

David Arthur Chamulak

Physics Division, Bldg. 203
Argonne National Laboratory
9700 S. Cass Avenue
Argonne, IL 60439
USA

Tel: 1 630 252-3442
Fax: 1 630 252-3903
E-mail: dchamulak@anl.gov

Research Interests

Nucleosynthesis: explosive nucleosynthesis, carbon burning
Nuclear Reactions: heavy ion reactions, applications in astrophysics.
Abundances: origin of the elements, galactic chemical evolution.
Supernovae: mechanisms, modelling, use as standard candels.

Education

| | | |
|-----------------------------------|------------------------------------|-----------|
| Michigan State University | PhD Physics | 2003–2009 |
| Lawrence Technological University | Graduate Study in Computer Science | 2002–2003 |
| Lawrence Technological University | BS Physics and Computer Science | 1998–2002 |

Appointments

| | |
|--------------|--|
| 2009–present | Postdoctoral Fellow, Theory Group Argonne National Laboratory |
| 2005–2009 | Research Assistant, Department of Physics and Astronomy Michigan State University (MSU) |
| 2006–2007 | Student Researcher, X-2 Thermonuclear Applications Los Alamos National Laboratory |
| 2001–2003 | Research Assistant, Intelligent Systems and Autonomous Robotics Lab Lawrence Technological University (LTU) |

Awards

| | |
|---|------|
| American Astronomical Society Chambliss Award Honorable Mention | 2007 |
| Award for Outstanding Senior in Physics(LTU) | 2002 |
| Meritorious Achievement in the Mathematical Contest in Modeling | 2002 |

Teaching

Graduate Teaching Assistant, Physics Lab for Scientists, MSU
Graduate Teaching Assistant, Introductory Physics Lab, MSU

Service

2010–2011 Theory Seminar Chair, Argonne National Laboratory

Refereed publications

- 1) *Asymmetry and the Nucleosynthetic Signature of Nearly Edge-Lit Detonation in White Dwarf Cores*, **Chamulak, D. A.**, Meakin, C. A., Seitenzahl, I., Truran, J., accepted for publication in ApJ.

- 2) *Evaluating Systematic Dependencies of Type Ia Supernovae: The Influence of Deflagration to Detonation Density*, Jackson, A. P., Calder, A. C., Townsley, D. M., **Chamulak, D. A.**, Brown, E. F., Timmes, F. X. 2010, ApJ, 720, 99
- 3) *Nucleosynthesis in Surface Detonation Models of Type Ia Supernovae*, **Chamulak, D. A.**, Meakin, C. A., Seitenzahl, I., Truran, J. W., 2010, in Nuclei in the Cosmos 11, Proc. Sci(NIC-XI), 069 (conference proceedings)
- 4) *Turbulence-Flame Interaction on the Early Evolution of Flames in Type Ia Supernovae*, Calder, A. C., Jackson, A. P., Townsley, D. M., **Chamulak, D. A.**, Brown, E. F., Timmes, F. X. 2010, in Nuclei in the Cosmos 11, Proc. Sci(NIC-XI), 249 (conference proceedings)
- 5) *Evaluating Systematic Dependencies of Type Ia Supernovae: The Influence of Deflagration to Detonation Density*, Calder, A. C., Jackson, A. P., Krueger B., Townsley, D. M., **Chamulak, D. A.**, Brown, E. F., Timmes, F. X. 2010, in Nuclei in the Cosmos 11, Proc. Sci(NIC-XI), 251 (conference proceedings)
- 6) *Evaluating Systematic Dependencies of Type Ia Supernovae: The Influence of Progenitor ^{22}Ne Content on Dynamics*, Townsley, D. M., Jackson, A., Calder, A. C., **Chamulak, D. A.**, Brown, E. F., Timmes, F. X. 2009, ApJ, 701, 1582
- 7) *The Reduction of the Electron Abundance during the Pre-explosion Simmering in White Dwarf Supernovae*, **Chamulak, D. A.**, Brown, E. F., Timmes, F. X., & Dupczak, K. 2008, ApJ, 677, 160.
- 8) *Gamow-Teller strength for the analog transitions to the first $T = 1/2, J^\pi = 3/2^-$ states in ^{13}C and ^{13}N and the implications for type Ia supernovae*, Zegers, R. G. T., Brown, E. F., Akimune, H., Austin, S. M., van den Berg, A. M., Brown, B. A., **Chamulak, D. A.**, Fujita, Y., Fujiwara, M., Galés, S., Harakeh, M. N., Hashimoto, H., Hayami, R., Hitt, G. W., Itoh, M., Kawabata, T., Kawase, K., Kinoshita, M., Nakanishi, K., Nakayama, S., Okumura, S., Shimbara, Y., Uchida, M., Ueno, H., Yamagata, T., & Yosoi, M. 2008, Phys. Rev. C, 77, 2, 024307.
- 9) *The Laminar Flame Speedup by ^{22}Ne Enrichment in White Dwarf Supernovae*, **Chamulak, D. A.**, Brown, E. F., & Timmes, F. X. 2007, ApJ, 665, L93.
- 10) *The Laminar Flame Acceleration by Neon-22 Enrichment in White Dwarf Supernovae*, **Chamulak, D. A.**, Brown, E. F., & Timmes, F. X. 2006, in Nuclei in the Cosmos 9, Proc. Sci(NIC-IX), 079 (conference proceedings)

- 11) *An Affordable Modular Mobile Robotic Platform With Fuzzy Logic Control and Evolutionary Artificial Neural Networks*, Tedder, M., **Chamulak, D. A.**, Chen, L., Nair, S., Shvartsman, A., Tseng, I., & Chung, C. 2004, *Journal of Robotic Systems*, 21, 8, 419.

Selected Works in Preparation

- 1) *The Effect of Metallicity on the Production of Silicon Group Elements in Type Ia Supernovae*, **Chamulak, D. A.**, Brown, E. F., Calder, A. C., Jackson, A., Krueger, B., Timmes, F. X., Townsley, D. M., in preparation.
- 2) *Explosive Burning in Detonated White Dwarf Matter: Precision Methods for Nucleosynthetic Yield Calculation*, Meakin, C. A., **Chamulak, D. A.**, Seitenzahl, I., Truran, J., in preparation.

Talks and Posters

- October 2011 Fall Meeting of the APS Division of Nuclear Physics
East Lansing, MI
- April 2011 Argonne National Laboratory High Energy Division Seminar
Argonne, IL, USA
- March 2011 Astronomy with Radioactivities VII,
Phillip Island, Victoria, Australia
- January 2011 217th Meeting of the American Astronomical Society,
Seattle, WA, USA
- December 2010 Argonne National Laboratory Physics Division Seminar
Argonne, IL, USA
- October 2010 JINA Fronteers 2010,
Lake Geneva, WI, USA
- August 2010 The Pan-American Advanced Study Institute (PASI)
on the physics and astrophysics of rare isotopes,
Joao Pessoa, Brazil
- July 2010 Nuclei in the Cosmos (NIC) XI,
Heidelberg, Germany
- June 2010 10th Great Lakes Cosmology Workshop,
Chicago, IL, USA
- August 2009 Poster presented at Stellar Death and Supernovae,
Santa Barbara, CA, USA
- April 2009 Argonne National Laboratory Theory Seminar
Argonne, IL, USA
- July 2008 Poster presented at Nuclei in the Cosmos (NIC) X,
Mackinac Island, MI, USA
- August 2007 JINA Fronteers 2007,
South Bend, IN, USA
- January 2007 Poster presented at 209th Meeting of the American Astronomical Society,
Seattle, WA, USA

References

- Prof. Edward F. Brown Department of Physics and Astronomy, MSU
ebrown@pa.msu.edu
- Prof. Francis X. Timmes School of Earth and Space Exploration, Arizona State
fxt44@mac.com
- Prof. James W. Truran Department of Astronomy and Astrophysics, Univ. of Chicago
truran@nova.uchicago.edu
- Prof. Remco G.T. Zegers Department of Physics and Astronomy, MSU
zegers@nscl.msu.edu