nebulae*, Asymmetric Planetary Nebulae III: Winds, Structure & the Thunderbird, Mt. Rainier, WA, July 2003
21. *Laboratory Experiments and Numerical Studies of Astrophysical Clumpy Flows*, 4th International Conference on High Energy Density Laboratory Astrophysics, University of Michigan, Ann Arbor, MI, February 2002
22. *Strong Shocks and Supersonic Winds in Inhomogeneous Media*, Hypersonic and Aerothermic Flows and Shocks, and Lasers: Plasma-Radiation-Surface Interactions and Lasers, Paris Observatory, Meudon, France, April 2001
23. *Shocks and Winds in Clumpy Media*, Mass Outflow in Active Galactic Nuclei: New Perspectives, The Catholic University of America, Washington, DC, March 2001
24. *Shocks and Winds in Clumpy Media*, Star Formation/ISM Jamboree, CITA & University of Toronto, Toronto, Canada, February 2001
25. *AMR Simulations of Winds in Clumpy Flows*, Meeting of the Astronomical Society of New York, University of Rochester, Rochester, NY, April 2000; News Letter of the Astronomical Society of New York, vol. 5, p.13

Abstracts and Posters

1. *Systematic Effects of Progenitor Composition on the Deflagration-to-Detonation Transition in Type Ia Supernovae*, **Poludnenko, A.Y.**, Gamezo, V.N., Oran, E.S., MPA/ESO/MPE/Excellence Cluster Universe Conference “Supernovae Illuminating the Universe: from Individuals to Populations”, Garching, Germany, September 2012
 2. *Spontaneous Formation of Detonations by Turbulent Flames in Thermonuclear Supernovae*, **Poludnenko, A.Y.**, Oran, E.S., 219th Meeting of the American Astronomical Society, 2012, #242.26
 3. *Turbulent Flame Speed and the Deflagration-to-Detonation Transition*, **Poludnenko, A.Y.**, Oran, E.S., 217th Meeting of the American Astronomical Society, 2011, BAAS, vol. 43, #337.08
 4. *The Interaction of High-Speed Turbulence with Flames*, **Poludnenko, A.Y.**, Oran, E.S., 33rd International Symposium on Combustion (abstract #W2P128), Beijing, China, August 2010
 5. *The Interaction of High-Speed Turbulence with Flames*, **Poludnenko, A.Y.**, Oran, E.S., 215th Meeting of the American Astronomical Society (abstract #430.12), 2010, BAAS, vol. 42, p. 357
 6. *Modeling High-Speed Turbulence–Flame Interaction*, **Poludnenko, A.Y.**, Oran, E.S., Gamezo, V.N., 2009 TeraGrid Conference (abstract #15), Arlington, VA, June 2009
 7. *Radiative MHD Shocks in Heterogeneous Media*, Shroyer, B., Cunningham, A.J., Frank, A., **Poludnenko, A.Y.**, Jones, T., Yirak, K., Carroll, J., 214th Meeting of the American Astronomical Society, #425.05, 2009, BAAS, vol. 41, p. 695
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8. *Non-Kolmogorov Turbulence Generation for Flame-Turbulence Interaction Studies*, **Poludnenko, A.Y.**, Gamezo, V.N., Oran, E.S., 32nd International Symposium on Combustion (abstract #W5P187), McGill University, Montreal, Canada, August 2008
9. *From Seconds to Days: Modeling of Post-Explosion Evolution of Type Ia Supernova Explosions*, **Poludnenko, A.Y.**, Khokhlov, A.M., Paths to Exploding Stars: Accretion and Eruption, KITP/UCSB, Santa Barbara, CA, March 2007
10. *Modeling Late-Time Stages of Type Ia Supernovae Explosions*, **Poludnenko, A.Y.**, Khokhlov, A.M., 208th Meeting of the American Astronomical Society (abstract #2.10), 2006, BAAS, vol. 38, p. 80
11. *Computation of Fluid Flows with High Degree of Expansion / Contraction and Rotation*, **Poludnenko, A.Y.**, Khokhlov, A.M., 6th International Conference on High Energy Density Astrophysics, Rice University, Houston, TX, March 2006
12. *High-Gain, Direct-Drive Foam Target Designs for the National Ignition Facility*, Collins, T.J.B., Skupsky, S., Frank, A., Cunningham, A., **Poludnenko, A.Y.**, 46th Annual Meeting of the APS Division of Plasma Physics (abstract #HO1.010), Savannah, GA, November 2004
13. *Development of a Test Bed for Astrophysical Jet Hydrodynamics*, Knauer, J.P., Sublett, S., Collins, T.J.B., Frank, A., Igumenshchev, I.V., Meyerhofer, D.D., **Poludnenko, A.Y.**, *et al.*, 45th Annual Meeting of the APS Division of Plasma Physics (abstract #GM1.006), Albuquerque, NM, October 2003
14. *The MHD Module in AstroBEAR*, Varnière, P., Frank, A., **Poludnenko, A.Y.**, Mitran, S., Chicago Workshop on Adaptive Mesh Refinement Methods, University of Chicago, Chicago, IL, September 2003
15. *The Propagation of Radiative Interstellar Bullets: The Strings of η Car*, **Poludnenko, A.Y.**, Mitran, S., Mellema, G., Frank, A., 201th Meeting of the American Astronomical Society (abstract #49.07), 2002, BAAS, vol. 34, p. 1185
16. *Hypersonic Swizzle Sticks: Interacting YSO Jets*, Frank, A., Cunningham, A., Powers, A., **Poludnenko, A.Y.**, 201th Meeting of the American Astronomical Society (abstract #93.01), 2002, BAAS, vol. 34, p. 1258
17. *Hydrodynamics of Clumpy Flows: Application to Planetary Nebulae*, **Poludnenko, A.Y.**, Frank, A., Blackman, E.G., 209th IAU Symposium, Canberra, Australia, November 2001
18. *Hydrodynamic Interaction of Shock Waves with Inhomogeneous Media*, **Poludnenko, A.Y.**, Frank, A., Blackman, E.G., 198th Meeting of the American Astronomical Society (abstract #65.05), 2001, BAAS, vol. 33, p. 885
19. *Design of Experiments to Simulate Shock-Wave Penetration of Clumpy Molecular Clouds*, Dannenberg, K., Drake, R.P., Furnish, K., Asay, M.D., Hebron, D.E., Schroen-Carey, D., **Poludnenko, A.Y.**, Frank, A., Arnett, D., 43rd Annual Meeting of the APS Division of Plasma Physics (abstract #UP1.043), Long Beach, CA, November 2001
20. *Properties of SiO₂ Aerogels Suitable for Astrophysical Experiments*, Sublett, S.L., Knauer, J.P., Meyerhofer, D.D., Skupsky, S., Frank, A., **Poludnenko, A.Y.**, 43rd Annual Meeting of the APS Division of Plasma Physics (abstract #BP1.090), Long Beach, CA, November 2001
21. *Design of Experiments to Simulate Shock-Wave Penetration of Clumpy Molecular Clouds*, Dannenberg, K.K., Drake, R.P., Furnish, M.D., Knudson, J.D., Asay, J.R., Hebron, D.E., Schroen-Carey, D., **Poludnenko, A.Y.**, Frank, A., Arnett, D., 198th Meeting of the American Astronomical Society (abstract #64.02), 2001, BAAS, vol. 33, p. 882

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List of Publications and Presentations

22. *AMR Simulations of Winds in Clumpy Flows*, **Poludnenko, A.Y.**, Frank, A., LeVeque, R., Berger, M., 196th Meeting of the American Astronomical Society (abstract #04.12), 2000, *BAAS*, vol. 32, p. 681

Media Coverage and Broader Outreach

1. *First-Principles Modeling of Modern Jet-Engine Combustors with Petascale Computations: Real Jet Fuels, Real Jet-Engine Conditions*, **Poludnenko, A.Y.**, Lewis, C., Tran, V., Valenciano, M., Wissmann, M., HPC Insights, publication of the Department of Defense High Performance Computing Modernization Program, Fall 2016, pp. 20 – 25;
http://www.hpc.mil/images/hpcdocs/newsroom/hpcinsights_fall2016.pdf
2. *Understanding the Physics of the Deflagration-to-Detonation Transition*, **Poludnenko, A.Y.**, Oran, E.S., Lewis, C., Valenciano, M. Official selection for the Visualization Showcase, The International Conference for High Performance Computing, Networking, Storage and Analysis (Supercomputing 2013), Denver, CO, November, 2013;
http://sc13.supercomputing.org/schedule/event_detail.php?evid=svs103_1
3. *The Physics of the Unconfined Deflagration-to-Detonation Transition*, **Poludnenko, A.Y.**, Gamezo, V.N., Oran, E.S., 2013 NRL Review, Naval Research Laboratory, Washington, DC;
<http://www.nrl.navy.mil/media/publications/nrl-review/>
4. *Understanding the Physics of the Deflagration-to-Detonation Transition*, **Poludnenko, A.Y.**, Oran, E.S., HPC Insights, publication of the Department of Defense High Performance Computing Modernization Program, Fall 2012, pp. 2 – 5, Cover story;
https://www.hpc.mil/images/hpcdocs/newsroom/hpcinsights_fall2012.pdf
5. *The Physics, Chemistry and Dynamics of Explosions*, **Poludnenko, A.**, *Philosophical Transactions of the Royal Society A*, 370, 1960 (2012), Cover image;
<http://rsta.royalsocietypublishing.org/content/370/1960.cover-expansion>
6. *Propellants and Combustion*, Pope, S., **Poludnenko, A.**, Schwer, D., Austin, J., Ju, Y., *Aerospace America*, Year in Review, Dec. 2011, p. 53;
http://www.aerospaceamerica.org/Documents/Aerospace_America_PDFs_2011/December2011-Year-in-Review/AA_DEC2011.pdf
7. *Peering Inside the 'Deflagration-to-Detonation Transition' of Explosions*, *ScienceDaily*, Nov. 28, 2011;
<http://www.sciencedaily.com/releases/2011/11/111122113216.htm>
EurekAlert!, AIP/APS press release, Nov. 22, 2011;
http://www.eurekalert.org/pub_releases/2011-11/aiop-pit112211.php
8. *What makes the fuel go boom? Turbulence!*, *Arstechnica.com*, Jul. 29, 2011;
<http://arstechnica.com/science/2011/07/what-makes-the-fuel-go-boom-turbulence/>
9. *How Stars Explode*, *Science Magazine*, Editor's Choice, 333, 6045 (2011) p. 920;
<http://www.sciencemag.org/content/333/6045/twil.full.pdf>
10. *Supernova Simulation Lights Up the Sky*, San Diego Supercomputing Center, 2007;
<http://www.sdsc.edu/discoveries/discoveries.html>