

## LEE G. SOBOTKA

**Address:** Department of Chemistry, Box 1134  
Washington University in St. Louis (WU)  
St. Louis, Missouri 63130  
Email: lgs@wustl.edu  
Phone: (314) 935-5360

**Education:** B.S. in Chemistry, University of Michigan, Ann Arbor, 1977  
Ph.D. in Chemistry, University of California, Berkeley, 1982

### Professional History:

1997 - present Professor of Chemistry and Physics, WU  
1989 - 1997 Associate Professor of Chemistry and Physics, WU  
1984 - 1989 Assistant Professor of Chemistry, WU  
1982 - 1984 Postdoctoral Research Associate, Univ. of California-Berkeley & LBNL

### Awards and Honors:

1976 -1977 Moses Gombert Fellowship, University of Michigan  
1986 -1991 Presidential Young Investigator Award, NSF  
1998 Chairman Nuclear Chemistry Gordon Conference  
2008 Outstanding Referee Award (APS)  
2010 National American Chemical Society (ACS) Seaborg Award in Nuclear Chemistry  
2010 Fellow of the American Physical Society (APS), Division of Nuclear Physics

### Professional Associations:

- American Physical Society (APS), Nuclear Physics Division (DNP)
- American Chemical Society (ACS), Nuclear Chemistry and Technology
- Division and NSAC Liaison Committee
- Nuclear Science Long-Range Planning Committee (1989, 2000)
- National Superconducting Cyclotron Laboratory Executive Committee (1987-1990), chairman (1988-1990)
- Lawrence Berkeley Laboratory 88" Cyclotron PAC (1989 -1994)
- Review Committees:  
SUNY-Nuc. Lab. (1992), LBNL-Nuclear Science Division (1995 -1997)  
TAMU -Cyclotron lab. (1995), ANL-ATLAS (2011)
- Writing committee for various FRIB proposals (2000 - 2005), Users Ex. Com. 2012-
- NSAC subcommittee on how to best implement recommendations the 2007 Long Range Plan.

### Research Interest:

The de-excitation modes of highly-excited nuclei; continuum structure of exotic nuclei; dynamics of nuclear fusion and fission; the asymmetry dependence nucleon correlations inside of nuclei; the asymmetry dependence of the equation of state of nuclear matter; multi-particle correlations; advanced radiation detectors and the associated electronics including ASIC design; applied nuclear science.

## Refereed Publications: ~ 180

1. "Isomeric Transitions in  $^{204}\text{Pb}$ ," L.G. Sobotka, H.C. Griffin, and E.C. Kao, Phys. Rev. C **17**, 816 (1978).
2. "A Scenario for the 220-MeV  $^{40}\text{Ar} + ^{238}\text{U}$  Reaction," G.J. Mathews, L.G. Sobotka, G.J. Wozniak, R. Regimbart, R.P. Schmitt, G.U. Rattazzi and L.G. Moretto, Z. Physik, A **290**, 407 (1979).
3. "A Theoretical Investigation of Shell Effects in Deep Inelastic Collisions," L.G. Sobotka, G.J. Mathews and L.G. Moretto, Z. Physik, A **292**, 191 (1979).
4. "Rise and Fall of Spin Alignment in Deep-Inelastic Reactions," G. Wozniak, R.J. McDonald, A.J. Pacheco, C.C. Hsu, D.J. Morrissey, L.G. Sobotka, L.G. Moretto, S. Shih, C. Schuck, R.M. Diamond, H. Kluge and F.S. Stephens, Phys. Rev. Lett. **45**, 1081 (1980).
5. "Rigid Rotation and L-Wave Fractionation in the Deep Inelastic Reaction: 664 MeV  $^{84}\text{Kr} + ^{nat}\text{Ag}$ ," L.G. Sobotka, C.C. Hsu, G.J. Wozniak, G.U. Rattazzi, R.J. McDonald, A.J. Pacheco, and L.G. Moretto, Phys. Rev. Lett. **46**, 887 (1981).
6. "The Influence of Fluctuations on the Correlation Between Exit-Channel Kinetic Energy and Entrance-Channel Angular Momentum for Heavy Ion Collisions," L.G. Moretto and L.G. Sobotka, Z. Physik. **303**, 299 (1981).
7. "Angular Momentum Transfer and Partition in the Deep-Inelastic Reaction 664 MeV  $^{84}\text{Kr} + ^{nat}\text{Ag}$ ," L.G. Sobotka, C.C. Hsu, G.J. Wozniak, D.J. Morrissey, and L.G. Moretto, Nucl. Phys. A **231**, 510 (1981).
8. "Alpha Particle Emission From the Deep-Inelastic Reaction: 1354 MeV  $^{165}\text{Ho} + ^{181}\text{Ta}$ ," L.G. Sobotka, R.J. McDonald, G.J. Wozniak, D.J. Morrissey, A.J. Pacheco, and L.G. Moretto, Phys. Rev. C **25**, 1693 (1982).
9. "Angular Momentum, Statistical Equilibrium and Sequential Fission in very Asymmetric Systems," D.J. Morrissey, G.J. Wozniak, L.G. Sobotka, A.J. Pacheco, C.C. Hsu, R.J. McDonald and L.G. Moretto, Z. Physik A **305**, 131 (1982).
10. "Dependence of the Giant Dipole Strength Function on Excitation Energy," J.E. Draper, J.O. Newton, L.G. Sobotka, H. Lindenberger, G.J. Wozniak, L.G. Moretto, F.S. Stephens, R.M. Diamond and R.J. McDonald, Phys. Rev. Lett. **49**, 434 (1982).
11. "Intrinsic Fragment Spins Generated in the Reactions of  $^{20}\text{Ne}$  with  $^{197}\text{Au}$  and  $^{238}\text{U}$  at 12.6 MeV/Nucleon," D.J. Morrissey, G.J. Wozniak, L.G. Sobotka, A.J. Pacheco, R.J. McDonald, C.C. Hsu, and L.G. Moretto, Nucl. Phys. A **389**, 120 (1982).
12. "Angular Momentum Transfer and Alignment in Deep-Inelastic Reactions for Nearly Symmetric Heavy-Ion Systems," A.J. Pacheco, G.J. Wozniak, R.J. McDonald, R.M. Diamond, C.C. Hsu, L.G. Moretto, D.J. Morrissey, L.G. Sobotka and F.S. Stephens, Nucl. Phys. A **397**, 313 (1983).

13. "Alpha Particle Emission From the Reaction 1354 MeV  $^{165}\text{Ho} + ^{181}\text{Ta}$ ," L.G. Sobotka, R.J. McDonald, G.J. Wozniak, D.J. Morrissey, A.J. Pacheco and L.G. Moretto, Phys. Rev. C **28**, 219 (1983).
14. "Compound Nucleus Decay Via the Emission of Heavy Nuclei," L.G. Sobotka, M.L. Padgett, G.J. Wozniak, G. Guarino, A.J. Pacheco, L.G. Moretto, Y.D. Chan, R. Stokstad, I. Tserruya, and S. Wald, Phys. Rev. Lett. **51**, 2187 (1983).
15. "Large Solid Angle Bragg-Curve Spectrometer," R.J. McDonald, L.G. Sobotka, Z.Q. Yao, G.J. Wozniak, and G. Guarino, Nucl. Instr. Meth. **219**, 508 (1984).
16. "Symmetric Splitting of Very Light Systems," K. Grotowski, Z. Majka, R. Planeta, M. Szczodrak, Y. Chan, G. Guarino, L.G. Moretto, D.J. Morrissey, L.G. Sobotka, R.G. Stokstad, I. Tserruya, S. Wald, and G.J. Wozniak, Phys. Rev. C **30**, 1214 (1984).
17. "Compound Nucleus Decay Along the Mass Asymmetry Coordinate and the Role of Businaro-Gallone Point," L.G. Sobotka, M.A. McMahan, R.J. McDonald, C. Signarbieux, G.J. Wozniak, M.L. Padgett, J.H. Gu, Z.H. Liv, Z.Q. Yao, and L.G. Moretto, Phys. Rev. Lett. **53**, 2004 (1984).
18. "Partitioning of Nuclei," L.G. Sobotka and L.G. Moretto, Phys. Rev. C **31**, 668 (1985).
19. "Mass-Asymmetric Barriers from Excitation Functions for Complex Fragment Emission," M.A. McMahan, L.G. Moretto, M.L. Padgett, G.J. Wozniak, L.G. Sobotka, and M.G. Mustafa, Phys. Rev. Lett. **54**, 1995 (1985).
20. "Sequential Fission Angular Distributions From Mass-Asymmetric Heavy-Ion Reactions," D.J. Morrissey, G.J. Wozniak, L.G. Sobotka, R.J. McDonald, A.J. Pacheco, and L.G. Moretto, Nucl. Phys. A **442**, 578 (1985).
21. "K-Shell Ionization in 7.5- and 8.6 MeV/a.m.u. U + U Collisions at Very Small Impact Parameters," D. Molitoris, C. Stoller, R. Anholt, W.E. Meyerhof, D.W. Spooner, R.J. McDonald, L.G. Sobotka, G.J. Wozniak, L.G. Moretto, M.A. McMahan, E. Morenzoni, M. Nessi and W. Wölfli, Z. Phys. D **2**, 91 (1986).
22. "Excitation Energy Division in the First 160 MeV of Total Kinetic Energy Loss for the Reaction: 684 MeV  $^{80}\text{Kr} + ^{174}\text{Yb}$ ," L.G. Sobotka, G.J. Wozniak, R.J. McDonald, M.A. McMahan, R.J. Charity, L.G. Moretto, Z.H. Liu, F.S. Stephens, R.M. Diamond, M.A. Deleplanque and A.J. Pacheco, Phys. Lett. B **175**, 27 (1986).
23. "Particle-Bound Excited State Yields Produced in the Reaction: 181 MeV  $^{19}\text{F} + ^{159}\text{Tb}$ ," L.G. Sobotka, D.G. Sarantites, H. Puchta, F.A. Dilmanian, M. Jääskeläinen, M.L. Halbert, J.H. Barker, J.R. Beene, R.L. Ferguson, D.C. Hensley and G.R. Young, Phys. Rev. C **34**, 917 (1986).
24. "Nuclear Temperature Measurements and Feeding From Particle Unbound States," H.M. Xu, D.J. Fields, W.G. Lynch, M.B. Tsang, C.K. Gelbke, M.R. Maier, D.J. Morrissey, J. Pochodzalla, D.G. Sarantites, L.G. Sobotka, M.L. Halbert, D.C. Hensley, D. Hahn, H. Stcker, Phys. Lett. B **182**, 155 (1986).

25. "Nuclear Shapes from Alpha-Gamma Ray Angular Correlations," Z. Majka, D.G. Sarantites, L.G. Sobotka, K. Honkanen, E.L. Dines, L.A. Adler, Li Ze, M.L. Halbert, J.R. Beene, D.C. Hensley, R.P. Schmitt, and G. Nebbia, *Phys. Rev. Lett.* **58**, 322 (1987).
26. "Spin Coating Thin Films of Plastic Scintillator," E. Norbeck, T.P. Dubbs, and L.G. Sobotka, *Nucl. Instr. Meth., A* **262**, 546 (1987).
27. "The Angular Momentum Dependence of Complex Fragment Emission," L.G. Sobotka, D.G. Sarantites, Z. Li, E.L. Dines, M.L. Halbert, D.C. Hensley, J.C. Lisle, R.P. Schmitt, Z. Majka, G. Nebbia, H.C. Griffin, and A.J. Sierk, *Phys. Rev. C* **36**, 2713 (1987).
28. "A Dwarf Ball: Design, Instrumentation, and Response Characteristics of  $4\pi$  Light Charged-Particle Multidetector System," D.G. Sarantites, L.G. Sobotka, T.M. Semkow, V. Abenante, J. Elson, J.T. Hood, Z. Li, N.G. Nicolis, D.W. Stracener, J. Valdes, and D.C. Hensley, *Nucl. Instr. Meth. A* **264**, 319 (1988).
29. "Non-Resonant Microwave Absorption at Low Field in  $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ ," T.-S. Lin, L.G. Sobotka, and W. Froncisz, *Nature* **333**, 21 (1988).
30. "Systematics of Complex Fragment Emission in Niobium Induced Reactions," R.J. Charity, M.A. McMahan, G.J. Wozniak, R.J. McDonald, L.G. Moretto, D.G. Sarantites, L.G. Sobotka, G. Guarino, A. Pantaleo, L. Fiore, A. Gobbi, and K.D. Hildenbrand, *Nucl. Phys. A* **483**, 371 (1988).
31. "Reaction Filters: Charged Particle Multiplicity and Linear Momentum Transfer to Heavy Reaction Residues," M.B. Tsang, Y.D. Kim, N. Carlin, Z. Chen, R. Fox, C.K. Gelbke, W. Gong, W.G. Lynch, T. Murakami, T. Noyak, R. Ronningen, H. Xu, F. Zhu, L.G. Sobotka, D. Stracener, V. Abenante, Z. Majka, D.G. Sarantites, and H.C. Griffin. *Phys. Lett. B* **220**, 492 (1989).
32. "Multifragmentation Emission observed for the Reaction  $^{36}\text{Ar} + ^{238}\text{U}$  at  $E/A = 35$  MeV," Y.D. Kim, M.B. Tsang, N. Carlin, Z. Chen, R. Fox, C.K. Gelbke, W. Gong, W.G. Lynch, T. Murakami, T. Noyak, R. Ronningen, H. Xu, F. Zhu, L.G. Sobotka, D. Stracener, V. Abenante, Z. Majka, D.G. Sarantites, and H.C. Griffin, *Phys. Rev. Lett.* **63**, 494 (1989).
33. "Target Excitation and Angular Momentum Transfer in Reactions of  $E/A = 11.9$  MeV  $^{28}\text{Si}$  with  $^{181}\text{Ta}$  from  $4\pi$  Charged Particle, Neutron and  $\gamma$ -ray Multiplicity Measurements," Z. Majka, V. Abenante, Z. Li, N.G. Nicolis, D.G. Sarantites, T.M. Semkow, L.G. Sobotka, D.W. Stracener, J.R. Beene, D.C. Hensley, and H.C. Griffin, *Phys. Rev. C* **40**, 2124 (1989).
34. "Complex Fragments Emitted in Particle Stable States for the  $^{32}\text{S} + ^{nat}\text{Ag}$  Reaction at  $E/A = 22.3$  MeV," H.M. Xu, W.G. Lynch, C.K. Gelbke, M.B. Tsang, D.J. Fields, M.R. Maier, D.J. Morrissey, J. Pochodzalla, T.K. Nayak, D.G. Sarantites, L.G. Sobotka, M.L. Halbert and D.C. Hensley, *Phys. Rev. C* **40**, 186 (1989).
35. "Fracture without Fusion," L.G. Sobotka and P. Winter, *Nature*, **343**, 601 (1990).
36. "Deformation Effects in the Compound Nucleus Decay Using the Spin-Alignment Method," N.G. Nicolis, D.G. Sarantites, L.A. Adler, F.A. Dilmanian, K.J. Honkanen, Z. Majka, L.G. Sobotka, Z. Li, T.M. Semkow, J.R. Beene, M.L. Halbert, D.C. Hensley, J.G.

- Natowitz, R.P. Schmitt, D. Fabris, G. Nebbia and G. Mouchaty, Phys. Rev. C **41**, 2118 (1990).
37. "Azimuthal Distributions of Fission Fragments and  $\alpha$  Particles Emitted in the Reactions  $^{36}\text{Ar} + ^{238}\text{U}$  at  $E/A = 20$  and  $35$  MeV and  $^{14}\text{N} + ^{238}\text{U}$  at  $E/A = 50$  MeV," M.B. Tsang, Y.D. Kim, N. Carlin, Z. Chen, C.K. Gelbke, W.G. Gong, W.G. Lynch, T. Murakami, T. Nayak, R.M. Ronningen, H.M. Xu, F. Zhu, L.G. Sobotka, D.W. Stracener, D.G. Sarantites, Z. Majka, and V. Abenante, Phys. Rev. C **42**, R15 (1990).
  38. "Dwarf Ball and Dwarf Wall: Design, Instrumentation, and Response Characteristics of a  $4\pi$  CsI(Tl) - Plastic Phoswich Multidetector System for Light Charged Particle and Intermediate Mass Fragment Spectrometer," D.W. Stracener, D.G. Sarantites, L.G. Sobotka, J. Elson, J.T. Hood, Z. Majka, V. Abenante, A. Chbihi, and D.C. Hensley, Nucl. Instru. Meth. A **294**, 485 (1990).
  39. "Yield Decomposition and Excitation Energy Reconstruction in an Incomplete Fusion Reaction," A. Chbihi, L.G. Sobotka, Z. Majka, D.G. Sarantites, D.W. Stracener, V. Abenante, T.M. Semkow, N.G. Nicolis, D.C. Hensley, J.R. Beene, and M.L. Halbert, Phys. Rev. C **43**, 652 (1991).
  40. "Determination of the Nuclear Level Density at High Excitation Energy," A. Chbihi, L.G. Sobotka, N.G. Nicolis, D.G. Sarantites, D.W. Stracener, Z. Majka, D.C. Hensley, J.R. Beene, and M.L. Halbert, Phys. Rev. C **43**, 666 (1991).
  41. "A Study of the Particle Multiplicity Dependence of High Energy Photon Production in a Heavy-Ion Reaction," L.G. Sobotka, L. Gallamore, A. Chbihi, D.G. Sarantites, D.W. Stracener, W. Bauer, D.R. Bowman, N. Carlin, R.T. De Sousa, C.K. Gelbke, W.G. Gong, S. Hannuschke, Y.D. Kim, W.G. Lynch, R. Ronningen, M.B. Tsang, F. Zhu, J.R. Beene, M.L. Halbert, and M. Thoennessen, Phys. Rev. C **44**, R2257 (1991) and erratum August (1992).
  42. "Statistical Emission of Deuterons and Tritons from Highly Compound Nuclei," N.G. Nicolis, D. G. Sarantites, L.G. Sobotka, and R. J. Charity, Phys. Rev. C **45**, 2393 (1992).
  43. "Binary Character of Highly Dissipative  $^{209}\text{Bi} + ^{136}\text{Xe}$  Collisions at  $E_{\text{lab}}/A = 28.2$  MeV," B. Lott, S.P. Baldwin, B.M. Szabo, B.M. Quednau, W. U. Schröder, and J. Töke, L.G. Sobotka, J. Barreto, R. J. Charity, L. Gallamore, D.G. Sarantites, D.W. Stracener, and R. T. deSouza, Phys. Rev. Lett. **68**, 3141 (1992).
  44. "The Mechanism for the Disassembly of Excited  $^{16}\text{O}$  Projectiles into Four Alpha Particles," R. J. Charity, J. Barreto, L.G. Sobotka, D.G. Sarantites, D.W. Stracener, A. Chbihi, N.G. Nicolis, R. Auble, C. Baktash, J.R. Beene, F. Bertrand, M. Halbert, D.C. Hensley, D. Horen, C. Ludermann, M. Thoennessen, and R. Varner, Phys. Rev. C **46**, 1951 (1992).
  45. "Molecular-Orbital Study of Late-Fission Time Scales in Deep Inelastic  $^{238}\text{U} + ^{238}\text{U}$  Collisions," J.D. Molitoris, W.E. Meyerhof, Ch. Stoller, R. Anholt, D.W. Spooner, L.G. Moretto, L.G. Sobotka, R.J. McDonald, G.J. Wozniak, M. A. McMahan, L. Blumenfeld, N. Nessi, and E. Morenzoni, Phys. Rev. Lett. **70**, 537 (1993).

46. "The Tube : a simple  $4\pi$  detector for enhancing channels in  $\gamma$ -ray spectroscopy experiments," P.-F. Hua, D.G. Sarantites, L. G. Sobotka, J.L. Barreto, and A Kirov, Nucl. Instru. Meth. A **330**, 121 (1993).
47. "The Onset of Nuclear Vaporization," M.B. Tsang, W.C. Hsi, W.G. Lynch, D.R. Bowman, C.K. Gelbke, M.A. Lisa, G.F. Peaslee, G.J. Kunde, M.L. Begemann-Blaich, T. Hofmann, J. Hubele, J. Kempter, P. Kreutz, W.D.Kunze, V. Lindenstruth, U. Lynen, M. Mang, W.F.J. Müller, M. Neumann, B. Ocker, C.A. Ogilvie, J. Pochodzalla, F. Rosenberger, H. Sann, A. Schüttauf, V. Serfling, W. Trautmann, A. Tucholski, A. Wörner, B. Zwieglinski, G. Raciti, G. Imme, R.J. Charity, L.G. Sobotka, I. Iori, A. Moroni, R. Scardoni, A. Ferrero, W. Seidel, L. Stuttge, A. Cosmo, W.A. Friedman, and G. Peilert, Phys. Rev. Lett. **71**, 1502 (1993).
48. "Search for entrance channel effects in the decay of the  $^{164}\text{Yb}$  compound nucleus at  $E^{\square} \approx 54$  MeV," J. Barreto, N.G. Nicolis, D.G. Sarantites, R.J. Charity, L.G. Sobotka, D.W. Stracener, D.C. Hensley, J.R. Beene, C. Baktash, M. Halbert, D. Horen, and, M. Thoennesen, Phys. Rev. C **48**, 2881 (1993).
49. "Estimation of the time scale of last chance alpha emission using an "atomic clock," L. Gallamore, D.G. Sarantites, R.J. Charity, N.G. Nicolis, L.G. Sobotka, J.R. Beene, M. Halbert, and R. L. Varner, Phys. Rev. C **49**, R584 (1994).
50. "Time scale for proton emission from highly excited projectiles," R.J. Charity, L.G. Sobotka, G. Van Buren, F.A. Tibbals, J. Barreto, D.R. Bowman, M. Chartier, J. Dinius, D. Fox, C.K. Gelbke, D.O. Handzy, W.C. Hsi, P.F. Hua, A.S. Kirov, M.S. Lisa, W.G. Lynch, G.P. Peaslee, L. Phair, D.G. Sarantites, C. Schwarz, R.T. de Souza, M.B. Tsang, and C. Williams, Phys. Lett. **323**, 113 (1994).
51. "Energy dependence of multifragmentation in  $^{84}\text{Kr} + ^{197}\text{Au}$ ," G.F. Peaslee, M.B. Tsang, C. Schwarz, M.J. Huang, W.S. Huang, W.C. Hsi, C. Williams, W. Bauer, D.R. Bowman, M. Chartier, J. Dinius, C.K. Gelbke, T. Glasmacher, D.O. Handzy, M.A. Lisa, W.G. Lynch, C. Mader, L. Phair, M.-C. Lemaire, S.R. Souza, G. Van Buren, R.J. Charity, L.G. Sobotka, G.J. Kunde, U. Lynen, J. Pochodzalla, H. Sann, W. Trautmann, D. Fox, R.T. deSouza, G. Peilert, W.A. Friedman, N. Carlin, Phys. Rev. C **49**, R2271 (1994).
52. "Simulations of collisions between nuclei at intermediate energy using the BUU equation with neutron skin producing potentials," L.G. Sobotka, Phys. Rev. C **50**, R1272 (1994).
53. "Collective expansion in central Au+Au collisions," W.C. Hsi, et al. (the ALADIN-MINIWALL-MINIBALL collaboration), Phys. Rev. Lett. **73**, 3367 (1994).
54. "Fragment flow and the multifragmentation phase space," G.J. Kunde, et al. (the ALADIN-MINIWALL-MINIBALL collaboration), Phys. Lett. **74**, 38 (1995).
55. "Decay of  $^{160}\text{Er}^{\square}$  produced in  $^{16}\text{O} + ^{144}\text{Nd}$  and  $^{64}\text{Ni} + ^{96}\text{Zr}$  fusion reactions," J. Barreto, N.G. Nicolis, D.G. Sarantites, R.J. Charity, L.G. Sobotka, D.W. Stracener, D.C. Hensley, J.R. Beene, C. Baktash, M. Halbert, D. Horen, and, M. Thoennesen, Phys. Rev. C **51**, 2584 (1995).
56. "Two-proton emission from the ground state of  $^{12}\text{O}$ ," R.A. Kryger, A. Azhari, M. Hellström, J.H. Kelly, T. Kubo, R. Pfaff, E. Ramakrishnan, B.M. Sherrill, M.

- Thoennessen, S. Yokoyama, R.J. Charity, J. Dempsey, A. Kirov, N. Robertson, D.G. Sarantites, L.G. Sobotka, and J.A. Winger, Phys. Rev. Lett. **74**, 860 (1995).
57. "Dissipative Orbiting in  $^{209}\text{Bi} + ^{136}\text{Xe}$  Collisions at  $E_{\text{lab}}/A = 28.2$  MeV," S.P. Baldwin, B. Lott, B.M. Szabo, B.M. Quednau, W. U. Schröder, and J. Töke, L.G. Sobotka, J. Barreto, R. J. Charity, L. Gallamore, D.G. Sarantites, D.W. Stracener, and R. T. deSouza, Phys. Rev. Lett. **74**, 1299 (1995).
  58. "Assessing the Evolutionary Nature of Multifragment Decay," E. Cornell, T.M. Hamilton, D. Fox, Y. Lou, R.T. de Souza, M.J. Huang, W.C. Hsi, C. Schwarz, C. Williams, D.R. Bowman, J. Dinius, C.K. Gelbke, D.O. Handzy, M. Liza, W.G. Lynch, G.F. Peaslee, L. Phair, M.B. Tsang, G. Van Buren, R.J. Charity, L.G. Sobotka, and W.A. Friedman, Phys. Rev. Lett. **75**, 1475 (1995).
  59. "The dynamics of heavy-ion fusion probed by d/p double ratios from a cross bombardment," M. Korolija, R.J. Charity, N.G. Nicolis, D.G. Sarantites, and L.G. Sobotka, Phys. Rev. C **52**, 3074 (1995).
  60. "Prompt and sequential decay processes in the fragmentation of 40 MeV/A  $^{20}\text{Ne}$  projectiles," R.J. Charity, L.G. Sobotka, J. Dinius, C.K. Gelbke, T. Glasmacher, D.O. Handzy, W.C. Hsi, M.J. Huang, W.G. Lynch, C.P. Montoya, G.P. Peaslee, N.J. Robertson, D.G. Sarantites, C. Schwarz, and M.B. Tsang, Phys. Rev. C **52**, 3126 (1995).
  61. "Intermediate Mass Fragment - decay of the neck zone formed in peripheral  $^{209}\text{Bi}$  and  $^{136}\text{Xe}$  collisions at  $E_{\text{lab}}/A = 28.2$  MeV," J. Töke, B. Lott, S.P. Baldwin, B.M. Quednau, W. U. Schröder, L.G. Sobotka, J. Barreto, R. J. Charity, D.G. Sarantites, D.W. Stracener, and R. T. deSouza, Phys. Rev. Lett. **75**, 2920 (1995).
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179. "The observation of long-range three-body Coulomb effects in the decay of  ${}^{16}\text{Ne}$ ," K. W. Brown, R. J. Charity, L. G. Sobotka, Z. Chajecski, L.V. Grigorenko, I.A. Egorova, Yu.L. Parfenova, M.V. Zhukov, S. Bedoor, W.W. Buhro, J. M. Elson, W. G. Lynch, J. Manfredi, D.G. McNeel, W. Reviol, R. Shane, R. H. Showalter, M. B. Tsang, J. R. Winkelbauer, and A. H. Wuosmaa, [Phys. Rev. Lett. 113, 232501 \(2014\)](#).

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181. "Interplay between sequential and prompt two-proton decay for the first excited state of  $^{16}\text{Ne}$ ," K. W. Brown, R. J. Charity, L. G. Sobotka, L.V. Grigorenko, T. A. Golubkova, S. Bedoor, W. W. Buhro, Z. Chajecki, J. M. Elson, W. G. Lynch, J. Manfredi, D.G. McNeel, W. Reviol, R. Shane, R. H. Showalter, M. B. Tsang, J. R. Winkelbauer, and A. H. Wuosmaa, [Phys. Rev. C 92, 034329 \(2015\)](#).
182. "Isospin symmetry for  $A = 7$ ," K. W. Brown, R. J. Charity, J. M. Elson, W. Reviol, L. G. Sobotka, W.W. Buhro, Z. Chajecki, D. Coupland, H. Iwasaki, Jenny Lee, W. G. Lynch, J. Manfredi, A. Sanetullaev, R. Shane, R. H. Showalter, M. B. Tsang, D. Weissarr, J. R. Winkelbauer, M. Youngs, S. Bedoor, S. T. Marley, D. V. Shetty and A. H. Wuosmaa, Submitted (2015)
183. "Ground-state properties of  $^5\text{H}$ ," A. H. Wuosmaa, S. Bedoor, K. W. Brown, W. W. Buhro, Z. Chajecki, R. J. Charity, W. G. Lynch, J. Manfredi, S. T. Marley, D. G. McNeel, A. S. Newton, D. V. Shetty, R. H. Showalter, L. G. Sobotka, M. B. Tsang, and J. R. Winkelbauer, Submitted (2015).

### Previous Grant Support

- Institutional funds, \$96,500 from **Washington University**. New faculty research initiation grant.
- "Studies of Complex Fragment Emission and Angular Momentum Transfer in Nuclear Reactions," **Department of Energy**, Division of Nuclear Physics: \$60,000; period of award, June 1, 1985 through January 1, 1987.
- Presidential Young Investigator Award, **National Science Foundation**. Period of award, 1986-1991. The award is \$25,000 each year plus matching funds not to exceed a total of \$100,000 each year.
- "Studies of Complex Fragment Emission in Heavy-Ion Reactions," **Department of Energy**, Division of Nuclear Physics, budgets of: \$65,000 for 1987; \$75,000 for 1988; and \$95,000 for 1989.
- "Studies of Complex Fragment Emission in Heavy-Ion Reactions," **Department of Energy**, Division of Nuclear Physics, budgets of: \$103,000 for 1990; \$108,000 for 1991; and \$121,000 for 1992 (joint with R. J. Charity).
- "Studies of Complex Nuclear Decays in Heavy-Ion Reactions," **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of: \$135,000 for 1993; \$143,000 for 1994, and \$163,000 for 1995.

- “Studies of Complex Fragment Emission in Heavy-Ion Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R.J. Charity with budgets of: \$170,000 for 1996, \$171,000 (base) + \$22,000 (supplemental) funds for 1997, and \$172,000 for 1998.
- “Studies of Complex Nuclear Decays in Heavy-Ion Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of: \$177,000 for 1999, \$182,000 for 2000, and \$180,000 (+\$23,000 supplemental for CMOS chip development project) for 2001.
- “Large solid angle Si Array,” **National Science Foundation, the MRI program**. Spokesman: W. Lynch (Mich. State Univ.) with additional PI’s at Indiana University and Washington University (L.G. Sobotka). NSF budget \$348,000/\$100,000 - (Total/WU) plus 30% pro-rated matching funds also supplied by 3 institutions.
- Brachytherapy Dosimetry Using Plastic Scintillators, **National Institutes of Health and National Cancer Institute**. Spokesman : J. Williamson (WU -MIR) with additional PI’s in WU-Chemistry (L.G. Sobotka and R. J. Charity) and Physics (W. Binns and P. Gibbons). Grant covered the years 2000 -2002 with a total budget of \$856,000.
- “Studies of Complex Nuclear Decays in Heavy-Ion Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of: \$180,000 for 2002, \$208,000 for 2003, and 212,000 (base) + \$29,000 (supplemental for EE student.)
- “Studies of Complex Nuclear Decays in Heavy-Ion Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of:\$225,000 for 2005, \$230,000 for 2006, and \$233,000 for 2007.
- “CMOS chip development,” **National Science Foundation, the MRI program**. PI: G. Engel (Southern Illinois University at Edwardsville), L.G.S. as Co-PI. The two year budget (2007-2008) was \$192,000.
- “Carbon processing in intact Soybean leaves,” **I-CARES** (WU), LGS PI with J. Schaefer (Chem.), Y.C. Tai (Rad.), and R. Mach (Rad.). One-year (seed) budget of \$33,000 (2009).
- “Studies of Nuclear Structure and Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of: \$253,000 for 2008, \$263,000 for 2009, and \$272,000 for 2010.
- “PSD capable CMOS chip development and implementation,” **DTRA (Defense Threat Reduction Agency) subcontract from LANL**. LGS PI with Co-PI’s G. Engel (SIUE) and R. J. Charity. Three-year budget (2008-2010) of \$260,000; \$35,000 (2011); \$25,000 (2012).
- “MRI:Development of High-Resolution Positron Imaging System Dedicated to Plant Research”, **NSF-MRI**, PI Y. C. \$7,300 (Sobotka portion) for the period 9/10-9/13.
- “Development of a Simultaneous Beta-and gamma Imager for Plant-imaging research”, **Department of Energy**, Division of Medical sciences, PI Y. C. Tai, \$35,600 (Sobotka portion) for the period 9/10-9/13.

- “Studies of Nuclear Structure and Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with budgets of: \$292,000 for 2011, \$295,000 for 2012, and \$292,000 for 2013.
- “Breakup of loosely bound nuclei at intermediate energies for nuclear astrophysics and the development of a position sensitive microstrip detector system and its readout electronics using ASICs technologies.” **Department of Energy**, Division of Nuclear Physics, PI: R. Tribble [TAMU], WU component (Sobotka and Charity) \$306,000 for the period 2010-2015.

### Active grant support

- “Studies of Nuclear Structure and Reactions,” **Department of Energy**, Division of Nuclear Physics. Joint with R. J. Charity with 3-year budget (2014-2016) of: \$1,000,000.

### Invited Talks and Seminars (Contributed talks not listed)

- 1983 Lawrence Livermore National Laboratory, NP and NC Divisions  
Los Alamos National Laboratory, NP and INC Divisions  
Washington University, Department of Chemistry
- 1984 Chalk River Nuclear Laboratories  
Gordon Conference, Nuclear Chemistry
- 1985 Michigan State University, Cyclotron Laboratory  
University of Michigan, Department of Physics
- 1986 University of Michigan, Department of Chemistry
- 1987 Indiana University, Department of Chemistry  
Washington University, Department of Chemistry
- 1988 Carnegie-Mellon University, Mellon Institute  
Texas A and M University, Cyclotron Institute  
Grand Accelérateur National D'ions Lourds Laboratoire  
Gordon Conference, Nuclear Chemistry  
Chalk River Nuclear Laboratories
- 1989 Indiana University, Bloomington, Department of Chemistry
- 1990 State University of New York, SUNY, Department of Physics  
University of Illinois, Urbana, Department of Physics  
Washington University, Department of Physics
- 1991 Grand Accelérateur National D'ions Lourds Laboratoire
- 1993 Michigan State University, Cyclotron Laboratory
- 1995 Chalk River Nuclear Laboratories  
Gull Lake Conference  
Texas A & M University, Cyclotron Institute
- 1997 Michigan State University, Cyclotron Laboratory  
University of Illinois, Carbondale, Department of Physics  
Indiana University, Bloomington, Cyclotron Laboratory
- 1999 International Workshop on Gross Properties of Nuclei, Hirschegg Austria
- 2000 M. Smoluchowski Institute of Physics, Krakow, Poland

- Argonne National Laboratory, Physics Division  
Texas A & M University, Department of Chemistry
- 2001 Michigan State University, Cyclotron Laboratory
- 2002 Nuclear Chemistry Gordon Conference
- 2003 American Physical Society (plenary talk)
- 2004 American Physical Society (plenary talk)  
WCI-I - Catania, Italy
- 2005 WCI-III - TAMU  
Michigan State University, Cyclotron Laboratory  
Indiana University, Cyclotron Laboratory  
Institute of Nuclear Theory (INT) – Seattle
- 2006 Indiana University, Department of Chemistry
- 2007 Cocoyco – Mexico  
Notre-Dame, two seminars: a. Physics and b. Joint Chemistry + Physics  
Texas A & M Cyclotron Institute  
Duke University
- 2008 Michigan State University, Cyclotron Laboratory  
Texas A & M, Department of Chemistry  
Washington University, Computer Science & Engineering (CSE)
- 2009 University of Rochester, Department of Physics
- 2010 Carpathian Summer School of Physics, Sinaia Romania  
Washington University, Physics  
Texas A & M Cyclotron Institute
- 2011 Washington University, Assembly Series - The physical science of the Fukushima disaster  
Texas A & M Cyclotron Institute  
Washington University, Public lecture – The physical science of the Fukushima disaster  
Nuclear Chemistry Gordon Conference  
Indiana University, Cyclotron Laboratory  
American Physical Society (plenary talk)  
ANSIP-2011 talk in Acireale, Italy.
- 2012 International Nucleus-Nucleus Conference (San Antonio, TX)  
RIKEN – Japan
- 2013 International Workshop on Nuclear Dynamics and Thermodynamics, TAMU
- 2014 ICI-8, International Conference on Isotopes (Chicago, IL.)  
Ohio University (Athens)
- 2015 Washington University: Saturday Science Series – The Chart of the Nuclides  
Texas A & M, Department of Chemistry  
Pacifichem 2015 Congress

## University Activities

### Courses Taught:

- |   |      |                        |
|---|------|------------------------|
| 1) General Chemistry Lecture                      | 111: | 1992, 1993, 1994.      |
| 2) General Chemistry Lecture                      | 112: | 1997, 1998, 1999.      |
| 3) General Chemistry Laboratory                   | 115: | 1987, 1988, 1989.      |
| 4) Undergraduate Physical Sciences Seminar Series | 181: | 1996-1999, 2010        |
| 5) Physical Chemistry 0 (PS in 12 problems)       | 400: | 2005-2009, 2011-       |
| 6) Physical Chemistry I (Thermodynamics)          | 421: | 2000.                  |
| 7) Physical Chemistry II (Thermo., S.M., Kin.)    | 402: | 2002-2004, 2008-2013   |
| 8) Radio-chemistry Laboratory                     | 435: | 1985, 1990, 1991-1994. |

- 9) Introduction to the Atomic Nucleus 436: 1986-1988, 1995, 2006, 2014-  
 10) Statistical Thermodynamics C562 and/or P529: 1989,1990,2001-2004.  
 11) Nuclear Physics 542 (only 1/3 taught by LGS): 1992, 1995.  
 11) Advanced Laboratory Physics 322 (3 project experiments developed by LGS.)

#### Departmental Services:

Admissions Committee:	1984 -1988
Recruitment Committee:	1984 -1987
Seminar Committee:	1984-1987, 1988-1989, 1990- present
Search Committee (Physical-Chemistry):	1985-1986, 1988-1989, 2004-2005
Search Committee (Astrophysics):	1990-1991, 1995-1996, 2000-2001
Search Committee (Lab Supervisor):	1985-1986
Undergraduate Work Committee:	1989 - 1994, 2000 - present
New Building Committee, chair:	1994 - 2002
Shops Committee, chair:	1993 - present
Department planning group:	1994 – 1999
Chemistry Space Committee:	2010 - present

#### University Services:

Radiological Safety Committee:	1984 – present (Hilltop representative)
Freshman advisor:	1985 – 1986, 1993 – 1994
University Wide Shop Committee:	1995
Moog selection Committee:	2001 – 2003
University Curriculum Committee:	2001 – 2003
Compton-Ferguson selection Committee:	2010 –

#### Graduate Students:

- L. Gallamore, M.S. [Chem.] 1992  
 First position: Director of the detector laboratory at International Technologies,  
 Current position: Practicing (patent) Lawyer in Missouri
- J.F. Dempsey, Ph.D.** [Chem.] 1997  
 Thesis: Dynamical aspects of fragment production in heavy-ion collisions.  
 Most recent academic position: Associate Professor, Departments of Nuclear  
 Engineering and Radiology, University of Florida.  
 Present position: Founder and Chief Scientific Officer of ViewRay
- M. Ganesan, M.S. [E.E] 2000 - secondary advisor  
 Current position: INTEL
- M. Malikansari, M.S. [E.E.] 2001 - secondary advisor  
 Current position: INTEL
- M. Nethi, M.S. [E.E.] 2003 - secondary advisor  
 Current position: INTEL
- N. Gunawardena M.S. [Chem.] 2003  
 Current position – Pacific Northwest National Laboratory PNNL  
 International Nuclear Security
- M. Sadasivam, M.S. [E.E.] 2004 - secondary advisor  
 Current position: INTEL
- S. Komarov, Ph.D.** [Phys.] 2006  
 Thesis: Collective Enhancement of the Nuclear Level Density  
 Current position: Staff scientist - Washington University Medical School
- R. Shane, Ph.D.** [Phys.] 2011

Thesis: Asymmetry Dependence of Correlations in Exotic Nuclei  
Current position: Staff scientist - National Superconducting Cyclotron Laboratory  
Mike Hall MS [E.E.] 2010 - secondary advisor.  
Thesis: Development of a Pulse-Shape discriminating (PSD) capable ASIC  
Current position: Velocidata, St. Louis

**Tara Mastren** [Chem. and Radiology] 2014  
Advised jointly with Prof. S. Lapi – WU radiology  
Thesis: Isotope Harvesting at NSCL and FRIB  
Current position: Post-Doctoral associate at UT Southwestern, TX

Kyle Brown [WU-Chem]  
Current Ph.D. student  
Thesis: Comparison of the correlations between isobaric twined 2p decays.

Cole Pruitt [WU-Chem]  
Current student  
Thesis: Particle-assisted decay of the Hoyle state and proton elastic scattering with secondary beams.

Dan Hoff [WU-Chem]  
Current student  
Thesis: Spin-flip induced spin alignment

Tyler Webb Pruitt [WU-Phys]  
Current student  
Thesis: A search for  $^{11}\text{O}$ .

### **Undergraduates engaged in research in our group:**

About 15 undergraduates have been mentored in our group between 1985 - 2012. Four went on to medical school or MD/PhD programs, the remainder went on to graduate school in physical science. The graduate schools include: Berkeley (chem.), MIT (phys.), Harvard (phys.), Stanford (both chem. and phys.), Northwestern (chem.), Duke (phys.), U. of Colorado at Boulder (mat. sci.), and Michigan State University (several phys).