# Curriculum Vitae – Robert John Charity

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## Professional Experience

- 1984-1987 *Visiting Post-Doctoral Research Associate*
  Lawrence Berkeley National Laboratory, Berkeley, USA
- 1988-1990 *Guest Scientist*
  Gesellschaft für Schwereionenforschung, Darmstadt, Germany
- 1990-1997 *Research Assistant Professor of Chemistry*
  Washington University, St. Louis, USA
- 1997-2003 *Research Associate Professor of Chemistry*
  Washington University, St. Louis, USA
- 2003-Present *Research Professor of Chemistry*

## Short Visiting Positions (6 weeks or less)

Visiting Professor, Catholic University of Louvain, Louvain-la-Neuve, Belgium 1999, 2000, and 2003

## Education

- 1980 *Bachelor of Science* in Physics with Honors from the University of Queensland, Brisbane, Australia.
- 1984 *Ph.D.* in Nuclear Physics from the Australian National University, Canberra, Australia.
  Advisor: John O. Newton
  Thesis Title: *Heavy-Ion Induced Fission Reactions*.

## Committee Memberships

- 1997-2001 User Executive Committee of the National Superconducting Cyclotron Laboratory, Michigan State University (2000-2001 Chairman)
- 2001-2003 Program Advisory Committee of the 88" Cyclotron at Lawrence Berkeley National Laboratory.

## Awards

- Outstanding Referee for the American Physical Society, 2012
- Fellow of the American Physical Society, 2012.
- Certificate of Excellence in Reviewing, Physics Letters B, 2012

## Teaching Experience

- Chemistry 436 – Radioactivity and its Applications – Spring 1992

University College, Washington University, St. Louis.

- Chemistry 436 – Radioactivity and its Applications – Spring 1995

University College, Washington University, St. Louis.

- Summer School 'Re-writing Nuclear Physics textbooks: 30 years of radioactive ion beam physics', Pisa, Italy, July, 2015

## Professional Societies

- The American Physical Society, Nuclear Physics Division

## Research Interests

My research includes the study of both nuclear reactions and nuclear structure. In recent years I have pursued these two areas using invariant-mass spectroscopy. In particular, in collaborations using a number of charged-particle detector arrays, the continuum spectroscopy of light proton-rich nuclei has been studied, with emphasis on prompt ground-state two-proton emission for systems beyond the proton drip line. These studies have evolved to follow the transition from prompt to sequential two-proton decay by studying the decay of the excited states of these systems. Effort has also been spent in understanding the strong spin-alignment observed in inelastic scattering at intermediate energy which has application for *g*-factor measurements and the structure of continuum states close to decay thresholds. In addition to this invariant-mass work, I am involved both experimentally and theoretically in understanding correlations in ground-state nuclei using the dispersive optical model approach, which constrains the self-energy of nucleons within the nucleus and allows us to predicts the magnitude of neutron skins which have important applications for neutron star physics. Experimentally this requires neutron and proton elastic scattering data, reaction and total cross sections which has led to experimental programs at a number of laboratories.

## Invited talks and Seminars

**1985**

- Lawrence Livermore National Laboratory, Nuclear Chemistry Division, Livermore.

**1987**

- ACS Symposium on Central Collisions and Fragmentation Processes, Denver.

- Michigan State University, National Superconducting Cyclotron Laboratory, East Lansing.
- Australian National University, Department of Nuclear Physics, Canberra, Australia.

**1988**

- Grand Accelerator National d'Ions Lourds, Caen, France.

**1989**

- ACS symposium on Nuclear Dynamics and Nuclear Disassembly, Dallas.
- University of Uterecht, Department of Physics, Netherlands.
- University of Bolonna, Department of Physics, Italy.
- University of Florence, Department of Physics, Italy.
- Centre de Recherches Nucleaires, Strasbourg, France.

**1990**

- Lawrence Berkeley Laboratory, Nuclear Science Division, Berkeley.

**1993**

- ACS Symposium on the Formation and Disintegration of Hot Nuclear Matter, Chicago.

**1994**

- Gordon Research Conference on Nuclear Chemistry, New London.

**1995**

- ACS Symposium on Hot and Expanding Nuclear Matter, Chicago.
- Texas A&M University, Cyclotron Institute, College Station.

**1996**

- Michigan State University, National Superconducting Cyclotron Laboratory, East Lansing.

**1997**

- 6$^{th}$ International Conference on Nucleus-Nucleus Collisions, Gatlinburg.

**1999**

- Universite catholique de Louvain, Institut de Physique Nucleaire, Louvain-la-Neuve, Belgium.

**2000**

- Gordon Research Conference on Nuclear Chemistry, New London.

**2001**

- ACS Symposium on Critical Questions/Issues in Nuclear Dynamics, San Diego.
- Lawrence Berkeley Laboratory, 88" Cyclotron, Berkeley.

**2002**

- ACS Symposium on Nuclei and Nuclear Matter at the Limits of Stability, Boston.

**2003**

- Topics in Heavy-Ion Collisions, Montreal, Canada.

**2005**

- Universite catholique de Louvain, Institut de Physique Nucleaire, Louvain-la-Neuve, Belgium.

**2006**

- Michigan State University, National Superconducting Cyclotron Laboratory, East Lansing.
- Gordon Research Conference on Nuclear Chemistry, New London.
- Texas A&M University, Cyclotron Institute, College Station.

**2007**

- Gordon Research Conference on Nuclear Chemistry, New London.

**2008**

- Gordon Research Conference on Nuclear Chemistry, New London.
- Joint ICTP-IAEA Advanced Workshop on Model Codes for Spallation Reactions, Trieste, Italy.

**2010**

- Second Advanced Workshop on Model Codes for Spallation Reactions, Saclay, France.
- Michigan State University, National Superconducting Cyclotron Laboratory, East Lansing.
- ECT* Workshop on Reactions and Nucleon Properties in Rare Isotopes, Trento, Italy.
- University of Liege, Liege, Belgium.
- Triangle Universities Nuclear Laboratory, Duke University, Durham.

**2011**

- Fourth International Conference on Proton-emitting Nuclei. June 6-10, 2011, Bordeaux, France. (PROCON 2011)
- Interfaces between Nuclear Reactions and Structure, Institute for Nuclear Theory Workshop INT-11-48w.
- Joint ATLAS-HRIBF-NSCL-FRIB users meeting, Michigan State University.
- Holifield Radioactive Ion Beam Facility, Oak Ridge National Laboratory.

**2012**

- $11^{Th}$ International Conference on Nucleus-Nucleus collisions in San Antonio (NN20122).
- Carpathian Summer School of Physics 2012, Sinaia, Romania.

**2013**

- Heavy-Ion Accelerator Symposium on Fundamental and Applied Science, 2013, Canberra, Australia.
- Gordon Research Conference on Nuclear Chemistry, New London.

**2014**

- Michigan State University, National Superconducting Cyclotron Laboratory, East Lansing.
- University of Pisa, Italy
- International Workshop on Multifacets of EOS and Clustering, Catania, Italy

**2015**

- Gordon Research Conference on Nuclear Chemistry, New London.
- International Conference on Nucleus-Nucleus Collisions (NN2015)
- Rewriting Nuclear Physics textbooks, 30 years with radioactive ion beam physics, summer school, Pisa, Italy

**2017**

- FRIB Day 1 Science Workshop, Chicago.

## Referee and Grant Reviewing

- Physical Review C
- Physical Review Letters
- Physical Review Special Topics Accelerators and Beams
- Physics Letters B
- Nuclear Physics A
- European Physical Journal A
- European Physical Journal Plus
- Europhysics Letters
- International Journal of Modern Physics E.
- Chinese Physics C
- Annals of Nuclear Energy
- Progress in Particle and Nuclear Physics
- ACS Earth and Space Sciences
- Australian Research Council
- Department of Energy Small Business Innovation Research Grants
- Department of Energy, Office of Science, Office of Nuclear Physics
- International Science and Technology Center

## Research Grants

- 1/1/1992-12/31/1992 *Studies of Complex Fragment Emission in Heavy-Ion Reactions,*L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/1993-12/31/1995 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/1996-12/31/1998 *Studies of Complex Fragment Emission in Heavy-Ion Reactions,* L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator.

- 1/1/1999-12/31/2001 *Studies of Complex Fragment Emission in Heavy-Ion Reactions,* L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 2000-2002 *Brachytherapy Dosimetry Using Plastic Scintillators*, J. Williamson, L.G. Sobotka, R.J. Charity, W. Binns and P. Gibbons, National Institutes of Health and National Cancer Institute, Co investigator.

- 1/1/2002-12/31/2004 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/2005-12/31/2007 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/2008-12/31/2010 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/2011-12/31/2013 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/2014-12/31/2016 *Studies of Complex Fragment Emission in Heavy-Ion Reactions*, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

- 1/1/2017-12/31/2019 Studies of Complex Fragment Emission in Heavy-Ion Reactions, L.G. Sobotka and R.J. Charity, Department of Energy, Division of Nuclear Physics, Co principle investigator

**Publications in Refereed Journals**

1) *Fission Barriers of Pb Nuclei at High Angular Momentum*, D.J. Hinde, J.O. Newton, J.R. Leigh and R.J. Charity, Nuclear Physics **A398** (1983) 308-324

2) *Measurements of Pre-Fission Neutrons from $^{200}$Pb; Further Limits to Statistical Fission Parameters*, D. Ward, R.J. Charity, D.J. Hinde, J.R. Leigh and J.O. Newton, Nuclear Physics **A403** (1983) 189-204

3) *High Spin States in $^{222}$Th*, D. Ward, G.D. Dracoulis, J.R. Leigh, R.J. Charity, D.J. Hinde and J.O. Newton, Nuclear Physics **A406** (1983) 591-612.

4) *Neutron Emission from Accelerating Fragments in Heavy Ion Induced Fission*, D.J. Hinde, R.J. Charity, G.S. Foote, J.R. Leigh, J.O. Newton, S. Ogaza and A. Chatterjee, Physical Review Letters **52** (1984) 986-989.

5) *Neutron Multiplicities in Heavy-Ion-Induced Fission: Timescale of Fusion-Fission*, D.J. Hinde, R.J. Charity, G.S. Foote, J.R. Leigh, J.O. Newton, S. Ogaza and A. Chatterjee, Nuclear Physics **A452** (1985) 550-572.

6) *Characterization of Hot Compound Nuclei from Binary Decay into Complex Fragments*, R.J. Charity, M.A. McMahan, D.R. Bowman, Z.H. Liu, R.J. McDonald, G.J. Wozniak, L.G. Moretto, S. Bradley, W.L. Kehoe, A.C. Mignerey and M.N. Namboodiri, Physical Review Letters **56** (1986) 1354-1357.

7) *Heavy-Ion Induced Fusion-Fission Systematics and the Effect of the Compound Nucleus Spin Distribution on the Fission-Barrier Determination*, R.J. Charity, J.R. Leigh, J.J.M. Bokhorst, A. Chatterjee, G.S. Foote, D.J. Hinde, J.O. Newton, S. Ogaza and D. Ward, Nuclear Physics **A457** (1986) 441-460.

8) *Excitation Energy Division in the First 160 MeV of Total Kinetic Energy Loss for the Reaction 684 MeV $^{80}Kr + ^{174}Yb$*, L.G. Sobotka, G.J. Wozniak, R.J. McDonald, M.A. McMahan, R.J. Charity, L.G. Moretto, Z.H. Liu, F.S. Stephans, R.M. Diamond, M.A. Deleplanque, Physics Letters B **175** (1986) 27-31.

9) *Using a Cyclotron plus ECR Source for Detector Evaluation and Calibration*, M.A. McMahan, G.J. Wozniak, C.M. Lyneis, D.R. Bowman, R.J. Charity, Z.H. Liu, L.G. Moretto, W.L. Kehoe, A.C. Mignerey and M.N. Namboodiri, Nuclear Instruments and Methods A **253** (1986) 1-9.

10) *Complex Fragment Emission at 50 MeV/u: Compound Nuclei for Ever?* D.R. Bowman, R.J. Charity, R.J. McDonald, M.A. McMahan, G.J. Wozniak, L.G. Moretto, W.L. Kehoe, S. Bradley, A.C. Mignerey, A. Moroni, A. Bracco, I. Iori and M.N. Namboodiri, Physics Letters B **189** (1987) 282-286.

11) *Emission of Complex Fragments from Highly Excited Systems Produced in $^{93}Nb + ^{9}Be$ and $^{27}Al$ Reactions at E/A = 25.4 and 30.3 MeV*, R.J. Charity, D.R. Bowman, Z.H. Liu, R.J. McDonald, M.A. McMahan, G.J. Wozniak, L.G. Moretto, S. Bradley, W.L. Kehoe and A.C. Mignerey, Nuclear Physics **A476** (1988) 516-544.

12) *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. Panteleo, L. Fiore, A. Gobbi and K. Hildenbrand, Nuclear Physics **A483** (1988) 371-405.

13) *Measurements and Statistical Model Analysis of Pre-Fission Neutron Multiplicities*, J.O. Newton, D.J. Hinde, R.J. Charity, J.R. Leigh, J.J.M. Bokhorst, A. Chatterjee, G.S. Foote and S. Ogaza, Nuclear Physics **A483** (1988) 126-152.

14) *A Novel Approach to the Measurement of the Neutron Multiplicity Associated with Reverse Kinematics Heavy Ion Reactions*. A. Pantaleo, L.Fiore, G. Guarino, V. Paticchio, G. D'Erasmo, E.M. Fiore, N. Colonna, R.J. Charity, G.J. Wozniak and L.G. Moretto, Nuclear Instruments and Methods A**269** (1988) 580-584.

15) *Incomplete Fusion and Complex Fragment Emission: A Continuum of Isotropic Sources*, N. Colonna, R.J. Charity, D.R. Bowman, M.A. McMahan, G.J. Wozniak, L.G. Moretto, G. Guarino, A. Pantaleo, L. Fiore, A. Gobbi and K.D. Hildenbrand, Physical Review Letters **62** (1989) 1833-1836.

16) *Complex-Fragment Emission in 12.6 MeV/Nucleon $^{63}Cu$ Induced Reactions on $^{12}C$ and $^{27}Al$ Targets*, H.Y. Han, K.X. Jing, E. Plagnol, D.R. Bowman, R.J. Charity, L. Vinet, G.J. Wozniak and L.G. Moretto, Nuclear Physics **A492** (1989) 138-160.

17) *Where Has All the Fusion Gone...?*, E. Plagnol, L. Vinet, D.R. Bowman, Y.D. Chan, R.J. Charity, E. Chavez, S.B. Gazes, H. Han, W.L. Kehoe, M.A. McMahan, L.G. Moretto, R.G. Stokstad, G.J. Wozniak and G. Auger, Physics Letters B **221** (1989) 11-15.

18) *Possibility of Transient Effects During the Emission of Intermediate Mass Fragments*, J. Pochodzalla, R.J. Charity, U. Lynen, H. Sann, W. Trautmann and R. Trockel, Physical Review C **40** (1989) 2918-2921.

19) *Complex Fragments From Excited Actinide Nuclei: A New Test of the Finite Range Model*, D.G. Sarantites, D.R. Bowman, G.J. Wozniak, R.J. Charity, Z.H. Liu, R.J. McDonald, M.A. McMahan, L.G. Moretto, Physics Letters B **218** (1989) 427-430.

20) *Sources of Complex Fragment Emission in Lanthanum-Induced Reactions at E/A = 14.7 and 18.0 MeV*, R.J. Charity, K.X. Jing, D.R. Bowman, M.A. McMahan, G.J. Wozniak, L.G. Moretto, N. Colonna, G. Guarino, A. Pantaleo, L. Fiore, A. Gobbi and K.D. Hildenbrand, Nuclear Physics **A511** (1990) 59-91.

21) *Equilibrium and Non-Equilibrium Complex Fragment Emission in 50-100 MeV/A $^{139}La + ^{12}C$ Reactions*, D.R. Bowman, G.F. Peaslee, N. Colonna, R.J. Charity, M.A. McMahan, D. Delis, H. Han, K. Jing, G.J. Wozniak, L.G. Moretto, W.L. Kehoe, B. Libby, A.C. Mignerey, A. Moroni, S. Angius, I. Iori, A. Pantaleo and G. Guarino, Nuclear Physics **A523** (1991) 425.

22) *Evidence for a Nonequilibrated Dinuclear System in Dissipative Collisions at 19 MeV/nucleon*, G. Casini, A.A. Stefanini, M. Bini, P.R. Muarenzig, A. Olmi, G. Poggi, R.J. Charity, R. Freifelder, A. Gobbi, K.D.Hildenbrand, M.H. Tanaka and J.P. Wessels, Physical Review Letters **67** (1991) 3364-3367.

23) *Results on Two-, Three-, and Four-Body Events from $^{100}Mo + ^{100}Mo$ and $^{120}Sn + ^{120}Sn$ Collisions at around E/A = 20 MeV*, R.J. Charity, R. Freifelder, A. Gobbi, N. Herrmann, K.D. Hildenbrand, F. Rami, H. Stelzer, J. Wessels, G. Casini, P.R. Maurenzig, A. Olmi, A.A. Stefanini, J. Galin, D. Guerreau, U. Jahnke, J.C. Adloff, B. Bilwes, R. Bilwes, G. Rudolf, M. Petrovici, M. Gnirs and D. Pelte, Zeitschrift für Physik A- Hadrons and Nuclei **341** (1991) 53-73.

24) *Mechanism for the Disassembly of Excited $^{16}O$ 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.J. Horen, C. Ludemann, M. Thoennessen, and R. Varner, Physical Review C **46** (1992) 1951-1967.

25) *Excitation-Energy Dependence of the Giant Dipole Resonance Width*, G. Enders, F.D. Berg, K. Hagel, W. Kühn, V. Metag, R. Novotny, M. Pfeiffer, O. Schwalb, R.J. Charity, A. Gobbi, R. Freifelder, W. Henning, K.D. Hildenbrand, R. Holzmann, R.S. Mayer, R.S. Simon, J.P. Wessels, G. Casini, A. Olmi, and A.A. Stefanini, Physical Review Letters **69** (1992) 249-252.

26) *Statistical Fragmentation of Au Projectiles at E/A=600 MeV*, J. Hubele, P. Kreutz, V. Lindenstruth, J.C. Adloff, M. Begemann-Blaich, P. Bouissou, G. Imme, I. Iori, G.J. Kunde, S. Leray, Z. Liu, U. Lynen, R.J. Meijer, U. Milkau, A. Moroni, W.F.J. Müller, C. Ngo, C.A. Ogilvie, J. Pochodzalla, G. Raciti, G. Rudolf, H. Sann, A. Schüttauf, W. Seidel, L. Stuttge, W. Trautmann, A. Tucholski, R. Heck, A.R. DeAngelis, D.H.E. Gross, H.R. Jaqaman, H.W. Barz, H. Schulz, W.A. Friedman, and R.J. Charity, Physical Review C **46** (1992) R1577-R1581.

27) *Binary Character of Highly Dissipative $^{209}Bi+^{136}Xe$ Collisions at $E_{lab}/A$ = 28.2 MeV*, B. Lott, S.P. Baldwin, B.M. Szabo, B.M. Quednau, W.U. Schröder, J. Tõke, L.G. Sobotka, J. Barreto, R.J. Charity, L. Gallamore, D.G. Sarantities, D.W. Stracener, and R.T. de Souza, Physical Review Letters **68** (1992) 3141-4144.

28) *Statistical Emission of Deuterons and Tritons from Highly Excited Compound Nuclei*, N.G. Nicolis, D.G. Sarantites, L.G. Sobotka and R.J. Charity, Physical Review C **45** (1992) 2393-2402.

29) *Search for Entrance Channel Effects in the Decay of $^{164}Yb$ Compound Nuclei at $E^* \approx 54$ MeV*, J.L. 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, and M. Thoennessen, Physical Review C **48** (1993) 2881-2894.

30) *Fission Time Scales from Anisotropic In--Plane Distributions in $^{100}Mo+^{100}Mo$ and $^{120}Sn+^{120}Sn$ collisions around 20 A MeV*, G. Casini, P.G. Bizzeti, P.R. Maurenzig, A. Olmi, A.A. Stefanini, J.P. Wessels, R.J. Charity, R. Freifelder, A. Gobbi, N. Herrmann, K.D. Hildenbrand and H. Stelzer, Physical Review Letters **71** (1993) 2567-2570.

31) *Mass Asymmetry Dependence of Scission Times in the Reactions of 18.5 A MeV $^{136}Xe$ + $^{48}Ti$*, M. Gui, K. Hagel, R. Wada, Y. Lou, D. Utley, B. Xiao, J. Li, J.B. Natowitz, G. Enders, W. Kühn, V. Metag, R. Novotny, O. Schwalb, R.J. Charity, R. Freifelder, A. Gobbi, W. Henning, K.D. Hildenbrand, R. Mayer, R.S. Simon, J.P. Wessels, G. Casini, A. Olmi and A.A. Stefanini, Physical Review C **48** (1993) 1791-1814.

32) *Highly Deformed Band in $^{136}$Pm and the Anomalous Dynamical Moment of inertia in the A≈135 Superdeformed Region,* M.A. Riley, T. Petters, J. Shick, D.E. Archer, J. Doring, J.W. Holcomb, G.D. Johns, T.D. Johnson, O.N. Tekyi-Mensah, S.L. Tabor, P.C. Womble, V.A. Wood, C. Baktash, M.L. Halbert, D.C. Hensley, I.Y. Lee, R.J. Charity, D.G. Sarantites, L.L. Wittner and J. Simpson, Physical Review C **47** (1993) R441-R443.

33) *Onset of Nuclear Vaporization in $^{197}$Au+$^{197}$Au Collisions*, M.B. Tsang, W.C. Hsi, W.G. Lynch, D.R. Bowman, C.K. Gelbke, G.F. Peaslee, G.J. Kunde, M.L. Begemann Blaich, T. Hofmann, J. Hubele, J. Kempter, P. Kreutz, 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, J. Stroth, W. Trautmann, A. Tucholski, A. Wörner, E. Zude, B. Zwieglinski, A. Aiello, G. Immé, V. Pappalardo, G. Raciti, R.J. Charity, L.G. Sobotka, I. Iori, A. Moroni, R. Scardoni, A. Ferrero, W. Seidel, Th. Blaich, L. Stuttge, A. Cosmo, W.A. Friedman, G. Peilert, Physical Review Letters **71** (1993) 1502-1505.

34) *A highly-segmented ΔE-time-of-flight wall as a forward detector of the 4π-system for charged particles at the SIS/ESR accelerator*, A. Gobbi, J.P. Alard, G. Augustinski, Z. Basrak, N. Bastid, I.M. Belayev, Th. Blaich, P. Boccaccio, R. Bock, S. Boussange, A. Buta, R. Ĉaplar, C. Cerruti, R.J. Charity, N. Cindro, J.P. Coffin, M. Crouau, F. Daudon, J.F. Devin, P. Dupieux, J. Erö, Z.G. Fan, C. Fayard, P. Fintz, Z. Fodor, L. Fraysse, R. Freifelder, S. Frolov, E. Gimenez, Y. Grigorian, G. Guillaume, N. Herrmann, K.D. Hildenbrand, S. Hölbling, F. Hornecker, A. Houari, S.C. Jeong, M. Jorio, F. Jundt, J. Kecskemèti, P. Koncz, Y. Korchagin, R. Kotte, M. Krämer, C. Kuhn, A. Lebedev, I. Legrand, C.F. Maguire, V. Manko, M. Marquardt, T. Matulewicz, S. Mayade, G. Mgebrishvili, J. Mösner, D. Moisa, G. Montarou, I. Montbel, P. Morel, W. Neubert, R. Neunenumerate, G. Ortlepp, D. Pelte, M. Petrovici, F. Rami, W. Reisdorf, M.A. Saettel, E. Sahuc, G. Savinel, Z. Seres, D. Schüll, B. Sikora, V. Simion, S. Smolyankin, U. Sodan, M.H. Tanaka, K.M. Teh, R. Tezkratt, B. Tischler, M. Trzaska, M.A. Vasiliev, D. Vincent, P. Wagner, J. Weinert, J.P. Wessels, T. Wienold, Z. Wilhelmi, D. Wohlfarth, and A.V. Zhilin, Nuclear Instruments and Methods in Physics Research A **324** (1993) 156-176.

35) *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.A. Lisa, W.G. Lynch, G.F. Peaslee, L. Phair, D.G. Sarantites, C. Schwarz, R.T. de Souza, M.B. Tsang and C. Williams, Physics Letters B **323** (1994) 113-117.

36) *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.L. Halbert and R.L. Varner, Physical Review C **49** (1994) R584-586.

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