

# Sylvie Hudan

Associate Scientist

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## Research Interests

Decay of nuclear matter under extreme conditions of excitation, density, and deformation; properties and decay of nuclei exotic in  $N/Z$ ; dynamics of heavy-ion collisions in the Fermi energy domain; applicability of thermodynamic concepts to small, finite short-lived systems; interplay of statistical and dynamical processes on cluster formation; particle-particle correlation techniques as a probe of limiting temperature; molecular dynamics models; nuclear fusion of neutron-rich light nuclei at and near the Coulomb barrier.

## Experience

### Associate Scientist, Indiana University; Bloomington, IN – 2011-Present

Nuclear equation-of-state; fusion of neutron-rich light nuclei; nuclear dynamics of heavy-ion reactions.

### Assistant Scientist, Indiana University; Bloomington, IN – 2003-2011

Nuclear dynamics of heavy-ion reactions; nuclear equation-of-state; fusion of neutron-rich light nuclei.

### Postdoctoral Fellow, Indiana University; Bloomington, IN – 2002-2003

Nuclear dynamics of heavy-ion reactions; nuclear equation-of-state; multifragmentation of excited nuclear matter.

### Graduate Research Assistant, GANIL; Caen, France – 1998-2001

Research Advisor: D. Guerreau

Etude expérimentale et théorique de la production de fragments dans les collisions Xe+Sn de 25 à 150 A.MeV. (Experimental and theoretical study of fragment production in Xe+Sn collisions from 25 to 150 A.MeV).

### M.S. Internship, GANIL; Caen, France – 1998

Research Advisor: A. Chbihi.

Determination of the excitation energy of fragments produced in heavy-ion reactions.

## Education

University of Caen, Caen, France – PhD, 2001

University of Caen, Caen, France – M.S., 1998

ISMRA, Caen, France – B.S. Engineering (Measurement), 1998

## Professional Societies

Member of American Chemical Society, Division of Nuclear Chemistry and Technology, 2002 - present

Member of American Physical Society, Division of Nuclear Physics, 2002 - present

## Professional Service

### Departmental (CEEM)

CEEM Space Committee — 2010 - Present

CEEM Social Committee — 2010 - Present

IUCF Social Committee — 2003 - 2004

### Outside

Session co-chair, *Phases of Nuclear Matter*, Nuclear Chemistry Gordon Conference, Colby-Sawyer College, New London, NH, June 4-9, 2006.

Symposium co-organizer, V. E. Viola Celebration of a Career, Bloomington, IN, October 28-29, 2005.

## Educational Services

External referee, PhD committee, f J. Gauthier, Univeristé Laval, Québec, QC, Canada, April 2012.

Supervision of undergraduate students, graduate students and post-doctoral fellows in the Nuclear Chemistry group at Indiana University.

Member of the Research Experiences for Undergraduates program (NSF) committee, 2009.

Supervision of a Research Experiences for Undergraduates program (NSF) student, summer 2009.

Supervision of a Research Experiences for Undergraduates program (NSF) student, summer 2008.

## Invited Talks and Seminars

23. Timescale for Equilibration of N/Z Gradients in Dinuclear Systems, S. Hudan, *Symposium on Nuclear Reactions, ACS Fall Meeting*, Indianapolis, IN, September 8-9, 2013.

22. Timescale for equilibration of N/Z gradients in dinuclear systems, S. Hudan, *Nuclear fragmentation from equilibrium to dynamics*, Nuclear Chemistry Gordon Research Conference, Colby-Sawyer College, New London, NH, June 9-14, 2013.

21. Tracking saddle-to-scission dynamics using N/Z in projectile breakup reactions, Asy-EOS 2012, Int. Workshop on Nuclear Symmetry Energy and Reaction Mechanism, Siracusa, Sicily, Italy, September 4-7, 2012.

20. Measuring the fusion of neutron-rich light nuclei at and below the Coulomb barrier, *GANIL/LPC seminar*, Caen, France, August 31, 2012.

19. Tracking saddle-to-scission dynamics using N/Z in projectile breakup reactions, *11th International Conference on Nucleus-Nucleus Collisions*, San Antonio, TX, May 27- June 1, 2012.
18. Short-lived binary splits of an excited projectile-like fragment induced by transient deformation, *GANIL/LPC seminar*, Caen, France, July 9, 2010.
17. Proximity Decay of Nuclei, *Nuclear physics seminar*, University of Notre Dame, Notre Dame, IN, November 10, 2008.
16. Proximity Decay of Nuclei, *Nuclear physics seminar*, Indiana University Cyclotron Facility, Bloomington, IN, November 7, 2008.
15. Proximity Decay of Nuclei, *Nuclear physics and chemistry seminar*, University of Kentucky, Lexington, KY, September 25, 2008.
14. Proximity Decay of Nuclei, *Nuclear Reactions*, Nuclear Chemistry Gordon Conference, Colby-Sawyer College, New London, NH, June 15-20, 2008.
13. Tidal effects and the Proximity decay of nuclei, *Nuclear Structure and Reactions in the Era of Radioactive Beams*, 234<sup>th</sup> National Meeting, American Chemical Society, Boston, MA, August 19-23, 2007.
12. Short timescale behavior of colliding heavy nuclei at intermediate energies, *Nuclear physics seminar*, Indiana University Cyclotron Facility, Bloomington, IN, April 7, 2006.
11. Interplay of initial deformation and Coulomb proximity on nuclear decay, *Nuclear Reactions – Isospin and Structure in Reaction*, Nuclear Chemistry Gordon Conference, Colby-Sawyer College, New London, NH, June 13-18, 2004.
10. Dynamical fragment production in non-central heavy-ion collisions, *Topics in Heavy Ion Collisions*, Montréal, Canada, June 25-28, 2003.
9. Exciting nuclear matter!, *Physics department seminar*, SUNY Oswego, Oswego, NY, May 7, 2003.
8. Dynamical aspects in heavy-ion reactions at intermediate energy, *DAPNIA seminar*, Saclay, France, January 10, 2003.
7. Dynamical aspects in heavy-ion reactions at intermediate energy, *IPNO seminar*, Orsay, France, January 8, 2003.
6. Dynamical aspects in heavy-ion reactions at intermediate energy, *IPNL seminar*, Lyon, France, December 17, 2002.
5. Dynamical aspects in heavy-ion reactions at intermediate energy, *GANIL/LPC seminar*, Caen, France, December 10, 2002.

4. Mid-peripheral collisions: PLF\* decay, *Lynch/Tsang group seminar*, NSCL, MSU, East Lansing, MI, September 10, 2002.
3. Mid-peripheral collisions: PLF\* decay, *Nuclei and Nuclear Matter at the Limits of Stability*, 224<sup>th</sup> National Meeting, American Chemical Society, Boston, MA, August 18-22, 2002.
2. Isospin enrichment of the mid-rapidity zone? *Nuclear Reactions – Isospin and Structure in Reaction*, Nuclear Chemistry Gordon Conference, Colby-Sawyer College, New London, NH, June 16-21, 2002.
1. Etude expérimentale et théorique de la production de fragments dans les collisions Xe +Sn de 25 à 150 A.MeV, *PhD defense*, GANIL, Caen, France, December 21, 2001.

### Papers in Conference Proceedings

9. Fusion of 200 incident ions with 12C target nuclei, M.J. Rudolph, Z.Q. Gosser, K. Brown, T.K Steinbach, S. Hudan, R.T. deSouza, A. Chbihi, B. Jacquot, M. Famiano, J.F. Liang, D. Shapira and D Mercier, International Conference on Nucleus-Nucleus Collisions, J. Phys.: Conf. Ser. **420**, 012122 (2013).
8. Tracking saddle-to-scission dynamics using N/Z in projectile breakup reactions, S. Hudan, K. Brown, A.B. McIntosh, R.T. deSouza, S. Bianchin, J. Black, A. Chbihi, M. Famiano, M.O. Frégeau, J. Gauthier, D. Mercier, J. Moisan, C.J. Metelko, R. Roy, C. Schwarz, W. Trautmann and R. Yanez, International Conference on Nucleus-Nucleus Collisions, J. Phys.: Conf. Ser. **420**, 012095 (2013).
7. Two-proton decay of the <sup>6</sup>Be ground state and the double isobaric analog of <sup>11</sup>Li, R.J. Charity, J.M. Elson, S. Komarov, L.G. Sobotka, J. Manfredi, R. Shane, I.A. Egorova, L.V. Grigorenko, K. Hagino, D. Bazin, Z. Chajeccki, D. Coupland, A. Gade, H. Iwasaki, M. Kilbrun, J. Lee, S.M. Lukyanov, W.G Lynch, M. Mocko, S P Lobastov, A Rodgers, A Sanetullaev, M B Tsang, M S Wallace, J Winkelbauer, M. Youngs, S. Hudan, C. Metelko, M.A. Famino, S.T. Marley, D.V. Shetty, A.H. Wuosmaa, M.J. van Goethem and M.V. Zhukov, International Conference on Nucleus-Nucleus Collisions, J. Phys.: Conf. Ser. **420**, 012073 (2013).
6. Isospin effects in <sup>40,48</sup>Ca+<sup>40,48</sup>Ca collisions, V. Henzl for the HiRA collaboration, International Conference on Nucleus-Nucleus Collisions, Nucl. Phys. A **834**, 552c (2010).
5. Highly segmented detector arrays for studying the resonant decay of unstable nuclei, R. T. de Souza, C. Metelko and S. Hudan, Nucl. Instru. and Meth. in Phys. Res. Section B **261**, 1107 (2007).
4. Isotopic effects in multifragmentation and the nuclear equation of state, W. Trautmann and the ALADIN and INDRA collaborations, Proceedings of the Ninth International Conference on Nucleus-Nucleus Collisions - (NN2006), Nucl. Phys. A **787**, 575c (2007).

3. Fragment production in central heavy-ion collisions: reconciling the dominance of dynamics with observed phase transition signals through universal fluctuations. J.D. Frankland, A. Chbihi, S. Hudan, A. Mignon, A. Ono for the ALADIN and INDRA collaborations, XL International Winter Meeting on Nuclear Physics, January 21-25, 2002, Bormio, Italy.
2. Universal fluctuations: a new approach to the study of "phase transitions" in intermediate energy heavy ion collisions. J. D. Frankland, R. Bougault, A. Chbihi, S. Hudan, A. Mignon, for the INDRA collaboration, International Workshop on Multifragmentation and related topics (IWM2001), November 28-December 1, 2001, LNS Catania, Italy.
1. Excitation energy of the fragments produced in central collisions of Xe + Sn at intermediate energies. S. Hudan, A. Chbihi, J.D. Frankland, J.P. Wieleczko, for the INDRA collaboration, XXXVIII International Winter Meeting on Nuclear Physics, January 24-29, 2000, Bormio, Italy.

### **Contributions in Conferences**

13. Sub-barrier fusion cross-sections of neutron-rich light nuclei, S. Hudan, *Low Energy Community Meeting*, East Lansing, MI, August 23-24, 2013.
12. Tracking saddle-to-scission dynamics using N/Z in projectile breakup reactions, *April Meeting*, American Physical Society, Atlanta, GA, March 31 - April 3, 2012.
11. Fusion of neutron-rich O ions on a carbon target at near-barrier energies, *Division of Nuclear Physics meeting*, American Physical Society, East Lansing, MI, October 26-29, 2011.
10. Isotopic trends in dynamical breakup, *Division of Nuclear Physics meeting*, American Physical Society, East Lansing, MI, October 26-29, 2011.
9. Mid-peripheral collisions around the Fermi energy: comparison with an event generator, *April meeting*, American Physical Society, Denver, CO, May 2-5, 2009.
8. MASE (Multiplexed Analog Shaper Electronics): A novel approach to readout of a highly segmented silicon detector array, *April meeting*, American Physical Society, Saint-Louis, MO, April 11-15, 2008.
7. Neutron to proton ratios of quasi-projectile and mid-rapidity emission in the  $^{64}\text{Zn} + ^{64}\text{Zn}$  reaction at 45 MeV/nucleon. *Division of Nuclear Physics meeting*, American Physical Society, Nashville, TN, October 25-28, 2006.
6. Short timescale behavior of colliding heavy nuclei at intermediate energies, *April meeting*, American Physical Society, Dallas, TX, April 22-25, 2006.
5. Tidal Effects in the Resonance decay of light clusters, *April meeting*, American Physical Society, Dallas, TX, April 22-25, 2006.

4. Breakup of projectile-like fragments in heavy-ion collisions at intermediate energies: statistical and dynamical production. *Division of Nuclear Physics meeting*, American Physical Society, East Lansing, MI, October 9-12, 2002.
3. Excitation energy of the fragments produced in central collisions of Xe + Sn at intermediate energies, *XXXVIII International Winter Meeting on Nuclear Physics*, Bormio, Italy, January 24-29, 2000.
2. Rencontres Jeunes Chercheurs, Aussois, France, December 6-12, 1999.
1. Rencontres Jeunes Chercheurs, Grasse, France, December 13-18, 1998.

### **Participation in Workshops and Conferences**

17. FRIB Equipment Workshop, East Lansing, MI, February 20-22, 2010.
16. Step Forward to FRIB, Argonne National Laboratory, Lemont, IL, May 30-31, 2009.
15. NSCL TPC Workshop, East Lansing, MI, December 6-7, 2007.
14. Nuclear Chemistry Gordon Conference, Colby-Sawyer College, New London, NH, June 4-9, 2006.
13. NSCL User Workshop, East Lansing, MI, May 31-June 2, 2006.
12. NSCL User Workshop, East Lansing, MI, August 18-20, 2005.
11. World Consensus Initiative 2005, College Station, TX, February 12-16, 2005.
10. NSCL User Workshop, East Lansing, MI, October 25-26, 2004.
9. World Consensus Initiative Post Gordon Workshop 2004, Smith College, Northampton, MA, June 18-19, 2004.
8. RIA facility workshop, East Lansing, MI, March 9-13, 2004.
7. NSCL User Workshop, East Lansing, MI, September 27-28, 2003.
6. Second RIA Summer School on Exotic Beam Physics, NSCL, MSU, East Lansing, MI, August 4-9, 2003.
5. Strip 2002, East Lansing, MI, May 31-June 2, 2002.
4. Colloque GANIL, Belgodere, Corsica, France, September 17-22, 2001.
3. International Joliot-Curie School, *Nuclear Astrophysics*, Spa, Belgium, September 10-16, 2000.
2. VIth Nucleus Nucleus Collisions International Conference, Strasbourg, France, July 3-7, 2000.
1. IVth INDRA Workshop, GANIL, Caen, France, May 25-28, 1998.

## Publications in Refereed Journals

54. Measuring the fusion cross-section of light nuclei with low-intensity beams, T. K. Steinbach, M. J. Rudolph, Z. Q. Gosser, K. Brown, B. Floyd, S. Hudan, R. T. deSouza, J. F. Liang, D. Shapira and M. Famiano, Nucl. Instr. Meth. In Phys. Res. A, 2013 (submitted).
53. Timescale for Isospin Equilibration in Projectile Breakup, S. Hudan and R.T. deSouza, Special Review Edition of Eur. J. Phys. A on Symmetry Energy (in press).
52. Neutron-hole states in  $^{45}\text{Ar}$  from  $^1\text{H}(^{46}\text{Ar}, \text{d})^{45}\text{Ar}$  reactions, F. Lu, Jenny Lee, M. B. Tsang, D. Bazin, D. Coupland, V. Henzl, D. Henzlova, M. Kilburn, W. G. Lynch, A. M. Rogers, A. Sanetullaev, Z. Y. Sun, M. Youngs, R. J. Charity, L. G. Sobotka, M. Famiano, S. Hudan, M. Horoi, and Y. L. Ye, Phys. Rev. C **88**, 017604 (2013).
51. Confronting near and sub-barrier fusion cross-sections for  $^{20}\text{O}+^{12}\text{C}$  with a microscopic method, R.T. de Souza, S. Hudan, V.E. Oberacker, S. Umar, Phys. Rev. C **88**, 014602 (2013).
50. Timescale for equilibration of N/Z gradients in dinuclear systems, K. Brown, S. Hudan, R.T. de Souza, J. Gauthier, R. Roy, D.V. Shetty, G.A. Souliotis, S.J. Yennello, Phys. Rev. C **87**, 061601(R) (2013).
49. Double isobaric analog of  $^{11}\text{Li}$  in  $^{11}\text{B}$ , R. J. Charity, L.G. Sobotka, K. Hagino, D. Bazin, M.A. Famiano, A. Gade, S. Hudan, S.A. Komarov, Jenny Lee, S.P. Lobastov, S.M. Lukyanov, W.G. Lynch, C. Metelko, M. Mocko, A.M. Rogers, H. Sagawa, A. Sanetullaev, M.B. Tsang, M.S. Wallace, M.J. van Goethem, and A. H. Wuosmaa, Phys. Rev. C **86**, 041307(R) (2012).
48. Tracking saddle-to-scission dynamics using N/Z in projectile breakup reactions, S. Hudan, A. B. McIntosh, R. T. de Souza, S. Bianchin, J. Black, A. Chbihi, M. Famiano, M. O. Frégeau, J. Gauthier, D. Mercier, J. Moisan, C. J. Metelko, R. Roy, C. Schwarz, W. Trautmann, and R. Yanez, Phys. Rev. C **86**, 021603(R) (2012).
47. Using induced signals to sense position from a microchannel plate detector, R. T. de Souza, Z. Q. Gosser, and S. Hudan, Rev. Sci. Instrum. **83**, 053305 (2012).
46. Near- and sub-barrier fusion of  $^{20}\text{O}$  incident ions with  $^{12}\text{C}$  target nuclei, M.J. Rudolph, Z.Q. Gosser, K. Brown, S. Hudan, R.T. de Souza, A. Chbihi, B. Jacquot, M. Famiano, J.F. Liang, D. Shapira, D. Mercier, Phys. Rev. C **85**, 024605 (2012).
45. Angular dependence in proton-proton correlation functions in central  $^{40}\text{Ca} + ^{40}\text{Ca}$  and  $^{48}\text{Ca} + ^{48}\text{Ca}$  reactions, V. Henzl, M. A. Kilburn, Z. Chajęcki, D. Henzlova, W. G. Lynch, D. Brown, A. Chbihi, D. D. S. Coupland, P. Danielewicz, R. T. deSouza, M. Famiano, C. Herlitzius, S. Hudan, Jenny Lee, S. Lukyanov, A. M. Rogers, A. Sanetullaev, L. G. Sobotka, Z. Y. Sun, M. B. Tsang, A. Vander Molen, G. Verde, M. S. Wallace, and M. Youngs, Phys. Rev. C **85**, 014606 (2012).

44. Ground-State Proton Decay of  $^{69}\text{Br}$  and Implications for the  $^{68}\text{Se}$  Astrophysical Rapid Proton-Capture Process Waiting Point, A. M. Rogers, M. A. Famiano, W. G. Lynch, M. S. Wallace, F. Amorini, D. Bazin, R. J. Charity, F. Delaunay, R. T. de Souza, J. Elson, A. Gade, D. Galaviz, M.-J. van Goethem, S. Hudan, J. Lee, S. Lobastov, S. Lukyanov, M. Matos $\check{c}$ , M. Mocko, H. Schatz, D. Shapira, L. G. Sobotka, M.B.Tsang, and G.Verde, *Phys. Rev. Lett.* **106**, 252503 (2011).
43. Neutron spectroscopic factors of  $^{34}\text{Ar}$  and  $^{46}\text{Ar}$  from (p,d) transfer reactions, Jenny Lee, M.B. Tsang, D. Bazin, D. Coupland, V. Henzl, D. Henzlova, M. Kilburn, W. G. Lynch, A. M. Rogers, A. Sanetullaev, Z. Y. Sun, M. Youngs, R. J. Charity, L. G. Sobotka, M. Famiano, S. Hudan, D. Shapira, P. O'Malley, W. A. Peters, K. Y. Chae, and K. Schmitt, *Phys. Rev. C* **83**, 014606 (2011).
42. Sub-nanosecond time-of-flight for segmented silicon detectors, R.T. deSouza, A. Alexander, K. Brown, B. Floyd, Z.Q. Gosser, S. Hudan, J. Poehlman and M.J. Rudolph, *Nucl. Instru. and Meth. in Phys. Res. Section A* **632**, 133 (2011).
41. Neutron-Proton Asymmetry Dependence of Spectroscopic Factors in Ar Isotopes, Jenny Lee, M. B. Tsang, D. Bazin, D. Coupland, V. Henzl, D. Henzlova, M. Kilburn, W. G. Lynch, A. M. Rogers, A. Sanetullaev, A. Signoracci, Z. Y. Sun, M. Youngs, K. Y. Chae, R. J. Charity, H. K. Cheung, M. Famiano, S. Hudan, P. O'Malley, W. A. Peters, K. Schmitt, D. Shapira, and L. G. Sobotka, *Phys. Rev. Lett.* **104**, 112701 (2010).
40. Short-lived binary splits of an excited projectile-like fragment induced by transient deformation, A. B. McIntosh, S. Hudan, J. Black, D. Mercier, C. J. Metelko, R. Yanez, R. T. de Souza, A. Chbihi, M. Famiano, M. O. Frégeau, J. Gauthier, J. Moisan, R. Roy, S. Bianchin, C. Schwarz, W. Trautmann, *Phys. Rev. C* **81**, 034603 (2010).
39. Charge correlations and isotopic distributions of projectile fragmentation events in  $^{124}\text{Xe} + ^{112}\text{Sn}$  at  $E/A=50$  MeV, S. Hudan, A. B. McIntosh, J. Black, D. Mercier, C. J. Metelko, R. Yanez, R. T. de Souza, A. Chbihi, M. Famiano, M. O. Frégeau, J. Gauthier, J. Moisan, R. Roy, S. Bianchin, C. Schwarz, W. Trautmann, and A. S. Botvina, *Phys. Rev. C* **80**, 064611 (2009).
38. Mechanisms in Knockout Reactions, D. Bazin, R. J. Charity, R. T. de Souza, M. A. Famiano, A. Gade, V. Henzl, D. Henzlova, S. Hudan, J. Lee, S. Lukyanov, W. G. Lynch, S. McDaniel, M. Mocko, A. Obertelli, A. M. Rogers, L. G. Sobotka, J. R. Terry, J. A. Tostevin, M. B. Tsang, and M. S. Wallace, *Phys. Rev. Lett* **102**, 232501 (2009).
37. Investigation of particle-unbound excited states in light nuclei with resonance-decay spectroscopy using a  $^{12}\text{Be}$  beam, R. J. Charity, S. A. Komarov, L. G. Sobotka, J. Clifford, D. Bazin, A. Gade, Jenny Lee, S. M. Lukyanov, W. G. Lynch, M. Mocko, S. P. Lobastov, A. M. Rogers, A. Sanetullaev, M. B. Tsang, M. S. Wallace, R. G. T. Zegers, S. Hudan, C. Metelko, M. A. Famiano, A. H. Wuosmaa, M. J. van Goethem, *Phys. Rev. C* **78**, 054307 (2008).



36. Exclusive studies of 130–270 MeV  $^3\text{He}$ - and 200-MeV proton-induced reactions on  $^{27}\text{Al}$ ,  $^{\text{nat}}\text{Ag}$ , and  $^{197}\text{Au}$ , D. S. Ginger, K. Kwiatkowski, G. Wang, W.-c. Hsi, S. Hudan, E. Cornell, R. T. de Souza, V. E. Viola, R. G. Korteling, *Phys. Rev. C* **78**, 034601 (2008).
35. Source shape determination with directional fragment–fragment velocity correlations, INDRA and ALADIN Collaborations, A. Le Fèvre, C. Schwarz, G. Auger, M.L. Begemann-Blaich, N. Bellaize, R. Bittiger, F. Bocage, B. Borderie, R. Bougault, B. Bouriquet, J.L. Charvet, A. Chbihi, R. Dayras, D. Durand, J.D. Frankland, E. Galichet, D. Gourio, D. Guinet, S. Hudan, P. Lantesse, F. Lavaud, R. Legrain, O. Lopez, J. Łukasik, U. Lynen, W.F.J. Müller, L. Nalpas, H. Orth, E. Plagnol, E. Rosato, A. Saija, C. Sfienti, B. Tamain, W. Trautmann, A. Trzciński, K. Turzó, E. Vient, M. Vigilante, C. Volant and B. Zwiegliński, *Phys. Lett. B* **659**, 807 (2008).
34. Particle decay of  $^{12}\text{Be}$  excited states, R. J. Charity, S. A. Komarov, L. G. Sobotka, J. Clifford, D. Bazin, A. Gade, Jenny Lee, S. M. Lukyanov, W. G. Lynch, M. Mocko, S. P. Lobastov, A. M. Rogers, A. Sanetullaev, M. B. Tsang, M. S. Wallace, S. Hudan, C. Metelko, M. A. Famiano, A. H. Wuosmaa, and M. J. Goethem, *Phys. Rev. C* **76**, 064313 (2007).
33. Tidal Effects and the Proximity Decay of Nuclei, A.B. McIntosh, S. Hudan, C.J. Metelko, R.T. de Souza, R.J. Charity, W.G. Lynch, *Phys. Rev. Lett.* **99**, 132701 (2007).
32. The high resolution array (HiRA) for rare isotope beam experiments, M. S. Wallace, M. A. Famiano, M.-J. van Goethem, A. M. Rogers, W. G. Lynch, J. Clifford, F. Delaunay, J. Lee, S. Labostov, M. Mocko, L. Morris, A. Moroni, B. E. nett, D. J. Oostdyk, R. Krishnasamy, M. B. Tsang, R. T. de Souza, S. Hudan, L. G. Sobotka, R. J. Charity, J. Elson, G. L. Engel, *Nucl. Instru. and Meth. in Phys. Res. Section A* **583**, 302 (2007).
31. MASE: A novel approach to readout of a highly segmented silicon detector Array, C. Metelko, A. Alexander, S. Hudan, J. Poehlman, and R.T. de Souza, *Nucl. Instru. and Meth. in Phys. Res. Section A* **569**, 815 (2006).
30. Neutron to proton ratios of quasiprojectile and midrapidity emission in the  $^{64}\text{Zn}+^{64}\text{Zn}$  reaction at 45 MeV/nucleon, D. Thériault, J. Gauthier, F. Grenier, F. Moisan, C. St-Pierre, R. Roy, B. Davin, S. Hudan, T. Padaszynski, P. Sprunger, R.T. de Souza, E. Bell, J. Iglío, A.L. Keksis, D.V. Shetty, G.A. Soulioutis, B. Stein and S.J. Yennello, *Phys. Rev. C* **74**, 051602(R) (2006).
29. Short timescale behavior of colliding heavy nuclei at intermediate energies, S. Hudan, R.T. de Souza, and A. Ono, *Phys. Rev. C* **73**, 054602 (2006).
28. Resolving multiple particles in a highly segmented silicon array, T. Padaszynski, P. Sprunger, R.T. de Souza, S. Hudan, A. Alexander, B. Davin, G. Fleener, A. McIntosh, C. Metelko, R. Moore, N. Peters, J. Poehlman, J. Gauthier, F. Grenier, R. Roy, D. Thériault, E. Bell, J. Garey, J. Iglío, A.L. Keksis, S. Parketon, C. Richers, D.V. Shetty, S.N. Soisson, G.A. Soulioutis, B. Stein and S.J. Yennello, *Nucl. Instru. and Meth. in Phys. Res. Section A* **547**, 464 (2005).

27. Comparison of midvelocity fragment formation with projectilelike decay, S. Hudan, R. Alfaro, B. Davin, Y. Larochele, H. Xu, L. Beaulieu, T. Lefort, R. Yanez, R.T. de Souza, R.J. Charity, L.G. Sobotka, T.X. Liu, X.D. Liu, W.G. Lynch, R. Shomin, W.P. Tan, M.B. Tsang, A. Vander Molen, A. Wagner, H.F. Xi, Phys. Rev. C **71**, 054604 (2005).
26. Isotopic Scaling and the Symmetry Energy in Spectator Fragmentation, A. Le Fèvre et al., (ALADIN and INDRA Collaborations), Phys. Rev. Lett. **94**, 162701 (2005).
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