

## Richard James deBoer II

---

Department of Physics  
207 Nieuwland Science Hall  
Notre Dame, IN 46650

Phone: 574.631.3692  
Fax: 574.631.5952  
e-mail: [rdeboer1@nd.edu](mailto:rdeboer1@nd.edu)  
Citizenship: USA

### Education

Ph.D. Physics, University of Notre Dame, 2012

M.S. Physics, University of Notre Dame, 2009

M.S. Physics, Ball State University, 2005

B.S. Physics, Western Michigan University, 2003, *Cum Laude*

### Research

Research Assistant Professor  
Department of Physics

2016–present  
University of Notre Dame

Postdoc  
Joint Institute for Nuclear Astrophysics

2012–2016  
University of Notre Dame

- Created most comprehensive  $R$ -matrix analysis of the  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$  reaction by combining previous high energy analysis with low energy data. The results are being prepared for publication in *Reviews of Modern Physics*.
- Comprehensive  $R$ -matrix analysis of the  $^{10}\text{B}(p, \alpha)^7\text{Be}$  reaction for use as a standard for the National Ignition Facility at Lawrence Livermore National Laboratory.
- Developed Monte Carlo uncertainty analysis technique for use with  $R$ -matrix analyses. Implemented for the analysis of the  $^3\text{He}(\alpha, \gamma)^7\text{Be}$  reaction.
- Constructed multiple exit/entrance channel  $R$ -matrix analysis of the  $^{16}\text{O}$  compound nucleus system and demonstrated the level of agreement between a wide variety of past experimental work. Use results to make a more accurate determination of the reaction rates of the astrophysically important reactions  $^{15}\text{N}(p, \gamma)^{16}\text{O}$ ,  $^{15}\text{N}(p, \alpha)^{12}\text{C}$ , and  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$ .
- Reconstructed silicon detector array in 1.5 meter scattering chamber and made higher energy measurements of  $^{12}\text{C} + \alpha$  reactions, low energy study of  $^{14}\text{N}(p, p)$ , and new measurements on  $^{15}\text{N} + \alpha$  reactions.

Research Assistant  
Dr. Michael Wiescher

2005–2011  
University of Notre Dame

- Co-developer of the  $R$ -matrix code AZURE and publication of data analysis of the reaction  $^{16}\text{O}(\alpha, \gamma)^{20}\text{Ne}$
- Measured astrophysically important states in  $^{26}\text{Mg}$  at the High Intensity  $\gamma$ -ray Source
- Experience with  $\gamma$ -spectroscopy using High Purity Germanium detectors
- Experience with neutron spectroscopy using  $4\pi$   $^3\text{He}$  counter and liquid scintillation detectors utilizing time of flight

- Operation experience using various low energy Van de Graaff accelerators

Research Assistant  
Dr. Saiful Islam

2003–2005  
Ball State University

- Analysis of  $^{65}\text{Cu}(\alpha, p)^{68}\text{Zn}$  cross section data with comparison to Hauser-Feshbach statistical model

### Invited Talks

- *Nuclear Science at the University of Notre Dame*. Ball State University, Muncie, IN, USA, November 2015.
- *The Quest for the Holy Grail of Nuclear Astrophysics*. Ohio University, Athens, OH, USA, October 2015.
- *Reducing uncertainties in nuclear reaction data*. Gordon Research Conference, June 2015.
- *AZURE2: A general R-matrix code for nuclear astrophysics*. Laboratori Nazionali del Gran Sasso, Italy, May 2015.
- *Experimental nuclear physics for light element nucleosynthesis*. Gran Sasso Science Institute, Italy, May 2015.
- *Phenomenological R-matrix analysis of reactions populating the  $^{16}\text{O}$  compound nucleus*. Los Alamos National Laboratory, Los Alamos, NM, March 2015.
- *Solving the Mysteries of  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$* . Laboratori Nazionali del Gran Sasso, Italy, December 2014.
- *Complementary measurements for nuclear astrophysics:  $^{14}\text{N}(p, \gamma)^{15}\text{O}$  and others*. Laboratori Nazionali del Gran Sasso, Italy, November 2014.
- *Precision measurements for nuclear astrophysics*. Triangle Universities Nuclear Laboratories, Durham, NC, USA, September 2014.
- *The  $^3\text{He}(\alpha, \gamma)^7\text{Be}$  Reaction Rate*. Laboratori Nazionali del Gran Sasso, Italy, October 2013
- *Nuclear Astrophysics at the University of Notre Dame*. Ball State University, Muncie, IN, September 2013
- *Improved Rate Calculations for Low Mass Reactions*. University of Notre Dame, Notre Dame, IN, January 2013
- *Developments of R-matrix Codes for Nuclear Astrophysics by the JINA Collaboration*. University of Edinburgh, September 2012
- *Indirect study of the  $^{22}\text{Ne}(\alpha, n)$  reaction*. Los Alamos National Laboratory, Los Alamos, NM, March 2012
- *Indirect study of the  $^{22}\text{Ne}(\alpha, n)$  reaction*. Lawrence Livermore National Laboratory, June 2012
- *The R-matrix code AZURE: Overview and capabilities*. Triangle Universities Nuclear Laboratory, Durham, NC, January 2009
- *$^{16}\text{O}(\alpha, \gamma)^{20}\text{Ne}$  S factor: Measurements and R-matrix analysis*. University of Notre Dame, Notre Dame, IN, January 2008

### Conference Talks

- 2016 *R*-matrix Workshop on Methods and Applications, AZURE2 tutorial using the  ${}^3\text{He}(\alpha, \gamma){}^7\text{Be}$  reaction
- Frontiers 2016, Characterizing neutron backgrounds for CASPAR
- APS Prairie 2015, Including higher energy data in the *R*-matrix extrapolation of  ${}^{12}\text{C}(\alpha, \gamma){}^{16}\text{O}$
- DNP 2015, Including higher energy data in the *R*-matrix extrapolation of  ${}^{12}\text{C}(\alpha, \gamma){}^{16}\text{O}$
- CNR\*15, *R*-matrix analysis of  ${}^{16}\text{O}$  compound nucleus reactions
- NPA7 2015, Low energy scattering cross sections ratios of  ${}^{14}\text{N}(p, p){}^{14}\text{N}$
- DNP 2014, Monte Carlo Uncertainty Analysis of  ${}^3\text{He}(\alpha, \gamma){}^7\text{Be}$
- Low Energy Nuclear Physics and Astrophysics Town Meeting 2014, *R*-matrix
- DNP 2013, Reaction Rate Uncertainties using *R*-matrix:  ${}^3\text{He}(\alpha, \gamma){}^7\text{Be}$  and  ${}^{12}\text{C}(\alpha, \gamma){}^{16}\text{O}$
- ECT\*-JINA Workshop 2013, Status of  ${}^{12}\text{C} + \alpha$  Reactions from an *R*-matrix Viewpoint
- NPA 2013, Reaction Rates with Uncertainties from an *R*-matrix analysis:  ${}^{15}\text{N}(p, \gamma){}^{16}\text{O}$ ,  ${}^{15}\text{N}(p, \alpha){}^{12}\text{C}$ , and  ${}^{12}\text{C}(\alpha, \gamma){}^{16}\text{O}$
- NIC 2012, JINA *R*-matrix Project
- Frontiers 2012, Simultaneous *R*-matrix Analysis of  ${}^{16}\text{O}$  Compound Nucleus Reactions
- DNP 2012, Simultaneous *R*-matrix Analysis of  ${}^{16}\text{O}$  Compound Nucleus Reactions
- EMMI-JINA Workshop 2012, Proton induced fusion reactions as a NIF temperature probe
- THERRA 2011, Simultaneous *R*-matrix Analysis of  ${}^{16}\text{O}$  Compound Nucleus Reactions
- DNP 2011, *R*-matrix Analysis of  ${}^{16}\text{O}$  Compound Nucleus Reactions
- APS 2011, Threshold Photoneutron Cross Sections for  ${}^{26}\text{Mg}$
- Frontiers 2010, Photoexcitation of astrophysically important states in  ${}^{26}\text{Mg}$
- Nuclear Astrophysics Graduate Student Meeting 2009, Notre Dame Nuclear Science Laboratory overview
- A Workshop on *R*-Matrix and Nuclear Reactions in Stellar Hydrogen and Helium Burning 2008, AZURE *R*-matrix analysis of  ${}^{21}\text{Na}(p, p)$
- Fourth European Summer School on Experimental Nuclear Astrophysics 2007, The *R*-matrix code AZURE

### Conference Organization

- Co-chair of the 2016 *R*-matrix Workshop on Methods and Applications held June 27 to July 1 of 2016 (co-sponsored by Los Alamos National Laboratory, Ohio University, and the Joint Institute for Nuclear Astrophysics)
- Organizer of student *R*-matrix workshop at Gran Sasso National Laboratory held May 11-14, 2015
- Principle organizer for the 2009 Nuclear Astrophysics Graduate Student Meeting at the University of North Carolina at Chapel Hill, NC

### Awards and Honors

- Larry O. Lamm Memorial Award in Nuclear Physics, Spring 2012
- Cornelius Brown Fellowship, Spring 2011
- Outstanding Graduate Teaching Award, University of Notre Dame, Spring 2006

## Publications in Refereed Journals

- R.J. deBoer, J. Görres, M. Wiescher, E. Uberseder, R.E. Azuma, A. Best, C. Brune, D. Sayre, and K. Smith. The  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$  reaction and its implications for stellar helium burning. *Reviews of Modern Physics*. Submitted to journal.
- R. Talwar, T. Adachi, G. P. A. Berg, L. Bin, S. Bisterzo, M. Couder, R. J. deBoer, X. Fang, H. Fujita, Y. Fujita, J. Görres, K. Hatanaka, T. Itoh, T. Kadoya, A. Long, K. Miki, D. Patel, M. Pignatari, Y. Shimbara, A. Tamii, M. Wiescher, T. Yamamoto, and M. Yosoi. Probing astrophysically important states in the  $^{26}\text{Mg}$  nucleus to study neutron sources for the  $s$  process. *Phys. Rev. C*, 93:055803, May 2016.
- Q. Li, J. Görres, R. J. deBoer, G. Imbriani, A. Best, A. Kontos, P. J. LeBlanc, E. Uberseder, and M. Wiescher. Cross section measurement of  $^{14}\text{N}(p, \gamma)^{15}\text{O}$  in the CNO cycle. *Phys. Rev. C*, 93:055806, May 2016.
- A. Boeltzig, C. G. Bruno, F. Cavanna, S. Cristallo, T. Davinson, R. Depalo, R. J. deBoer, A. Di Leva, F. Ferraro, G. Imbriani, P. Marigo, F. Terrasi, and M. Wiescher. Shell and explosive hydrogen burning. *The European Physical Journal A*, 52(4):1–13, 2016.
- B. Bucher, X. D. Tang, X. Fang, A. Heger, S. Almaraz-Calderon, A. Alongi, A. D. Ayangeakaa, M. Beard, A. Best, J. Browne, C. Cahillane, M. Couder, R. J. deBoer, A. Kontos, L. Lamm, Y. J. Li, A. Long, W. Lu, S. Lyons, M. Notani, D. Patel, N. Paul, M. Pignatari, A. Roberts, D. Robertson, K. Smith, E. Stech, R. Talwar, W. P. Tan, M. Wiescher, and S. E. Woosley. First direct measurement of  $^{12}\text{C}(^{12}\text{C}, n)^{23}\text{Mg}$  at stellar energies. *Phys. Rev. Lett.*, 114:251102, Jun 2015.
- D.W. Bardayan, K.A. Chipps, S. Ahn, J.C. Blackmon, R.J. deBoer, U. Greife, K.L. Jones, A. Kontos, R.L. Kozub, L. Linhardt, B. Manning, M. Mato, P.D. O'Malley, S. Ota, S.D. Pain, W.A. Peters, S.T. Pittman, A. Sachs, K.T. Schmitt, M.S. Smith, and P. Thompson. The first science result with the JENSA gas-jet target: Confirmation and study of a strong subthreshold resonance. *Physics Letters B*, 751:311 – 315, 2015.
- Khachatour V. Manukyan, Wanpeng Tan, Richard J. deBoer, Edward J. Stech, Ani Aprahamian, Michael Wiescher, Sergei Rouvimov, Kyle R. Overdeep, Christopher E. Shuck, Timothy P. Weihs, and Alexander S. Mukasyan. Irradiation-enhanced reactivity of multilayer Al/Ni nanomaterials. *ACS Applied Materials & Interfaces*, 7(21):11272–11279, 2015. PMID: 25915560.
- M. L. Sergi, C. Spitaleri, M. La Cognata, L. Lamia, R. G. Pizzone, G. G. Rapisarda, X. D. Tang, B. Bucher, M. Couder, P. Davies, R. deBoer, X. Fang, L. Lamm, C. Ma, M. Notani, S. O'Brien, D. Roberson, W. Tan, M. Wiescher, B. Irgaziev, A. Mukhamedzhanov, J. Mrazek, and V. Kroha. Improvement of the high-accuracy  $^{17}\text{O}(p, \alpha)^{14}\text{N}$  reaction-rate measurement via the trojan horse method for application to  $^{17}\text{O}$  nucleosynthesis. *Phys. Rev. C*, 91:065803, Jun 2015.
- R. J. deBoer, D. W. Bardayan, J. Görres, P. J. LeBlanc, K. V. Manukyan, M. T. Moran, K. Smith, W. Tan, E. Uberseder, M. Wiescher, P. F. Bertone, A. E. Champagne, and M. S. Islam. Low energy scattering cross section ratios of  $^{14}\text{N}(p, p)^{14}\text{N}$ . *Phys. Rev. C*, 91:045804, Apr 2015.
- Suprita Chakraborty, Richard deBoer, Avijit Mukherjee, and Subinit Roy. Systematic  $R$ -matrix analysis of the  $^{13}\text{C}(p, \gamma)^{14}\text{N}$  capture reaction. *Phys. Rev. C*, 91:045801, Apr 2015.

- L C Chamon, L R Gasques, G P A Nobre, E S Rossi Jr, R J deBoer, C Seymour, M Wiescher, and G G Kiss. Evidence of a slight nuclear transparency in the alpha-nucleus systems. *Journal of Physics G: Nuclear and Particle Physics*, 42(5):055102, 2015.
- S. Bisterzo, R. Gallino, F. Kppeler, M. Wiescher, G. Imbriani, O. Straniero, S. Cristallo, J. Grrs, and R. J. deBoer. The branchings of the main s-process: their sensitivity to -induced reactions on  $^{13}\text{C}$  and  $^{22}\text{Ne}$  and to the uncertainties of the nuclear network. *Monthly Notices of the Royal Astronomical Society*, 449(1):506–527, 2015.
- D.J. Mountford, R.J. deBoer, P. Descouvemont, A. St. J. Murphy, E. Uberseder, and M. Wiescher. Evaluation of the implementation of the  $R$ -matrix formalism with reference to the astrophysically important  $^{18}\text{F}(p, \alpha)^{15}\text{O}$  reaction. *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 767(0):359 – 363, 2014.
- R. J. deBoer, J. Görres, K. Smith, E. Uberseder, M. Wiescher, A. Kontos, G. Imbriani, A. Di Leva, and F. Strieder. Monte carlo uncertainty of the  $^3\text{He}(\alpha, \gamma)^7\text{Be}$  reaction rate. *Phys. Rev. C*, 90:035804, Sep 2014.
- R. J. deBoer, A. Best, J. Görres, K. Smith, W. Tan, M. Wiescher, R. Raut, G. Rusev, A. P. Tonchev, and W. Tornow. Photoneutron strengths in  $^{26}\text{Mg}$  at energies of astrophysical interest. *Phys. Rev. C*, 89:055802, May 2014.
- L C Chamon, L R Gasques, L F M Alves, V Guimares, P Descouvemont, R J deBoer, and M Wiescher. Effect of the inelastic couplings on the scattering of alpha particles by  $^{12}\text{C}$  at low energies. *Journal of Physics G: Nuclear and Particle Physics*, 41(3):035101, 2014.
- M. Pignatari, M. Wiescher, F. X. Timmes, R. J. de Boer, F.-K. Thielemann, C. Fryer, A. Heger, F. Herwig, and R. Hirschi. Production of carbon-rich presolar grains from massive stars. *The Astrophysical Journal Letters*, 767(2):L22, 2013.
- A. Kontos, E. Uberseder, R. deBoer, J. Görres, C. Akers, A. Best, M. Couder, and M. Wiescher. Astrophysical  $S$  factor of  $^3\text{He}(\alpha, \gamma)^7\text{Be}$ . *Phys. Rev. C*, 87:065804, Jun 2013.
- A. Best, S. Falahat, J. Görres, M. Couder, R. deBoer, R. T. Güray, A. Kontos, K.-L. Kratz, P. J. LeBlanc, Q. Li, S. O’Brien, N. Özkan, K. Sonnabend, R. Talwar, E. Uberseder, and M. Wiescher. Measurement of the reaction  $^{18}\text{O}(\alpha, n)^{21}\text{Ne}$ . *Phys. Rev. C*, 87:045806, Apr 2013.
- A. Best, M. Beard, J. Görres, M. Couder, R. deBoer, S. Falahat, R. T. Güray, A. Kontos, K.-L. Kratz, P. J. LeBlanc, Q. Li, S. O’Brien, N. Özkan, M. Pignatari, K. Sonnabend, R. Talwar, W. Tan, E. Uberseder, and M. Wiescher. Measurement of the reaction  $^{17}\text{O}(\alpha, n)^{20}\text{Ne}$  and its impact on the  $s$  process in massive stars. *Phys. Rev. C*, 87:045805, Apr 2013.
- R. J. deBoer, J. Görres, G. Imbriani, P. J. LeBlanc, E. Uberseder, and M. Wiescher.  $R$ -matrix analysis of  $^{16}\text{O}$  compound nucleus reactions. *Phys. Rev. C*, 87:015802, Jan 2013.
- M. Gulino, C. Spitaleri, X. D. Tang, G. L. Guardo, L. Lamia, S. Cherubini, B. Bucher, V. Burjan, M. Couder, P. Davies, R. deBoer, X. Fang, V. Z. Goldberg, Z. Hons, V. Kroha, L. Lamm, M. La Cognata, C. Li, C. Ma, J. Mrazek, A. M. Mukhamedzhanov, M. Notani, S. O’Brien, R. G. Pizzone, G. G. Rapisarda, D. Roberson, M. L. Sergi,

- W. Tan, I. J. Thompson, and M. Wiescher. Suppression of the centrifugal barrier effects in the off-energy-shell neutron +  $^{17}\text{O}$  interaction. *Phys. Rev. C*, 87:012801, Jan 2013.
- A. Kontos, J. Görres, A. Best, M. Couder, R. deBoer, G. Imbriani, Q. Li, D. Robertson, D. Schürmann, E. Stech, E. Uberseder, and M. Wiescher. Proton capture on  $^{17}\text{O}$  and its astrophysical implications. *Phys. Rev. C*, 86:055801, Nov 2012.
- G. Imbriani, R. J. deBoer, A. Best, M. Couder, G. Gervino, J. Görres, P. J. LeBlanc, H. Leiste, A. Lemut, E. Stech, F. Strieder, E. Uberseder, and M. Wiescher. Measurement of  $\gamma$  rays from  $^{15}\text{N}(p, \gamma)^{16}\text{O}$  cascade and  $^{15}\text{N}(p, \alpha_{\gamma 1})^{12}\text{C}$  reactions. *Phys. Rev. C*, 85:065810, Jun 2012.
- R. J. deBoer, A. Couture, R. Detwiler, J. Görres, P. Tischhauser, E. Uberseder, C. Ugalde, E. Stech, M. Wiescher, and R. E. Azuma. Measurement of elastic  $^{12}\text{C} + \alpha$  scattering: Above the proton separation energy. *Phys. Rev. C*, 85:045804, Apr 2012.
- R. J. deBoer, P. J. LeBlanc, S. Falahat, G. Imbriani, J. Görres, S. O'Brien, E. Uberseder, and M. Wiescher. Elastic scattering of protons from  $^{15}\text{N}$ . *Phys. Rev. C*, 85:038801, Mar 2012.
- A. Palumbo, W. P. Tan, J. Görres, A. Best, M. Couder, R. Crowter, R. J. deBoer, S. Falahat, P. J. LeBlanc, H. Y. Lee, S. O'Brien, E. Strandberg, M. Wiescher, J. P. Greene, Zs. Fülöp, G. G. Kiss, E. Somorjai, N. Özkan, G. Efe, and R. T. Güray. Systematic study of the  $\alpha$ -optical potential via elastic scattering near the  $Z = 50$  region for  $p$ -process nuclei. *Phys. Rev. C*, 85:035808, Mar 2012.
- A. Best, J. Görres, M. Couder, R. deBoer, S. Falahat, A. Kontos, P. J. LeBlanc, Q. Li, S. O'Brien, K. Sonnabend, R. Talwar, E. Uberseder, and M. Wiescher. First direct measurement of resonance strengths in  $^{17}\text{O}(\alpha, \gamma)^{21}\text{Ne}$ . *Phys. Rev. C*, 83:052802, May 2011.
- P. J. LeBlanc, G. Imbriani, J. Görres, M. Junker, R. Azuma, M. Beard, D. Bemmerer, A. Best, C. Brogini, A. Cacioli, P. Corvisiero, H. Costantini, M. Couder, R. deBoer, Z. Elekes, S. Falahat, A. Formicola, Zs. Fülöp, G. Gervino, A. Guglielmetti, C. Gustavino, Gy. Gyürky, F. Käppeler, A. Kontos, R. Kuntz, H. Leiste, A. Lemut, Q. Li, B. Limata, M. Marta, C. Mazzocchi, R. Menegazzo, S. O'Brien, A. Palumbo, P. Prati, V. Roca, C. Rolfs, C. Rossi Alvarez, E. Somorjai, E. Stech, O. Straniero, F. Strieder, W. Tan, F. Terrasi, H. P. Trautvetter, E. Uberseder, and M. Wiescher. Constraining the  $S$ -factor of  $^{15}\text{N}(p, \gamma)^{16}\text{O}$  at astrophysical energies. *Phys. Rev. C*, 82(5):055804, Nov 2010.
- H. Costantini, R. J. deBoer, R. E. Azuma, M. Couder, J. Görres, J. W. Hammer, P. J. LeBlanc, H. Y. Lee, S. O'Brien, A. Palumbo, E. C. Simpson, E. Stech, W. Tan, E. Uberseder, and M. Wiescher.  $^{16}\text{O}(\alpha, \gamma)^{20}\text{Ne}$   $S$ -factor: Measurements and  $R$ -matrix analysis. *Phys. Rev. C*, 82(3):035802, Sep 2010.
- R. J. deBoer, M. Wiescher, J. Görres, R. Longland, C. Iliadis, G. Rusev, and A. P. Tonchev. Photoexcitation of astrophysically important states in  $^{26}\text{Mg}$  II: Ground-state-transition partial widths. *Phys. Rev. C*, 82(2):025802, Aug 2010.
- R. E. Azuma, E. Uberseder, E. C. Simpson, C. R. Brune, H. Costantini, R. J. de Boer, J. Görres, M. Heil, P. J. LeBlanc, C. Ugalde, and M. Wiescher. AZURE: An  $R$ -matrix code for nuclear astrophysics. *Phys. Rev. C*, 81(4):045805, Apr 2010.

- R. Longland, C. Iliadis, G. Rusev, A. P. Tonchev, R. J. deBoer, J. Görres, and M. Wiescher. Photoexcitation of astrophysically important states in  $^{26}\text{Mg}$ . *Phys. Rev. C*, 80(5):055803, Nov 2009.
- R. T. Güray, N. Özkan, C. Yalçın, A. Palumbo, R. deBoer, J. Görres, P. J. Leblanc, S. O'Brien, E. Strandberg, W. P. Tan, M. Wiescher, Zs. Fülöp, E. Somorjai, H. Y. Lee, and J. P. Greene. Measurements of proton-induced reaction cross sections on  $^{120}\text{Te}$  for the astrophysical  $p$ -process. *Phys. Rev. C*, 80(3):035804, Sep 2009.

### Acknowledgments

- M. L. Avila, G. V. Rogachev, E. Koshchiy, L. T. Baby, J. Belarge, K. W. Kemper, A. N. Kuchera, A. M. Mukhamedzhanov, D. Santiago-Gonzalez, and E. Uberseder. Constraining the 6.05 MeV  $0^+$  and 6.13 MeV  $3^-$  cascade transitions in the  $^{12}\text{C}(\alpha, \gamma)^{16}\text{O}$  reaction using the asymptotic normalization coefficients. *Phys. Rev. Lett.*, 114:071101, Feb 2015.
- J. Refsgaard, O.S. Kirsebom, E.A. Dijck, H.O.U. Fynbo, M.V. Lund, M.N. Portela, R. Raabe, G. Randisi, F. Renzi, S. Sambri, A. Sytoma, L. Willmann, and H.W. Wilschut. Measurement of the branching ratio for  $\beta$ -delayed  $\alpha$  decay of  $^{16}\text{N}$ . *Physics Letters B*, 752:296 – 301, 2016.

### Teaching Experience

- Practical introduction to  $R$ -matrix fitting, Notre Dame, April–June 2016
- Co-supervisor for REU student Gabriel Calderon, May–July 2015
- Teacher of the 2015  $R$ -matrix workshop at Gran Sasso National Laboratory, 7 graduate student participants, May 11–14, 2015
- Co-supervisor for visiting graduate student David Mountford, January–June 2013
- Teaching Assistant, Undergraduate Physics Laboratory, University of Notre Dame, 2005–2007
- Teaching Assistant, Nuclear Warfare, University of Notre Dame, 2007
- Teaching Assistant, Undergraduate Physics Laboratory, Ball State University, 2003–2005
- Mathematics and Physics tutor, Ball State University, 2004–2005
- Mathematics tutor, Western Michigan University, 2001–2002