

**SECTION 2**

**PUBLICATIONS, THESIS TITLES, OUTREACH,  
AND VISITORS**

## PUBLICATIONS

*Publications and invited talks by non-NSCL scientists which are based in whole or in part on experimental work at the NSCL are tagged with the symbol #-.*

### PAPERS

#### (a) Physical Review Letters

First Study of Heavy-Ion Mirror Charge Exchange; M. Steiner, S.M. Austin, D. Bazin, W. Benenson, C.A. Bertulani, J. A. Brown, M. Fauerbach, M. Hellström, E. Kashy, J. H. Kelley, R.A. Kryger, T. Kubo, N.A. Orr, R. Pfaff, B.M. Sherrill, M. Thoennessen, S.J. Yennello, B.M. Young, P. Zecher, D.J. Morrissey, and C. Powell, Phys. Rev. Lett. 76(1996)26; [E] 76(1996)3042

Phase Coexistence in Multifragmentation?; L.G. Moretto, L. Phair, R. Ghetti, K. Tso, N. Colonna, W. Skulski, G.J. Wozniak, D.R. Bowman, N. Carlin, M. Chartier, C.K. Gelbke, W.G. Gong, W.C. Hsi, Y.D. Kim, M.A. Lisa, W.G. Lynch, G.F. Peaslee, C. Schwarz, R.T. de Souza, M.B. Tsang, and F. Zhu, Phys. Rev. Lett. 76(1996)372

Giant Dipole Resonance Built on Highly Excited States of  $^{120}\text{Sn}$  Nuclei Populated by Inelastic Alpha Scattering; E. Ramakrishnan, T. Baumann, A. Azhari, R.A. Kryger, R. Pfaff, M. Thoennessen, S. Yokoyama, J.R. Beene, M.L. Halbert, P.E. Mueller, D.W. Stracener, R.L. Varner, R.J. Charity, J.F. Dempsey, D.G. Sarantites, and L.G. Sobotka, Phys. Rev. Lett. 76(1996)2025

Circumstantial Evidence for Critical Behavior in Peripheral Au+Au Collisions at 35 MeV/nucleon; P.F. Mastinu, M. Belkacem, M. D'Agostino, M. Bruno, P.M. Milazzo, G. Vannini, D.R. Bowman, N. Colonna, J.D. Dinius, A. Ferrero, M.L. Fiandri, C.K. Gelbke, T. Glasmacher, F. Gramegna, D.O. Handzy, D. Horn, W.C. Hsi, M. Huang, I. Iori, G.J. Kunde, M.A. Lisa, W.G. Lynch, G.V. Margagliotti, C.P. Montoya, A. Moroni, G.F. Peaslee, F. Petruzzelli, R. Rui, C. Schwarz, M.B. Tsang, C. Williams, V. Latora, and A. Bonasera, Phys. Rev. Lett. 76(1996)2646

Reducibility and Thermal and Mass Scaling in Angular Correlations from Multifragmentation Reactions; L. Phair, L.G. Moretto, G.J. Wozniak, R.T. de Souza, D.R. Bowman, N. Carlin, C.K. Gelbke, W.G. Gong, Y.D. Kim, M.A. Lisa, W.G. Lynch, G.F. Peaslee, M.B. Tsang, and F. Zhu, Phys. Rev. Lett. 77(1996)822

Momentum Content of Single-Nucleon Halos; P.G. Hansen, Phys. Rev. Lett. 77(1996)1016

Charge Correlations and Dynamical Instabilities in the Multifragment Emission Process; L.G. Moretto, Th. Rubehn, L. Phair, N. Colonna, G.J. Wozniak, D.R. Bowman, G.F. Peaslee, N. Carlin, R.T. de Souza, C.K. Gelbke, W.G. Gong, Y.D. Kim, M.A. Lisa, W.G. Lynch, and C. Williams, Phys. Rev. Lett. 77(1996)2634

Reply to Comment on the APEX  $e^+e^-$  Experiment; I. Ahmad, S.M. Austin, B.B. Back, R.R. Betts, F.P. Calaprice, K.C. Chan, A. Chishti, P. Chowdhury, C. Conner, R.W. Dunford, J.D. Fox, S.J. Freedman, M. Freer, S.B. Gazes, A.L. Hallin, T. Happ, D. Henderson, N.I. Kaloskamis, E. Kashy, W. Kutschera, J. Last, C.J. Lister, M. Liu, M.R. Maier, D.J. Mercer, D. Mikolas, P.A.A. Perera, M.D. Rhein, D.E. Roa, J.P. Schiffer, T.A. Trainor, P. Wilt, J.S. Winfield, M. Wolanski, F.L.H. Wolfs, A.H. Wuosmaa, G. Xu, A. Young, and J.E. Yurkon, Phys. Rev. Lett. 77(1996)2839

Multifragment Production in Reactions of  $^{112}\text{Sn} + ^{112}\text{Sn}$  and  $^{124}\text{Sn} + ^{124}\text{Sn}$  at  $E/A = 40$  MeV; G.J. Kunde, S.J. Gaff, C.K. Gelbke, T. Glasmacher, M.J. Huang, R. Lemmon, W.G. Lynch, L. Manduci, L. Martin, M.B. Tsang, W.A. Friedman, J. Dempsey, R.J. Charity, L.G. Sobotka, D.K. Agnihotri, B. Djerroud, W.U. Schroder, W. Skulski, J. Toke, and K. Wyzozebski, Phys. Rev. Lett. 77(1996)2897

-#-Dynamical Fragment Production as a Mode of Energy Dissipation in Heavy-Ion Collisions; J. Töke, D.K. Agnihotri, S.P. Baldwin, B. Djerroud, B. Lott, B.M. Quednau, W. Skulski, W.U. Schröder, L.G. Sobotka, R.J. Charity, D.G. Sarantites, and R.T. de Souza, Phys. Rev. Lett. 77(1996)3514

Mass Dependence of Directed Collective Flow; M.J. Huang, R.C. Lemmon, F. Daffin, W.G. Lynch, C.

Schwarz, M.B. Tsang, C. Williams, P. Danielewicz, K. Haglin, W. Bauer, N. Carlin, R.J. Charity, R.T. de Souza, C.K. Gelbke, W.C. Hsi, G.J. Kunde, M.-C. Lemaire, M.A. Lisa, U. Lynen, G.F. Peaslee, J. Pochodzalla, H. Sann, L.G. Sobotka, S.R. Souza, and W. Trautmann, Phys. Rev. Lett. 77(1996)3739

New Region of Deformation: The Neutron-Rich Sulfur Isotopes; H. Scheit, T. Glasmacher, B.A. Brown, J.A. Brown, P.D. Cottle, P.G. Hansen, R. Harkewicz, M. Hellström, R.W. Ibbotson, J.K. Jewell, K.W. Kemper, D.J. Morrissey, M. Steiner, P. Thirolf, and M. Thoennessen, Phys. Rev. Lett. 77(1996)3967

Investigating the Evolution of Multifragmenting Systems with Fragment Emission Order; E.W. 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.A. Lisa, W.G. Lynch, G.F. Peaslee, L. Phair, M.B. Tsang, G. VanBuren, R.J. Charity, L.G. Sobotka, and W.A. Friedman, Phys. Rev. Lett. 77(1996)4508

Study of the Breakup Reaction  ${}^8\text{B} \rightarrow {}^7\text{Be} + p$ : Absorption Effects and E2 Strength; J.H. Kelley, S.M. Austin, A. Azhari, D. Bazin, J.A. Brown, H. Ebsensen, M. Fauerbach, M. Hellström, S.E. Hirzebruch, R.A. Kryger, D.J. Morrissey, R. Pfaff, C.F. Powell, E. Ramakrishnan, B.M. Sherrill, M. Steiner, T. Suomijärvi, and M. Thoennessen, Phys. Rev. Lett. 77(1996)5020

### (b) Physics Letters B

Off-Shell Effects in Heavy Particle Production; G.F. Bertsch and P. Danielewicz, Phys. Lett. B367(1996)55

Multifragment production in Au+Au at 35 MeV/u; M. D'Agostino, P.F. Mastinu, P.M. Milazzo, M. Bruno, D.R. Bowman, P. Buttazzo, L. Celano, N. Colonna, J.D. Dinius, A. Ferrero, M.L. Fiandri, C.K. Gelbke, T. Glasmacher, F. Gramegna, D.O. Handzy, D. Horn, W.C. Hsi, M. Huang, I. Iori, G.J. Kunde, M.A. Lisa, W.G. Lynch, L. Manduci, G.V. Margagliotti, C.P. Montoya, A. Moroni, G.F. Peaslee, F. Petruzzelli, L. Phair, R. Rui, C. Schwarz, M.B. Tsang, G. Vannini, and C. Williams, Phys. Lett. B368(1996)259

Parity Violation in the  $g$ -Decay of Polarized  ${}^{93}\text{Tc}$  Nuclei in the  $17/2^-$  Isomer; M. Hass, C. Broude, L. Weissman, L. Mueller, G. Montagnoli, F. Scarlassara, G.F. Segato, C. Signorini, G. Goldring, D. Ackermann, P. Bednarczyk, L. Corradi, P. Spolaore, M. Lindroos, S. Hofmann, V. Ninov, F.P. Hessberger, F. Soramel, N. Takahashi, and B.A. Brown, Phys. Lett. B371(1996)25

Statistical Multifragmentation in Central Au+Au Collisions at 35 MeV/u; M. D'Agostino, A.S. Botvina, P.M. Milazzo, M. Bruno, G.J. Kunde, D.R. Bowman, L. Celano, N. Colonna, J.D. Dinius, A. Ferrero, M.L. Fiandri, C.K. Gelbke, T. Glasmacher, F. Gramegna, D.O. Handzy, D. Horn, W.C. Hsi, M. Huang, I. Iori, M.A. Lisa, W.G. Lynch, L. Manduci, G.V. Margagliotti, P.F. Mastinu, I.N. Mishustin, C.P. Montoya, A. Moroni, G.F. Peaslee, F. Petruzzelli, L. Phair, R. Rui, C. Schwarz, M.B. Tsang, G. Vannini, and C. Williams, Phys. Lett. B371(1996)175

Non-Equilibrium Modifications of the Nuclear Equation of State; G. Fai and P. Danielewicz, Phys. Lett. B373(1996)5

Nuclear Flow in Consistent Boltzmann Algorithm Models; G. Kortemeyer, F. Daffin, and W. Bauer, Phys. Lett. B374(1996)25

Systematics of Angular Momentum Transfer in Intermediate Energy Nuclear Collisions; R. Yanez, W. Loveland, D.J. Morrissey, K. Aleklett, J.O. Liljenzin, E. Hagebo, D. Jerrestam, and L. Westerberg, Phys. Lett. B376(1996)29

Proton Halos in the  $1s_{0d}$  Shell; B.A. Brown and P.G. Hansen, Phys. Lett. B381(1996)391

Neutrons from the Breakup of  ${}^{19}\text{C}$ ; F.M. Marqués, E. Liegard, N.A. Orr, J.C. Angélique, L. Axelsson, G. Bizard, W.N. Catford, N.M. Clarke, G. Costa, M. Freer, S. Grévy, D. Guillemaud-Mueller, G.J. Gyapong, F. Hanappe, P.G. Hansen, B. Heusch, B. Jonson, C. Le Brun, F.R. Lecolley, F. Lefebvres, M. Lewitowicz, G. Martínéz, A.C. Mueller, T. Nilsson, A. Ninane, G. Nyman, B. Petersen, F. Pougheon, K. Riisager, M.G. Saint-Laurent, Y. Schutz, M. Smedberg, O. Sorlin, L. Stuttgé, D.D. Warner, Phys. Lett. B381(1996)407

Pion Transparency in 500 MeV  $C(\pi,\pi')$  Reactions?; B.-A. Li, W. Bauer, and C.M. Ko, Phys. Lett. B382(1996)337

Temperature Dependence of the Giant Dipole Resonance Width in  $^{208}\text{Pb}$ ; E. Ramakrishnan, A. Azhari, J.R. Beene, R.J. Charity, M.L. Halbert, P.-F. Hua, R.A. Kryger, P.E. Mueller, R. Pfaff, D.G. Sarantites, L.G. Sobotka, M. Thoennessen, G. Van Buren, R.L. Varner, and S. Yokoyama, Phys. Lett. B383(1996)252

Statistical Correlations in Nuclear Many-Body States; D. Kusnezov, B.A. Brown, and V. Zelevinsky, Phys. Lett. B385(1996)5

#### (d) Physical Review C: Rapid Communications

Reducibility and a New Entropic Term in Multifragment Charge Distributions; A. Ferrero, I. Iori, A. Moroni, F. Petruzzelli, R. Scardaoni, L.G. Moretto, D.R. Bowman, M. Bruno, P. Buttazzo, L. Celano, N. Colonna, M. D'Agostino, J.D. Dinius, M.L. Fiandri, E. Fuschini, C.G. Gelbke, T. Glasmacher, F. Gramagna, D.O. Handzy, D. Horn, W.C. Hsi, M. Huang, G.J. Kunde, M.A. Lisa, W.G. Lynch, P.F. Mastinu, P.M. Milazzo, G.V. Margagliotti, C.P. Montoya, G.F. Peaslee, L. Phair, R. Rui, C. Schwarz, M.B. Tsang, G. Vannini, and C. Williams, Phys. Rev. C53(1996)R5

Analysis of Hard Two-Photon Correlations Measured in Heavy-Ion Reactions at Intermediate Energies; H.W. Barz, B. Kampfer, Gy. Wolf, and W. Bauer, Phys. Rev. C53(1996)R553

Cross Comparisons of Nuclear Temperatures Determined from Excited States Populations and Isotope Yields; M.B. Tsang, F. Zhu, W.G. Lynch, A. Aranda, D.R. Bowman, R.T. de Souza, C.K. Gelbke, Y.D. Kim, L. Phair, S. Pratt, C. Williams, H.M. Xu, and W.A. Friedman, Phys. Rev. C53(1996)R1057

Impact Parameter Dependence of the Disappearance of Transverse Flow in Nuclear Collisions; R. Pak, W.J. Llope, D. Craig, E.E. Gualtieri, S.A. Hannuschke, R.A. Lacey, J. Lauret, A.C. Mignerey, D.E. Russ, N.T.B. Stone, A.M. Vander Molen, G.D. Westfall, and J. Yee, Phys. Rev. C53(1996)R1469

Enhanced  $E0$  and  $E2$  Transition Rates in the Midshell Xe Isotopes; P.F. Mantica and W.B. Walters, Phys. Rev. C53(1996)R2586

-#-Origin of Slow, Heavy Residues Observed in Dissipative  $^{197}\text{Au} + ^{86}\text{Kr}$  Collisions at  $E/A = 35$  MeV; W. Skulski, B. Djerroud, D.K. Agnihotri, S.P. Baldwin, J. Toke, X. Zhao, W.U. Schroder, L.G. Sobotka, R.J. Charity, J. Dempsey, D.G. Sarantites, B. Lott, W. Loveland, and K. Aleklett, Phys. Rev. C53(1996)R2594

Excess Electron Pairs from Heavy-Ion Collisions at CERN and a More Complete Picture of Thermal Production; K. Haglin, Phys. Rev. C53(1996)R2606

Measurement of the  $^1\text{H}(^6\text{He}, ^6\text{Li})n$  Reaction in Inverse Kinematics; J.A. Brown, D. Bazin, W. Benenson, J. Caggiano, M. Fauerbach, M. Hellström, J.H. Kelley, R.A. Kryger, R. Pfaff, B.M. Sherrill, M. Steiner, D.J. Morrissey, and C.F. Powell, Phys. Rev. C54(1996)R2105

Secondary Decays and the Helium Lithium Isotope Thermometer; H. Xi, W.G. Lynch, M.B. Tsang, and W.A. Friedman, Phys. Rev. C54(1996)R2163

Temperature Determination from the Lattice Gas Model; S. Das Gupta, J. Pan, and M.B. Tsang, Phys. Rev. C54(1996)R2820

#### (e) Physical Review C

$l$ -forbidden Gamow-Teller Beta Decay of  $^{57}\text{Cu}$ ; D.R. Semon, M.C. Allen, H. Dejbakhsh, C.A. Gagliardi, S.E. Hale, J. Jiang, L. Trache, R.E. Tribble, S.J. Yennello, H.M. Xu, X.G. Zhou, and B.A. Brown, Phys. Rev. C53(1996)96

- Isvector M1 Transitions in  $^{28}\text{Si}$  and the Role of Meson Exchange Currents; C. Lüttge, P. von Neumann-Cosel, F. Neumeyer, C. Rangacharyulu, A. Richter, G. Schrieder, E. Spamer, D.L. Sober, S.K. Matthews, and B.A. Brown, Phys. Rev. C53(1996)127
- Evaporation Residue, Fission Cross Section, and Linear Momentum Transfer for  $^{14}\text{N}$  Induced Reactions from 35A to 155A MeV; A.A. Sonzogni, A. Elmaani, C. Hyde-Wright, W. Jiang, D. Prindle, R. Vandenbosch, J. Dinius, G. Cron, D. Bowman, C.K. Gelbke, W. Hsi, W.G. Lynch, C. Montoya, G. Peaslee, C. Schwarz, M.B. Tsang, C. Williams, R. de Souza, D. Fox, and T. Moore, Phys. Rev. C53(1996)243
- Delays Associated with Elementary Processes in Nuclear Reaction Simulations; P. Danielewicz and S. Pratt, Phys. Rev. C53(1996)249
- New Search for  $^{26}\text{O}$ ; M. Fauerbach, D.J. Morrissey, W. Benenson, B.A. Brown, M. Hellström, J.H. Kelley, R.A. Kryger, R. Pfaff, C.F. Powell, and B.M. Sherrill, Phys. Rev. C53(1996)647
- Comment on "Large-Space Shell-Model Calculations for Light Nuclei"; A. Csótó and R.G. Lovas, Phys. Rev. C53(1996)1444
- Searching for Three-Nucleon Resonances; A. Csótó, H. Oberhummer, and R. Pichler, Phys. Rev. C53(1996)1589
- Shell-Model Picture of Virtual Detour Transitions in  $^{41}\text{Ca}$  Radiative Electron-Capture Decay; J.L. Zylicz, M. Pfützner, S.G. Rohozinski, and B.A. Brown, Phys. Rev. C53(1996)1593
- Fragmentation of  $^{78}\text{Kr}$  Projectiles; R. Pfaff, D.J. Morrissey, W. Benenson, M. Fauerbach, M. Hellström, C.F. Powell, B.M. Sherrill, M. Steiner, and J.A. Winger, Phys. Rev. C53(1996)1753
- Cavitation and Penetration in Central Collisions With Light Ions, G. Wang, K. Kwiatkowski, V.E. Viola, W. Bauer, and P. Danielewicz, Phys. Rev. C53(1996)1811
- Squeeze-Out of Nuclear Matter in Au + Au Collisions; M.B. Tsang, P. Danielewicz, W.C. Hsi, M. Huang, W.G. Lynch, D.R. Bowman, C.K. Gelbke, M.A. Lisa, G.F. Peaslee, R. J. Charity, L.G. Sobotka, M.L. Begemann-Blaich, F. Cosmo, A. Ferrero, J. Hubele, G. Imme, I. Iori, J. Kempter, P. Kreuz, G.J. Kunde, W.D. Kunze, V. Lindenstruth, U. Lynen, M. Mang, A. Moroni, W.F.J. Müller, M. Neumann, B. Ocker, C.A. Ogilvie, J. Pochodzalla, G. Raciti, F. Rosenberger, T. Rubehn, H. Sann, R. Scardaoni, A. Schüttauf, C. Schwarz, W. Seidel, V. Serfling, W. Trautmann, A. Tucholski, A. Wörner, and B. Zwieglinski, Phys. Rev. C53(1996)1959
- Upper Limit of the Lifetime of  $^{16}\text{B}$ ; R.A. Kryger, A. Azhari, J. Brown, J. Caggiano, M. Hellström, J.H. Kelley, B.M. Sherrill, M. Steiner, and M. Thoennessen, Phys. Rev. C53(1996)1971
- Changing Source Characteristics During Multifragment Decay; T.M. Hamilton, E. Cornell, 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, T. Glasmacher, D.O. Handzy, M.A. Lisa, W.G. Lynch, G.F. Peaslee, L. Phair, M.B. Tsang, G. VanBuren, R.J. Charity, L.G. Sobotka, A.A. Sonzogni, and D. Prindle, Phys. Rev. C53(1996)2273
- The ( $^7\text{Li}, ^7\text{Be}$ ) Reaction and Isvector Spin Strength in  $^{40}\text{Ca}$ ; J.S. Winfield, D. Beaumel, S. Gales, H. Laurent, I. Lhenry, J.M. Maison, G.M. Crawley, S. Danczyk, S.E. Hirzebruch, J. Stasko, and T. Suomijarvi, Phys. Rev. C54(1996)125
- One-Nucleon Transfer Reactions to Continuum States Induced by Heavy Ion Projectiles; I. Lhenry, T. Suomijarvi, Y. Blumenfeld, Ph. Chomaz, N. Frascaria, J.P. Garron, J.C. Roynette, J.A. Scarpaci, D. Beaumel, S. Fortier, S. Gales, H. Laurent, A. Gillibert, G.M. Crawley, J. Finck, G. Yoo, and J. Barreto, Phys. Rev. C54(1996)593
- Gamow-Teller Strength to  $^{38}\text{K}$  from the  $^{38}\text{Ar}(p,n)$  Reaction and  $^{38}\text{Ca}(b^+)$  Decay; B.D. Anderson, A.R. Baldwin, P. Baumann, B.A. Brown, F. Didierjean, C.C. Foster, L.A.C. Garcia, A. Huck, A. Knipper, R. Madey, D.M. Manley, G. Marguier, M. Ramdhane, H. Ravn, C. Richard-Serre, G. Walter, and J.W.

Watson, Phys. Rev. C54(1996)602

Neutron Halos in the Na Isotopes; B.A. Brown and W.A. Richter, Phys. Rev. C54(1996)673

Many-Body Coulomb Perturbation of Azimuthal  $\alpha$ - $\alpha$  Correlations; R. Popescu, C.K. Gelbke, and T. Glasmacher, Phys. Rev. C54(1996)796

Structure of the Neutron-Halo Nucleus  ${}^6\text{He}$ ; J. Jänecke, T. Annakkage, G.P.A. Berg, B.A. Brown, J.A. Brown, G. Crawley, S. Danczyk, M. Fujiwara, D.J. Mercer, K. Pham, D.A. Roberts, J. Stasko, J.S. Winfield, and G.H. Yoo, Phys. Rev. C54(1996)1070

Quasielastic Scattering of  ${}^9\text{Li}$  on  ${}^{12}\text{C}$ ; M. Zahar, M. Belbot, J.J. Kolata, K. Lamkin, D.J. Morrissey, B.M. Sherrill, M. Lewitowicz, A.H. Wuosmaa, J.S. Al-Khalili, J.A. Tostevin, and I.J. Thompson, Phys. Rev. C54(1996)1262

Bremsstrahlung Production of Low Mass Dielectrons in Relativistic Heavy Ion Collisions; D. Pal, K. Haglin, and D.K. Srivastava, Phys. Rev. C54(1996)1366

Collective Radial Expansion in Au + Au Reactions from 0.25 to 2 GeV/nucleon; F. Daffin, K. Haglin, and W. Bauer, Phys. Rev. C54(1996)1375

Collision Broadening of the  $r$  Meson in a Dropping Mass Scenario; K. Haglin, Phys. Rev. C54(1996)1492

Is There A Bound Dineutron in  ${}^{11}\text{Li}$ ?; K. Ieki, A. Galonsky, D. Sackett, J.J. Kruse, W.G. Lynch, D.J. Morrissey, N.A. Orr, B.M. Sherrill, J.A. Winger, F. Deák, A. Horvath, A. Kiss, Z. Seres, J.J. Kolata, R.E. Warner, and D.L. Humphrey, Phys. Rev. C54(1996)1589

Strength Functions and Spreading Widths of Simple Shell Model Configurations; N. Frazier, B.A. Brown, and V. Zelevinsky, Phys. Rev. C54(1996)1665

Radial Flow in  $40\text{Ar}+45\text{Sc}$  Reactions at  $E = 35-115$  MeV/nucleon; R. Pak, D. Craig, E.E. Gualtieri, S.A. Hannuschke, R.A. Lacey, J. Lauret, W.J. Llope, N.T. B. Stone, A.M. Vander Molen, G.D. Westfall, and J. Yee, Phys. Rev. C54(1996)1681

Total Reaction and 2n-Removal Cross Sections of 20-60A MeV  ${}^4,6,8\text{He}$ ,  ${}^6,9,11\text{Li}$ , and  ${}^{10}\text{Be}$  on Si; R.E. Warner, R.A. Patty, P.M. Voyles, A. Nadasen, F.D. Becchetti, J.A. Brown, H. Esbensen, A. Galonsky, J.J. Kolata, J. Kruse, M.Y. Lee, R.M. Ronningen, P. Schwandt, J. von Schwarzenberg, B.M. Sherrill, K. Subotic, J. Wang, and P. Zecher, Phys. Rev. C54(1996)1700

Isospin Dependence of Intermediate Mass Fragment Production in Heavy Ion Collisions at  $E/A = 55$  MeV; J.F. Dempsey, R.J. Charity, L.G. Sobotka, G.J. Kunde, S. Gaff, C.K. Gelbke, T. Glasmacher, M.J. Huang, R.C. Lemmon, W.G. Lynch, L. Manduci, L. Martin, M.B. Tsang, D.K. Agnihotri, B. Djerroud, W.U. Schröder, W. Skulski, J. Töke, and W.A. Friedman, Phys. Rev. C54(1996)1710

A Large-Basis Shell Model Analysis of  ${}^{14}\text{N}(g,p^+){}^{14}\text{C}_{gs}$  Reaction; S. Karataglidis, K. Amos, C. Bennhold, and L. Tiator, Phys. Rev. C54(1996)1863

Momentum Dependence of the Nuclear Mean Field from Peripheral Heavy-Ion Collisions; R. Pak, O. Bjarki, S.A. Hannuschke, R.A. Lacey, J. Lauret, W.J. Llope, A. Nadasen, N.T.B. Stone, A.M. Vander Molen, and G.D. Westfall, Phys. Rev. C54(1996)2457

Entrance-Channel Mass-Asymmetry Dependence of Compound Nucleus Formation Time in Light Heavy-Ion Reactions; A. Szanto de Toledo, B.C. Carlson, C. Beck, and M. Thoennessen, Phys. Rev. C54(1996)3290

### (c) Nuclear Physics A

Coulomb Displacement Energy and the Low-Energy Astrophysical  $S_{17}$  Factor for the  ${}^7\text{Be}(p,\gamma){}^8\text{B}$  Reaction; B.A. Brown, A. Csótó, and R. Sherr, Nucl. Phys. A597(1996)66

${}^6\text{He}$  and Neutron Momentum Distributions from  ${}^8\text{He}$  in Nuclear Break-Up Reactions at 240 MeV/u; T. Nilsson, F. Humbert, W. Schwab, H. Simon, M.H. Smedberg, M. Zinser, Th. Blaich, M.J.G. Borge, L.V. Chulkov, Th.W. Elze, H. Emling, H. Geissel, K. Grimm, D. Guillemaud-Mueller, P.G. Hansen, R. Holzmann, H. Irnich, B. Jonson, J.G. Keller, H. Klingler, A.A. Korshennikov, J.V. Kratz, R. Kulesa, D. Lambrecht, Y. Leifels, A. Magel, M. Mohar, A.C. Mueller, G. Münzenberg, F. Nickel, G. Nynan, A. Richter, K. Riisager, C. Scheidenberger, G. Schrieder, B.M. Sherrill, K. Stelzer, J. Stroth, O. Tengblad, W. Trautmann, E. Wajda, M.V. Zhukov, and E. Zude, Nucl. Phys. A598(1996)418

Parity-Violating Alpha-Decay of the 3.56-MeV  $J^P, T=0^+, 1$  State of  ${}^6\text{Li}$ ; A. Csótó and K. Langanke, Nucl. Phys. A601(1996)131

Influence of the emitter Coulomb Field on Two-Proton Correlation Functions; L. Martin, C.K. Gelbke, B. Erasmus, and R. Lednický, Nucl. Phys. A604(1996)69

Fragment Emission from Modestly Excited Nuclear Systems; Y. Lou, R.T. de Souza, S.L. Chen, E.W. Cornell, B. Davin, D. Fox, T.M. Hamilton, K. McDonald, M.B. Tsang, T. Glasmacher, J. Dinius, C.K. Gelbke, D.O. Handzy, W.C. Hsi, M. Huang, W.G. Lynch, C. Montoya, C. Schwarz, D. Prindle, A.A. Sonzogni, R. Vandenbosch, J.L. Wile, M. Parker, and C.L. Coffing, Nucl. Phys. A 604(1996)219

Moments and Mean Square Charge Radii of Short-Lived Argon Isotopes; A. Klein, B.A. Brown, U. Georg, M. Keim, P. Lievens, R. Neugart, M. Neuroth, R.E. Silverans and L. Vermeeren, Nucl. Phys. A607(1996)1

Low Energy M1 Strength in the  ${}^7\text{Li}(p,g_0){}^8\text{Be}$  Reaction; A. Csótó and S. Karataglidis, Nucl. Phys. A607(1996)62

Universality of Spectator Fragmentation at Relativistic Bombarding Energies; W.D. Kunze, A. Wörner, M.L. Begemann-Blaich, Th. Blaich, D.R. Bowman, R.J. Charity, A. Cosmo, A. Ferrero, C.K. Gelbke, C. Gross, W.C. Hsi, J. Hubele, G. Imme, I. Iori, J. Kempter, P. Kreuzt, G.J. Kunde, V. Lindenstruth, M.A. Lisa, W.G. Lynch, U. Lynen, M. Mang, T. Mühlkamp, A. Moroni, W.F.J. Müller, M. Neumann, B. Ocker, C.A. Ogilvie, G.F. Peaslee, J. Pochodzalla, G. Raciti, F. Rosenberger, T. Rubehn, H. Sann, C. Schwarz, W. Seidel, V. Serfling, L.G. Sobotka, J. Stroth, L. Stuttge, S. Tomasevic, W. Trautmann, A. Trzcinski, M.B. Tsang, A. Tucholski, G. Verde, C.W. Williams, E. Zude, and B. Zwieglinski, Nucl. Phys. A607(1996)457

Nuclear Shape Fluctuations in Fermi-Liquid Drop Model; D. Kiderlen, V.M. Kolomietz, and S. Shlomo, Nucl. Phys. A608(1996)32

#### (f) Nuclear Instruments and Methods

High Resolution Low Threshold Detector Telescopes for Multifragmentation Studies; D. Fox, R.T. de Souza, S.L. Chen, B. Davin, T.M. Hamilton, Y. Lou, J. Dorsett, and J. Ottarson, Nucl. Instrum. Meth. A368(1996)709

A Solenoidal Spectrometer for Positron-Electron Pairs Produced in Heavy-Ion Collisions; I. Ahmad, S.M. Austin, B.B. Back, D. Bazin, R.R. Betts, F.P. Calaprice, K.C. Chan, A. Chishti, P. Chowdhury, C. Conner, R.W. Dunford, J.D. Fox, S.J. Freedman, M. Freer, S.B. Gazes, J.S. Greenberg, J.P. Greene, A.L. Hallin, T. Happ, D. Henderson, N.I. Kaloskamis, E. Kashy, W. Kutschera, J. Last, C.J. Lister, M. Liu, M.R. Maier, D. Mercer, D. Mikolas, A. Perera, M.D. Rhein, D.E. Roa, J.P. Schiffer, T. Trainor, P. Wilt, J.S. Winfield, M. Wolanski, F.L.H. Wolfs, A.H. Wuosmaa, G. Xu, R.A. Young, and J.E. Yurkon, Nucl. Instrum. Meth. A370(1996)539

Fabrication of Thin Scintillator Foils; L.W. Weathers and M.B. Tsang, Nucl. Instrum. Meth. A381(1996)567

#### (g) Other Journals

Quantum Chaos and Complexity in Nuclei; V. Zelevinsky, *Ann. Rev. Nuclear and Particle Physics* 46(1996)237

The Nuclear Shell Model as a Testing Ground for Many-Body Quantum Chaos; V. Zelevinsky, B.A. Brown, N. Frazier, and M. Horoi, *Physics Reports* 276(1996)85

The Ionization and Fragmentation of C<sub>60</sub> by Highly Charged, High Energy Xenon Ions; S. Cheng, H.G. Berry, R.W. Dunford, H. Esbensen, D.S. Gemmell, E.P. Kanter, T. LeBrun, and W. Bauer, *Phys. Rev. A* 54(1996)3182

Dilepton Bremsstrahlung from Pion-Pion Scattering in a Relativistic OBE Model; H.C. Eggers, R. Tabti, C. Gale, and K. Haglin, *Phys. Rev. D* 53(1996)4822

Word Processors with Line-Wrap: Cascading, Self-Organized Criticality, Random Walks, Diffusion, Predictability; W. Bauer and S. Pratt, *Phys. Rev. E* 54(1996)R1009

Constraint Operator Solution to Quantum Billiard Problems; D.A. McGrew and W. Bauer, *Phys. Rev. E* 54(1996)5809

Attack on a Convoy of Nucleons; P.G. Hansen, *Nature* 384(1996)413

Computer-Assisted Assignments in a Large Physics Class; M. Thoennessen and M.J. Harrison, *Computers Educ.* 27(1996)141

High Gradient, Large Aperture Quadrupoles for the NSCL Superconducting Spectrograph; B. Zhang, A.F. Zeller, J. DeKamp, P. Johnson, B. Sherrill, R. Swanson, and R. Zink, *Adv. in Cryogenic Engineering* 41(1996)375

Construction and Testing of a General Purpose 50-liter Liquid Helium Cryovessel; J. Schubert, H. Blosser, J. Kim, L. Lee, G. Stork, and A. Zeller, *Adv. in Cryogenic Engineering* 41(1996)481

A Multi-Rod Collimator for Neutron Therapy; R.L. Maughan, G.F. Blosser, E.B. Blosser, M. Yudelev, J.D. Forman, H.G. Blosser, and W.E. Powers, *Int. J. Radiat. Oncol. Biol. Phys.* 24(1996)411

Recent Developments for Metallic Ion Production at the NSCL; P. McNeely, D. Cole, J. Moskalik, and A.F. Zeller, *Rev. Sci. Instrum.* 67(1996)1371

Efficient Production of a <sup>48</sup>Ca Beam from Oxide Material in an ECR Ion Source Using a Low Power Miniature Oven; R. Harkewicz, *Rev. Sci. Instrum.* 67(1996)2176

Effects of Frequency and Magnetic Field Scaling on the Superconducting ECR Ion Source (SCECRIS) at MSU-NSCL; S. Gammino, G. Ciavola, R. Harkewicz, K. Harrison, A. Srivastava, and P. Briand, *Rev. Sci. Instrum.* 67(1996)4109

Methods of Bounding Long-Term Stability in Storage Rings by Estimating Pseudo Invariants of Nonlinear Motion; G. Hoffstätter and M. Berz, *Particle Accelerators* (in print).

Rigorous Lower Bounds on the Survival Time in Particle Accelerators; G. Hoffstätter and M. Berz, *Particle Accelerators* 54(1996)193

An Analytical Theory of Arbitrary Order Achromats; W. Wan and M. Berz, *Phys. Rev. E* 54(1996)2870

#-Electron Spin Resonance of DNA Irradiated with a Heavy Ion-Beam (<sup>16</sup>O<sup>8+</sup>): Evidence for Damage to the Deoxyribose Phosphate Backbone; D. Becker, Y. Razskazovskii, M.U. Callaghan, and M.D. Sevilla, *Radiation Research* 146(1996)361

#### **CONFERENCE PROCEEDINGS - INVITED TALKS**

Problems in the Structure of Light Nuclei; B.A. Brown, in *Proceedings of the International Symposium*



on Frontiers of Nuclear Structure Physics, RIKEN, Osaka, Japan, March 2-5, 1994, edited by M. Ishihara, T. Otsuka, T. Mizusaki, and K. Yazaki (World Scientific Publishing, Singapore, 1996)

-#-Neutron Yields from Interactions of Galactic-Cosmic-Ray-Like Beams in Stopping Targets; L. Heilbronn, in Proceedings of the 30th COSPAR Scientific Assembly, Hamburg, Germany, July 11-21, 1994; *Advances in Space Research* 17, No. 2 (1996), pages (2)69 - (2)76

Gamow-Teller Strength in Nuclei; B.A. Brown, in "Weak and Electromagnetic Interactions in Nuclei '95", Osaka, Japan, June 12-16, 1995, edited by H. Ejiri, T. Kishimoto, and T. Sato (World Scientific Publishing, Singapore, 1996), p. 218

A New Look at Positron Production from Heavy Ion Collisions: Results from APEX; I. Ahmad, S.M. Austin, B.B. Back, D. Bazin, R.R. Betts, F.P. Calaprice, K.C. Chan, A. Chishti, P. Chowdhury, C. Conner, R.W. Dunford, J.D. Fox, S.J. Freedman, M. Freer, S.B. Gazes, A.L. Hallin, T. Happ, D. Henderson, N.I. Kaloskamis, E. Kashy, W. Kutschera, J. Last, C.J. Lister, M. Liu, M.R. Maier, D. Mercer, D. Mikolas, A. Perera, M.D. Rhein, D.E. Roa, J.P. Schiffer, T. Trainor, P. Wilt, J.S. Winfield, M. Wolanski, F.L.H. Wolfs, A.H. Wuosmaa, G. Xu, R.A. Young, and J.E. Yurkon, *ibid*, p. 629

Dynamical Timescales in Hot Rotating Nuclei; M. Thoennessen, in Proceedings of the Groningen Conference on Giant Resonances, Groningen, The Netherlands, 28 June - 1 July, 1995, edited by J.C. Bacelar, M.N. Harakeh, and O. Scholten; *Nucl. Phys. A599(1996)1c*

Soft Dipole Resonances in Exotic Nuclei?; A. Galonsky, J.J. Kruse, W.G. Lynch, D.J. Morrissey, N. Orr, J. Ottarson, D. Sackett, B.M. Sherrill, J. Wang, J. Winger, P. Zecher, K. Ieki, Y. Iwata, F. Deak, A. Horvath, A. Kiss, Z. Seres, J.J. Kolata, R.E. Warner, H. Schelin, and D.L. Humphrey, *ibid*; *Nucl. Phys. A599(1996)353c*

Fast Multifragment Disintegrations of Expanding Nuclear Systems; C.K. Gelbke, in Proceedings of the 1995 International Nuclear Physics Conference, Beijing, China, August 21-26, 1995, edited by Sun Zuxun and Xu Jincheng (World Scientific Publishing Company, Singapore, 1996), p. 305

Reducible Emission Probabilities and Thermal Scaling in Multifragmentation; L.G. Moretto, L. Phair, K. Tso, R. Ghetti, N. Colonna, W. Skulski, G.J. Wozniak, D.R. Bowman, N. Carlin, M. Chartier, R.T. de Souza, C.K. Gelbke, W.G. Gong, W.C. Hsi, Y.D. Kim, M.A. Lisa, W.G. Lynch, G.F. Peaslee, C. Schwarz, M.B. Tsang, and F. Zhu, *ibid*, p. 347

Problems and Accomplishments of Superconducting Cyclotrons; H.G. Blosser, D. Johnson, and J. Schubert, in Proceedings of the 14th International Conference on Cyclotrons and Their Applications, Cape Town, South Africa, October 8-13, 1995, edited by J.C. Cornell (World Scientific Publishing Co., Singapore, 1996), p. 674

Upgrade Plans for the National Superconducting Cyclotron Laboratory; W. Benenson, in "Extremes of Nuclear Structure", Proceedings of the International Workshop XXIV on Gross Properties of Nuclei and Nuclear Excitations, Hirschegg, Austria, January 15-20, 1996, edited by H. Feldmeier, J. Knoll, and W. Nörenberg, GSI Report ISSN 0720-8715 (GSI, Darmstadt, Germany, 1996), p. 252

Nuclear Structure of Particle Unstable Nuclei; M. Thoennessen, A. Azhari, T. Baumann, J.A. Brown, J. Caggiano, M. Hellström, J.H. Kelley, R.A. Kryger, H. Madani, E. Ramakrishnan, D. Russ, B.M. Sherrill, M. Steiner, T. Suomijärvi, P. Thierolf, and S. Yokoyama, *ibid*, p. 314

Stopping and Expansion in Central Collisions; P. Danielewicz, in Proceedings of the 34th International Winter Meeting on Nuclear Physics, Bormio, Italy, January 22-27, 1996, edited by I. Iori; *Ricerca Scientifica ed Educazione Permanente Supplemento N. 106(1996)1*

Signals of a Critical Behavior in Peripheral Au+Au Collisions at 35 MeV/nucleon; P.F. Mastinu, M. Belkacem, D.R. Bowman, M. Bruno, M. D'Agostino, J.D. Dinius, A. Ferrero, M.L. Fiandri, C.K. Gelbke, T. Glasmacher, F. Gramegna, D.O. Handzy, D. Horn, W.C. Hsi, M. Huang, I. Iori, G.J. Kunde, M.A. Lisa, W.G. Lynch, G.V. Margagliotti, P.M. Milazzo, C.P. Montoya, A. Moroni, G.F. Peaslee, F. Petruzzelli, R. Rui, C. Schwarz, M.B. Tsang, G. Vannini, C. Williams, V. Latora, and A. Bonasera, *ibid*, p. 110

The Nucleus  $^8\text{B}$  Studied by Fragmentation Reactions at 41A MeV; J.H. Kelley, Sam M. Austin, A. Azhari, D. Bazin, J.A. Brown, H. Ebsensen, M. Fauerbach, M. Hellström, S.E. Hirzebruch, R.A. Kryger, D.J. Morrissey, R. Pfaff, C.F. Powell, E. Ramakrishnan, B.M. Sherrill, M. Steiner, T. Suomijärvi, and M. Thoennessen, *ibid*, p. 355

Which Isovector Giant Resonances are Excited in the ( $^{13}\text{C},^{13}\text{N}$ ) Charge Exchange Reactions?; I. Lhenry, D. Beaumel, S. Fortier, S. Gales, H. Laurent, J.M. Maison, F. Azaiez, Y. Blumenfeld, J. Guillot, H. Langevin-Joliot, T. Suomijärvi, G.M. Crawley, J. Finck, and J. Stasko, *ibid*, p. 386

Gaussian Wave-Packet Dynamics with and without Correlations; D. Kiederlen and P. Danielewicz, in "Advances in Nuclear Dynamics 2", Proceedings of the 12th Winter Workshop on Nuclear Dynamics, Snowbird, Utah, February 3-10, 1996, edited by W. Bauer and G.D. Westfall (Plenum Press, New York, 1996), p. 65

Collective Radial Expansion in Au+Au Reactions from 0.25 to 2 GeV/A; F.C. Daffin, K. Haglin, and W. Bauer, *ibid*, p. 107

Search for the Decay of Non-Compact Geometries; N.T.B. Stone, G.D. Westfall, E.E. Gualtieri, S.A. Hannuschke, R. Lacey, J. Lauret, W.J. Llope, R. Pak, O. Bjarki, A.M. Vander Molen, and J. Yee, *ibid*, p. 113

Reducibility, Thermal and Mass Scaling in Angular Correlations from Multifragmentation Reactions; L. Phair, L.G. Moretto, G.J. Wozniak, R.T. de Souza, D.R. Bowman, N. Carlin, C.K. Gelbke, W.G. Gong, Y.D. Kim, M.A. Lisa, W.G. Lynch, G.F. Peaslee, M.B. Tsang, and F. Zhu, *ibid*, p. 137

Mass Dependence of Directed Collective Flow; M.J. Huang, R.C. Lemmon, F. Daffin, and W.G. Lynch, *ibid*, p. 151

A Study of Nuclear Flow in Consistent Boltzmann Algorithms; G. Kortemeyer, F. Daffin, and W. Bauer, *ibid*, p. 167

Radial and Directed Transverse Flow in Heavy-Ion Collisions; R. Pak, D. Craig, E.E. Gualtieri, S.A. Hannuschke, R. Lacey, J. Lauret, W.J. Llope, A.C. Mignerey, D.E. Russ, N.T.B. Stone, A.M. Vander Molen, G.D. Westfall, and J. Yee, *ibid*, p. 181

APEX and the  $e^+e^-$  Puzzle: Recent Results; I. Ahmad, S.M. Austin, B.B. Back, R.R. Betts, F.P. Calaprice, K.C. Chan, A. Chishti, P. Chowdhury, C. Conner, R.W. Dunford, J.D. Fox, S.J. Freedman, M. Freer, S.B. Gazes, A.L. Hallin, T. Happ, N.I. Kaloskamis, E. Kashy, W. Kutschera, J. Last, C.J. Lister, M. Liu, M.R. Maier, D.J. Mercer, D. Mikolas, P.A.A. Perera, M.D. Rhein, D.E. Roa, J.P. Schiffer, T.A. Trainor, P. Wilt, J.S. Winfield, M. Wolanski, F.L.H. Wolfs, A.H. Wuosmaa, A. Young, and J.E. Yurkon, *ibid*, p. 307

-#-Non-Instantaneous Breakup of Excited Nuclear Systems; R.T. de Souza and E. Cornell, *ibid*, p. 35

-#-From Dissipative Collisions to Multiple Fragment Production - A Unified View; J. Töke, B. Djerroud, W. Skulski, W.U. Schröder, D.K. Agnihotri, S.P. Baldwin, R.J. Charity, R.T. de Souza, B. Lott, B.M. Quednau, D.G. Sarantites, and L.G. Sobotka, *ibid*, p. 49

-#-Incomplete Energy Damping and Heavy-Residue Production in  $^{197}\text{Au} + ^{86}\text{Kr}$  Collisions at  $E/A = 35$  MeV; B. Djerroud, W. Skulski, D.K. Agnihotri, S.P. Baldwin, W.U. Schröder, J. Töke, L.G. Sobotka, R.J. Charity, J. Dempsey, D.G. Sarantites, B. Lott, W. Loveland, and K. Aleklett, *ibid*, p. 333

Calculus and Numerics on Levi-Civita Fields; M. Berz, in "Computational Differentiation: Techniques, Applications, and Tools", Proceedings of the Second International Conference on Computational Differentiation, Santa Fe, New Mexico, February 12-14, 1996, edited by M. Berz, C. Bischof, G. Corliss, and A. Griewank (Society for Industrial and Applied Mathematics, Philadelphia, 1996), p. 19

Exception Handling in Derivative Computation with Nonarchimedean Calculus; K. Shamseddine and M. Berz, *ibid*, p. 37

Remainder Differential Algebras and Their Applications; K. Makino and M. Berz, *ibid*, p. 63

### CONFERENCE PROCEEDINGS - CONTRIBUTED PAPERS

The NSCL Control System; J. Vincent, L. Foth, A. McGilvra, and J. Priller, in Selected Papers from the Ninth IEEE Conference on Real-Time Computer Applications in Nuclear, Particle, and Plasma Physics, East Lansing, May 23-26, 1995, IEEE Trans. Nucl. Sci. 43(1996)30

The Xamine Online/Offline Display Program; R. Fox and A. Vander Molen, *ibid*, IEEE Trans. Nucl. Sci.43(1996)55

A Parallel Transputer-Based Data Acquisition System for On-Line PET Imaging of Proton and Gamma-Ray Radiotherapy Beams; D.W. Litzenberg, F.D. Becchetti, D.A. Roberts, A.M. Vander Molen, and R. Fox, *ibid*, IEEE Trans. Nucl. Sci. 43(1996)154

Proposed Upgrade of the NSCL; R. C. York, H. Blosser, T. Grimm, D. Lawton, F. Marti, J. Vincent, and A.F.Zeller, Proceedings of the 1995 Particle Accelerator Conference and International Conference on High-Energy Accelerators, Dallas, Texas, May 1995.

Giant Dipole Resonance in Excited  $^{120}\text{Sn}$  and  $^{208}\text{Pb}$  Nuclei Populated by Inelastic Alpha Scattering; E. Ramakrishnan, T. Baumann, A. Azhari, R.A. Kryger, R. Pfaff, M. Thoennessen, S. Yokoyama, J.R. Beene, M.L. Halbert, P.E. Mueller, D.W. Stracener, R.L. Varner, G. Van Buren, R.J. Charity, J.F. Dempsey, P.F. Hua, D.G. Sarantites, and L.G. Sobotka, in Proceedings of the Groningen Conference on Giant Resonances, Groningen, The Netherlands, 28 June - 1 July, 1995, edited by J.C. Bacelar, M.N. Harakeh, and O. Scholten; Nucl. Phys. A599(1996)49c

Isovector Giant Resonances in  $^6\text{He}$ ,  $^{12}\text{B}$ ,  $^{90}\text{Y}$ ,  $^{120}\text{In}$ , and  $^{208}\text{Tl}$ ; J. Jänecke, T. Annakkage, K. Pham, D.A. Roberts, J.A. Brown, G. Crawley, S. Danczik, D.J. Mercer, J. Stasko, J.S. Winfield, G.H. Yoo, G.P.A. Berg, and M. Fujiwara, *ibid*; Nucl. Phys. A599(1996)191c

Cryogenic Aspects of the Operation of Superconducting Cyclotron Based Neutron Therapy Facility; R.L. Maughan, H.G. Blosser, E.B. Blosser, and K. McHill, Bulletin du Cancer-Radiotherapie (Elsevier, Paris) 83 (suppl. 1)(1996)146s

High Intensity Operation of a Superconducting Cyclotron; F. Marti, H.G. Blosser, T. Grimm, D.A. Johnson, D. Lawton, M.M. Gordon, P. Miller, J. Vincent, X.Y. Wu, R.C. York, and A.F. Zeller, in Proceedings of the 14th International Conference on Cyclotrons and Their Applications, Cape Town, South Africa, October 8-13, 1995, edited by J.C. Cornell (World Scientific Publishing Co., Singapore, 1996), p. 45

Beam Loss from Charge Changing Collisions in a Cyclotron; P. Miller, D. Lawton, and F. Marti, *ibid*, p. 269

Four Years of Operating Experience with the Harper Hospital Superconducting Cyclotron for Neutron Radiation Therapy; R.L. Maughan, D. Yudelev, A.T. Porter, J.D. Forman, H.G. Blosser, E.B. Blosser, and G.F. Blosser, *ibid*, p. 504

COSY INFINITY and Its Applications in Nonlinear Dynamics; M. Berz, K. Makino, K. Shamseddine, G.H. Hoffstätter, and W. Wan, in "Computational Differentiation: Techniques, Applications, and Tools", Proceedings of the Second International Conference on Computational Differentiation, Santa Fe, New Mexico, February 12-14, 1996, edited by M. Berz, C. Bischof, G. Corliss, and A. Griewank (Society for Industrial and Applied Mathematics, Philadelphia, 1996), p. 363

### ABSTRACTS OF CONTRIBUTED PAPERS

Constraints on Extensions of the Standard Model from Polarization-Asymmetry Correlation Measurements; P. Quin, J. Deutsch, F. Gimeno-Nogues, J. Govaerts, T. Otto, I. Pepe, R. Prieels, E. Thomas, J. Camps, P. De Moor, P. Schuurmans, N. Severijns, A. van Geert, L. Vanneste, M. Allet, K. Bodek, M. Ferro-Luzzi, J. Lang, R. Mueller, S. Navert, O. Naviliat-Cuncic, J. Sromicki, E. Stephan, J.

Zejma, B.R. Holstein, B.A. Brown, and R. Kirchner, in Book of Abstracts for PANIC'96, Williamsburg, Virginia, May 1996

ALN as a Keystone in a Multifaceted Computer-Assisted Personalized Approach to Learning; E. Kashy, M. Thoennesen, and S. L. Wolfe, Sloan ALN Spring Meeting, Urbana, Illinois, May 2-3, 1996, [http://www.sloan.org/education/aln\\_spring96/sessionI.ppt](http://www.sloan.org/education/aln_spring96/sessionI.ppt)

Ground State of  $^{10}\text{Li}$  and  $^{13}\text{Be}$ ; S. Yokoyama, A. Azhari, J. Brown, T. Baumann, A. Galonsky, P.G. Hansen, J.H. Kelley, R.A. Kryger, R. Pfaff, E. Ramakrishnan, P. Thirolf, and M. Thoennesen, Book of Abstracts, 4th International Conference on Radioactive Nuclear Beams, Omiya, Japan, June 4-7, 1996, p. 52

The Endpoint of the rp-Process; H. Schatz, A. Aprahamin, B.A. Brown, J. Goerres, H. Herndl, K.L. Kratz, P. Moeller, B. Pfeiffer, T. Rauscher, J.F. Rembges, F.K. Thielemann, M. Wiescher, and L. van Wormer, Book of Abstracts for International Conference on Nuclei in the Cosmos, Notre Dame, Indiana, July 1996.

Search for Di-Proton Emission in Light Nuclei; M. Thoennesen, M. Chromik, A. Azhari, M. Fauerbach, T. Glasmacher, R. Ibbotson, H. Scheit, and P. Thirolf, Book of Abstracts, Conference on Nuclear Structure at the Limits, Argonne, Illinois, July 22-26, 1996, p. 132

Performance of the High Gradient, Large Aperture Quadrupoles for the NSCL Superconducting Spectrometer; B. Zhang, A.F. Zeller, S. Bricker, J.C. DeKamp, P. Johnson, B. Sherrill, and R. Zink, Abstracts for 1996 Applied Superconductivity Conference, Pittsburgh, Pennsylvania, August 25-30, 1996, p. 218 (1996)

First Operation of the S800 Superconducting Spectrograph; A.F. Zeller, S. Alfredson, S. Bricker, J. Caggiano, J.C. DeKamp, R. Fontus, H. Hilbert, P. Johnson, H. Laumer, L. Morris, D. Pendell, D.P. Sanderson, B.M. Sherrill, R. Swanson, J. Wagner, R. Welton, J. Yurkon, B. Zhang, and R. Zink, *ibid.*, p. 226

Improved Limit on Right-Handed Currents in Nuclear Beta-Decay from the Polarization-Asymmetry Correlation in  $^{107}\text{In}$  Decay; N. Severijns, J. Camps, P. De Moor, P. Schuurmans, A. van Geert, L. Vanneste, J. Deutsch, J. Govaerts, T. Otto, R. Prieels, E. Thomas, P. Quin, O. Naviliat-Cuncic, B. R. Holstein, B. A. Brown, and R. Kirchner, in Book of Abstracts for International Symposium on Non-Nucleonis Degrees of Freedom Detected in Nucleus, Osaka, Japan, September 2-5, 1996.

Level Dynamics and Correlations in the Nuclear Shell Model; D. Kusnezov, B.A. Brown and V. Zelevinsky, *Bull. Am. Phys. Soc.* 41(1996)859

Strength Functions and Spreading Widths of Shell Model Basis States; N. Frazier, B.A. Brown, and V. Zelevinsky, *Bull. Am. Phys. Soc.* 41(1996)859

High L Behavior of the Spectral Rigidity for sd-shell Nuclei; M. Horoi, B.A. Brown, and V. Zelevinsky, *Bull. Am. Phys. Soc.* 41(1996)859

Pairing Phase Transition in Shell-Model Wave Functions; V. Zelevinsky, B.A. Brown, and M. Horoi, *Bull. Am. Phys. Soc.* 41(1996)860

A High-Efficiency Photon Detection System for Coulomb Excitation Studies of Fast Radioactive Nuclei; R.W. Ibbotson, T. Glasmacher, H. Scheit, and P.G. Thirolf, *Bull. Am. Phys. Soc.* 41(1996)860

Fully Microscopic Analyses Of Elastic Scattering Of 200 MeV Protons From Various Nuclei Ranging from  $^6\text{Li}$  to  $^{208}\text{Pb}$ ; P. Dortmans, K. Amos, and S. Karataglidis, *Bull. Am. Phys. Soc.* 41(1996)877

Large Basis Shell Model Structures And Fully Microscopic Analysis Of Elastic And Inelastic Proton Scattering from  $^{6,7}\text{Li}$ ; S. Karataglidis, P. Dortmans, and K. Amos, *Bull. Am. Phys. Soc.* 41(1996)877

- Decay Studies of Light Ag and Cd Isotopes and the rp-process; G. Raimann, M.J. Balbes, R.N. Boyd, D. Cano-Ott, R. Collatz, A. Guglielmetti, M. Hellström, Z. Hu, R. Kirchner, O. Klepper, E. Roeckl, K. Schmidt, M. Shibata, A. Weber, M. Hencheck, J. Morford, Z. Janas, M. Karny, J. Szerypo, and D.J. Morrissey, *Bull. Am. Phys. Soc.* 41(1996)896
- Coulomb Reacceleration Studies of  $^{11}\text{Be}$ ; J.E. Bush, D.P. Balamuth, P. Hausladen, K.R. Pohl, D. Bazin, J. Brown, J.A. Caggiano, L. Chen, B. Davids, D.J. Morrissey, B.M. Sherrill, and M. Thoennessen, *Bull. Am. Phys. Soc.* 41(1996)897
- Lifetimes of Excited  $0^+$  States in  $^{120}\text{Xe}$ ; P.F. Mantica and W.B. Walters, *Bull. Am. Phys. Soc.* 41(1996)901
- Partons in Phase Space; D. Brown and P. Danielewicz, *Bull. Am. Phys. Soc.* 41(1996)924
- Can Anomalous  $E1$  Transitions in Transuranic Nuclei Be Explained by Neutral Weak Decay?; Wm.C. McHarris, C.V. Hampton, W.A. Olivier, *Bull. Am. Phys. Soc.* 41(1996)964
- Excited State Populations and Temperature Measurements in Nucleus-Nucleus Collisions; M.B. Tsang, W.G. Lynch, F. Zhu, A. Aranda, D.R. Bowman, R.T. de Souza, C.K. Gelbke, Y.D. Kim, L. Phair, S. Pratt, C. Williams, H.M. Xu, and W.A. Friedman, *Bull. Am. Phys. Soc.* 41(1996)965
- Excited State Populations and Temperature Measurements in Nucleus-Nucleus Collisions; M.J. Huang, W.G. Lynch, J.D. Dinius, S.J. Gaff, C.K. Gelbke, T. Glasmacher, G.J. Kunde, L. Martin, C.P. Montoya, M.B. Tsang, N. Colonna, M. Bruno, M. D'Agostino, M.L. Fiandri, P.F. Mastinu, F. Gramegna, I. Iori, A. Moroni, F. Petruzzelli, G.V. Margagliotti, P.M. Milazzo, R. Rui, G. Vannini, and A. Ferrero, *Bull. Am. Phys. Soc.* 41(1996)965
- Projectile-Like Fragments in  $^{129}\text{Xe}$  on  $^{\text{nat}}\text{Cu}$  Reactions at  $E/A = 30, 40, 50,$  and  $60$  MeV; D.E. Russ, A.C. Mignerey, E.J. Garcia-Solis, H. Madani, J.Y. Shea, P.J. Stankas, O. Bjarki, E.E. Gualtieri, S.A. Hannuschke, R. Pak, N.T.B. Stone, A.M. VanderMolen, G.D. Westfall, and J. Yee, *Bull. Am. Phys. Soc.* 41(1996)965
- Measurement of the Sign of the Mean Transverse Momentum of Light Charged Particles Emitted in  $^{14}\text{N} + ^{154}\text{Sm}$  Collisions at  $E/A=35, 100$  and  $155$ MeV; R.C. Lemmon, M.B. Tsang, J. Dinius, S. Gaff, C.K. Gelbke, M.J. Huang, G. Kunde, W.G. Lynch, L. Manduci, R. Popescu, R.M. Ronningen, L. Weathers, D. White, R.J. Charity, J. Dempsey, L.G. Sobotka, W. Trautmann, and W. Dunnweber, *Bull. Am. Phys. Soc.* 41(1996)966
- Mass Dependence of Collective Flow; M.J. Huang, R.C. Lemmon, F. Daffin, W.G. Lynch, C. Schwarz, M.B. Tsang, C. Williams, P. Danielewicz, K. Haglin, W. Bauer, C.K. Gelbke, W.C. Hsi, G.J. Kunde, M. Lisa, G.F. Peaslee, R.J. Charity, L.G. Sobotka, U. Lynen, J. Pochodzalla, W. Sann, M.C. Trautmann, S.R. Lemaire, R.T. Souza, N. deSouza, and N. Carlin, *Bull. Am. Phys. Soc.* 41(1996)966
- Ground State of  $^{11}\text{N}$ ; A. Azhari, T. Baumann, J.A. Brown, M. Hellström, J.H. Kelley, R.A. Kryger, E. Ramakrishnan, T. Suomijarvi, P.G. Thirolf, M. Thoennessen, S. Yokoyama, D. Russ, and H. Madani, *Bull. Am. Phys. Soc.* 41(1996)984
- First Excited States In Neutron Rich Even-Even Argon And Sulfur Isotopes; H. Scheit, T. Glasmacher, B.A. Brown, J. Brown, R. Ibbotson, D.J. Morrissey, M. Steiner, P. Thirolf, M. Thoennessen, P.D. Cottle, K. Kemper, K. Jewell, and M. Hellström, *Bull. Am. Phys. Soc.* 41(1996)985
- Fragment Emission Probabilities in Multifragmenting Systems; T.M. Hamilton, E.W. Cornell, Y.L. Lou, S.L. Chen, B. Davin, D. Fox, K. McDonald, R.T. de Souza, M.J. Huang, W.C. Hsi, C. Schwarz, C. Williams, D.R. Bowman, N. Carlin, J. Dinius, C.K. Gelbke, T. Glasmacher, D.O. Handzy, M.A. Lisa, W.G. Lynch, C. Montoya, G.F. Peaslee, L. Phair, M.B. Tsang, F. Zhu, G. Van Buren, R.J. Charity, L.G. Sobotka, A.A. Songzoni, D. Prindle, R. Vandenbosch, J.L. Wile, M. Parker, and C.L. Coffing, *Bull. Am. Phys. Soc.* 41(1996)986

Apparent Overproduction of Neutrons in  $^{112,124}\text{Sn} + ^{124,136}\text{Xe}$  Reactions at  $E/A=55$  MeV; J. Töke, D.K. Agnihotri, B. Djerroud, W.U. Schröder, W. Skulski, K. Wyrozebski, G.J. Kunde, S. Gaff, C.K. Gelbke, T. Glasmacher, M.J. Huang, R. Lemmon, W.G. Lynch, L. Manduci, L. Martin, M.B. Tsang, R.J. Charity, J. Dempsey, and L.G. Sobotka, Bull. Am. Phys. Soc. 41(1996)987

The Reaction  $^1\text{H}(^{28}\text{Si},\text{A})\text{x}$  at 80 MeV/nucleon; J.L. Romero, F.P. Brady, D.A. Cebra, J. Chance, J.C. Kintner, J.H. Osborne, G. Acevedo-Bolton, D.J. Morrissey, M. Fauerbach, R. Pfaff, C.F. Powell, B.M. Sherrill, and H.H.K. Tang, Bull. Am. Phys. Soc. 41(1996)987

Fragmentation of  $^{78}\text{Kr}$  Projectiles; R. Pfaff, D.J. Morrissey, W. Benenson, M. Fauerbach, M. Hellström, C.F. Powell, B.M. Sherrill, M. Steiner, and J.A. Winger, Bull. Am. Phys. Soc. 41(1996)987

Neutron-Neutron Correlation Functions for the Reaction  $^{40}\text{Ar} + ^{165}\text{Ho}$  at  $E/A=25$  MeV; S.J. Gaff, A. Galonsky, C.K. Gelbke, T. Glasmacher, M. Huang, J. Kruse, G.J. Kunde, R. Lemmon, B. Lynch, B. Tsang, J. Wang, P. Zecher, F. Deák, Á. Kiss, Á. Horváth, Z. Seres, K. Ieki, and Y. Iwata, Bull. Am. Phys. Soc. 41(1996)988

Experiment to Measure the Reaction Cross Sections of He and Li Isotopes in Si; R. McLeod, A. Nadasen, L. Nieman, D. Sisan, R. Patty, P.M. Voyles, R.E. Warner, J. Brown, A. Galonsky, J. Kruse, R. Ronningen, B. Sherrill, J. Wang, P. Zecher, J. Kolata, and J. Von Schwarzenberg, Bull. Am. Phys. Soc. 41(1996)1024

Total and 2n-Removal Cross Sections of 20-60 MeV  $^{4,6,8}\text{He}$  and  $^{6-9,11}\text{Li}$  on Si; R.E. Warner, R. Patty, P. Voyles, A. Nadasen, F.D. Bechetti, M.Y. Lee, J.A. Brown, A. Galonsky, J. Kruse, R.M. Ronningen, B.M. Sherrill, J. Wang, P. Zecher, J.J. Kolata, J. von Schwarzenberg, K. Subotic, and P. Schwandt, Bull. Am. Phys. Soc. 41(1996)1024

Energy and Angular Distributions of Particles Detected in the MSU  $4\pi$  Phoswiches; D. Sisan, R. McLeod, A. Nadasen, L. Nieman, O. Bjarki, S. Hannuschke, R. Pak, N. Stone, A. Vander Molen, G.D. Westfall, and J. Yee, Bull. Am. Phys. Soc. 41(1996)1025

Ground State of  $^{10}\text{Li}$ ; S. Yokoyama, A. Azhari, J. Brown, T. Baumann, A. Galonsky, J.H. Kelley, R.A. Kryger, R. Pfaff, E. Ramakrishnan, P. Thirolf, and M. Thoennessen, Bull. Am. Phys. Soc. 41(1996)1025

Magnetic Field Mapping of the S800 Spectrograph; J.A. Caggiano, R. Fontus, P.H. Johnson, B.M. Sherrill, A.F. Zeller, and J.A. Nolen, Bull. Am. Phys. Soc. 41(1996)1035

Design Studies for an Ultra High Field K80 Cyclotron; J. Schubert and H. Blosser, Bull. Am. Phys. Soc. 41(1996)1040

The National Superconducting Cyclotron Laboratory; C.K. Gelbke, D.J. Morrissey, and R.C. York, Bull. Am. Phys. Soc. 41(1996)1218

Direct Observation of the Inversion of Transverse Flow; R.C. Lemmon, M.B. Tsang, J. Dinius, S. Gaff, C.K. Gelbke, M.J. Huang, G.J. Kunde, W.G. Lynch, L. Manduci, R. Popescu, R.M. Ronningen, L. Weathers, D. White, R.J. Charity, J. Dempsey, L.G. Sobotka, W. Trautmann, and W. Dunnweber, Bull. Am. Phys. Soc. 41(1996)1223

Low Energy Nuclear Reaction Cross Sections for a Secondary High-Spin Isomeric Nuclear Beam  $^{18}\text{F}$  in Silicon; D.A. Roberts, F.D. Bechetti, J. Janecke, M.Y. Lee, T.W. O'Donnell, K. Pham, R.E. Warner, R.M. Ronningen, and H.W. Wilschut, Bull. Am. Phys. Soc. 41(1996)1223

Studying the Reaction  $^{40}\text{Ar} + ^{165}\text{Ho}$  at  $E/A=25$  MeV Using Neutron-Neutron Intensity Interferometry; S.J. Gaff, A. Galonsky, C.K. Gelbke, T. Glasmacher, M.J. Huang, J. Kruse, G.J. Kunde, R. Lemmon, W.G. Lynch, M.B. Tsang, J. Wang, P. Zecher, F. Deák, Á. Kiss, Á. Horváth, Z. Seres, K. Ieki, and Y. Iwata, Bull. Am. Phys. Soc. 41(1996)1223

Isobaric Ratios and Flow for Symmetric  $^{112}\text{Sn}$  and  $^{124}\text{Sn}$ ; G.J. Kunde, S. Gaff, C.K. Gelbke, T. Glasmacher, L. Manduci, L. Martin, M. Mhuang, R. Lemmon, W. Lynch, B. Tsang, J. Dempsey, R.J. Charity, L.G. Sobotka, D. Agnihotri, B. Djerroud, W.U. Schröder, W. Skulski, J. Töke, and K. WYROZEBSKI, Bull. Am. Phys. Soc. 41(1996)1223

Heavy Residue Formation in Asymmetric Nuclear Collisions; W. Loveland, G.A. Souliotis, K. Hanold, I. Lhenry, A.C. Veeck, G.J. Wozniak, and D.J. Morrissey, Bull. Am. Phys. Soc. 41(1996)1223

Isospin Purity and Chaotic Dynamics in Continuum; V. Zelevinsky and V. Sokolov, Bull. Am. Phys. Soc. 41(1996)1226

Gamow-Teller Strength Functions for Shell Model States; Njema Frazier, Bull. Am. Phys. Soc. 41(1996)1226

Damping of the Giant Dipole Resonance Built on Excited States of  $^{208}\text{Pb}$  and  $^{120}\text{Sn}$  Nuclei; E. Ramakrishnan, T. Baumann, and M. Thoennessen, Bull. Am. Phys. Soc. 41(1996)1232

Excitation Functions for GDR Gamma-Rays in Coincidence with Fission; C.R. Morton, A. Buda, P. Paul, N.P. Shaw, J.R. Beene, N. Gan, M.L. Halbert, D.W. Stracener, R.L. Varner, M. Thoennessen, P. Thirolf, and I. Dioszegi, Bull. Am. Phys. Soc. 41(1996)1232

Photon Decay Following the Projectile Excitation of  $^{11}\text{Be}$ ; N. Gan, J.R. Beene, M.L. Halbert, D.W. Stracener, R.L. Varner, A. Azhari, E. Ramakrishnan, P. Thirolf, M. Thoennessen, and S. Yokoyama, Bull. Am. Phys. Soc. 41(1996)1233

Cross Sections for A=6,7 Production in Alpha+Alpha Reactions, and Cosmic Ray Nucleosynthesis; D.J. Mercer, Sam M. Austin, J.A. Brown, S.E. Danczyk, J.H. Kelley, T. Suomijärvi, and D.A. Roberts, Bull. Am. Phys. Soc. 41(1996)1245

A Measurement of the Cross Section for the  $^8\text{Li}(n,\gamma)^9\text{Li}$  Reaction at Astrophysical Energies by Reverse Kinematics; P.D. Zecher, A. Galonsky, S. Gaff, J.J. Kruse, G. Kunde, J. Wang, R.E. Warner, F. Deák, Á. Horváth, Á. Kiss, Z. Seres, K. Ieki, Y. Iwata, J.J. Kolata, J. Von Schwarzenberg, and H. Schelin, Bull. Am. Phys. Soc. 41(1996)1245

Search for the Gamma-Decay of the First Excited State of  $^{17}\text{Ne}$ ; M. Chromik, M. Fauerbach, P.G. Hansen, R. Ibbotson, T. Glasmacher, H. Scheit, M. Thoennessen, and P. Thirolf, Bull. Am. Phys. Soc. 41(1996)1249

The Development of Quadrupole Collectivity in the Neutron-Rich Si Isotopes; R.W. Ibbotson, T. Glasmacher, M. Chromik, M. Fauerbach, P.G. Hansen, D. Morrissey, H. Scheit, M. Thoennessen, P. Cottle, and K. Kemper, Bull. Am. Phys. Soc. 41(1996)1249

Mechanisms of Coulomb and Nuclear Breakup Reactions of Halo Nuclei; D.P. Balamuth, J.E. Bush, P. Hausladen, K.R. Pohl, D. Bazin, J. Brown, J. A. Caggiano, L. Chen, B. Davids, D.O. Handzy, M. Hellström, D.J. Morrissey, B. M. Sherrill, J. S. Winfield, M. Thoennessen, D.F. Winchell, and K.A. Griffioen, Bull. Am. Phys. Soc. 41(1996)1252

Probing the Halo Structure of  $^{19}\text{C}$ ,  $^{17}\text{C}$ ,  $^{15}\text{C}$  and  $^{14}\text{B}$ ; D. Bazin, W. Benenson, J. Brown, B. Davids, M. Fauerbach, P.G. Hansen, P. Mantica, D.J. Morrissey, C.F. Powell, B.M. Sherrill, and M. Steiner, Bull. Am. Phys. Soc. 41(1996)1253

Coulomb Excitation of the One-Neutron Halo Nucleus  $^{11}\text{Be}$ ; M. Fauerbach, M. Chromik, T. Glasmacher, P.G. Hansen, R. Ibbotson, D.J. Morrissey, H. Scheit, M. Thoennessen, and P. Thirolf, Bull. Am. Phys. Soc. 41(1996)1253

Effects of the Ground State of  $^{11}\text{N}$  on the Diproton Decay of  $^{12}\text{O}$ ; A. Azhari, R.A. Kryger, and M. Thoennessen, *Bull. Am. Phys. Soc.* 41(1996)1253

Coulomb Dissociation of  $^6\text{He}$ ,  $^8\text{He}$ ,  $^{11}\text{Li}$ ,  $^{14}\text{Be}$ ; J.J. Kruse, A. Galonsky, J. Wang, E. Tryggestad, P.D. Zecher, D.J. Morrissey, B. Sherrill, M. Steiner, R.E. Warner, F. Deák, Á. Horváth, Á. Kiss, Z. Seres, K. Ieki, Y. Iwata, Y. Ando, J.J. Kolata, and J. Von Schwarzenberg, *Bull. Am. Phys. Soc.* 41(1996)1253

Inelastic Proton Scattering in Inverse Kinematics on  $^{18}\text{Ne}$  and  $^{20}\text{O}$ ; P.D. Cottle, J.K. Jewell, K.W. Kemper, L.A. Riley, T. Glasmacher, J.A. Brown, M. Chromik, R. Ibbotson, D.J. Morrissey, H. Scheit, M. Steiner, S.E. Hirzebruch, and T. Suomijarvi, *Bull. Am. Phys. Soc.* 41(1996)1253

Development of a Beta Polarization Measurement System at the NSCL; P.F. Mantica, R.W. Ibbotson, D. Anthony, M. Fauerbach, D.J. Morrissey, C.F. Powell, M. Steiner, J. Rikovska, and N.J. Stone, *Bull. Am. Phys. Soc.* 41(1996)1260

Temperature Measurements for  $^{197}\text{Au}+^{197}\text{Au}$  and  $^{129}\text{Xe}+\text{nat}\text{Cu}$  Collisions; M.J. Huang, W.G. Lynch, H. Xi, M.B. Tsang, J.D. Dinius, S.J. Gaff, C.K. Gelbke, T. Glasmacher, G.J. Kunde, L. Martin, C.P. Montoya, N. Colonna, M. Bruno, M. D'Agostino, M.L. Fiandri, P.F. Mastinu, F. Gramegna, I. Iori, A. Moroni, F. Petruzzelli, G.V. Margagliotti, P.M. Milazzo, R. Rui, G. Vannini, and A. Ferrero, *Bull. Am. Phys. Soc.* 41(1996)1264

Influence of Secondary decay on Isotope Temperature; H. Xi, M.B. Tsang, M.J. Huang, W.G. Lynch, J.D. Dinius, S.J. Gaff, C.K. Gelbke, T. Glasmacher, G.J. Kunde, L. Martin, C.P. Montoya, N. Colonna, M. Bruno, M. D'Agostino, M.L. Fiandri, P.F. Mastinu, F. Gramegna, I. Iori, A. Moroni, F. Petruzzelli, G.V. Margagliotti, P.M. Milazzo, R. Rui, G. Vannini, and A. Ferrero, *Bull. Am. Phys. Soc.* 41(1996)1264

#### CHAPTER IN BOOK

Proton, Nuclear Binding Energy, Nuclear Decay, Alpha Decay, Beta Decay, Gamma Decay, and Nuclear Shell Model; B.A. Brown, *Contributions to the Macmillan Encyclopedia of Physics*, edited by J. S. Rigden (Macmillan Reference USA, 1996)

The SC: ISOLDE and Nuclear Physics; P.G. Hansen, in "History of CERN", Vol. III, edited by J. Krige (Elsevier Science Publishers, Amsterdam, 1996), p. 327

#### BOOKS EDITED/AUTHORED

"Advances in Nuclear Dynamics 2", Proceedings of the 12th Winter Workshop on Nuclear Dynamics, Snowbird, Utah, February 3-10, 1996, edited by W. Bauer and G.D. Westfall (Plenum Press, New York, 1996).

"The Harmony of Physics", on the occasion of Spartak Belyaev's 70th birthday, edited by D.H. Feng, A. Klein, M. Vallieres, and V. Zelevinsky, *Phys. Rep.* 264(1996)1

"Computational Differentiation: Techniques, Applications, and Tools", edited by M. Berz, C. Bischof, G. Corliss, and A. Griewank (SIAM, Philadelphia, 1996).

"Applications of Modern Map Methods in Particle Beam Physics", M. Berz, K. Fuchi, K. Shamseddine, and W. Wan (Academic Press, Orlando, Florida, 1996??)

#### INVITED TALKS

Upgrade Plans for the National Superconducting Cyclotron Laboratory; W. Benenson, *International Workshop XXIV on Gross Properties of Nuclei and Nuclear Excitations*, Hirschegg, Austria, January 15-20, 1996.

Nuclear Structure of Particle Unstable Nuclei; M. Thoennessen, *ibid.*



- The Nucleus  ${}^8\text{B}$  Studied by Fragmentation Reactions at 41A MeV; J.H. Kelley, 34th International Winter Meeting on Nuclear Physics, Bormio, Italy, January 22-27, 1996.
- Isospin Dependence of Fragmentation in the System Sn+Sn at  $E/A=40$  MeV; G.J. Kunde, *ibid.*
- Stopping and Expansion in Central Collisions; P. Danielewicz, *ibid.*
- #-Signals of a Critical Behavior in Peripheral Au+Au Collisions at 35 MeV/nucleon; P.F. Mastinu, *ibid.*
- Many-Body Final State Reactions as Sources of Dileptons from the Hadronic Medium; K. Haglin, Second INT/RHIC Workshop on Electromagnetic Probes of the Quark Gluon Plasma, Seattle, Washington, January 24-27, 1996.
- In Pursuit of the Liquid-Gas Phase Transition; W.G. Lynch, Second INDRA Workshop, Caen, France, January 29-31, 1996.
- Collective Radial Expansion in Au + Au Reactions from 0.25 to 2 GeV/A; F. Daffin, 12th Winter Workshop on Nuclear Dynamics, Snowbird, Utah, February 3-10, 1996.
- Mass Dependence of Directed Collective Flow; M.J. Huang, *ibid.*
- Gaussian Wave-Packet Dynamics with and without Correlations; D. Kiderlen, *ibid.*
- A Study of Nuclear Flow in Consistent Boltzmann Algorithms; G. Kortemeyer, *ibid.*
- Radial and Directed Transverse Flow in Heavy-Ion Collisions; R. Pak, *ibid.*
- Search for the Decay of Non-Compact Geometries; N. Stone, *ibid.*
- #-Non-Instantaneous Breakup of Excited Nuclear Systems; R.T. de Souza
- #-Incomplete Energy Damping and Heavy-Residue Production in  ${}^{197}\text{Au} + {}^{86}\text{Kr}$  Collisions at  $E/A = 35$  MeV; B. Djerroud, *ibid.*
- #-Reducibility, Thermal and Mass Scaling in Angular Correlations from Multifragmentation Reactions; L. Phair, *ibid.*
- #-From Dissipative Collisions to Multiple Fragment Production - A Unified View; J. Töke, *ibid.*
- Calculus and Numerics on Levi-Civita Fields; M. Berz, Second International Workshop on Computational Differentiation, Santa Fe, New Mexico, February 12-14, 1996.
- Remainder Differential Algebras and Their Applications; K. Makino, *ibid.*
- Exception Handling in Derivative Computation with Nonarchimedean Calculus; K. Shamseddine, *ibid.*
- Remainder Differential Algebras; M. Berz, COSY User's Meeting, Santa Fe, New Mexico, February 16, 1996.
- The Nucleus  ${}^8\text{B}$  Studied by Fragmentation Reactions at 41A MeV; J.H. Kelley, Workshop on  ${}^8\text{B}$ , GSI, Darmstadt, Germany, February 1996.
- Nuclear Astrophysics with Radioactive Beams; S.M. Austin, International Conference on Nuclear Dynamics at Long and Short Ranges, Angra dos Reis, Brazil, April 8-12, 1996.
- Two-Proton Intensity Interferometry; C.K. Gelbke, *ibid.*
- Order and Disorder in the Nuclear Shell Model; B.A. Brown, International Workshop on Contemporary Nuclear Shell Models, Philadelphia, April 29-30, 1996.

- The Coupled Cyclotron Fragmentation Facility at MSU; F. Marti, American Physical Society Meeting, Indianapolis, Indiana, May 2-5, 1996.
- Reconstructing the Final Stage of Heavy Ion Collisions at CERN and AGS; S. Pratt, *ibid.*
- The Nuclear Shell Model as a Testing Ground for Quantum Chaos; V. Zelevinsky, *ibid.*
- The Multifragmentation Phase Transition—Percolation Picture; W. Bauer, Catania Relativistic Ion Studies (CRIS '96) on Critical Phenomena and Collective Observables, Acicastello, Italy, May 1996.
- Collective Observables in the Heavy-Ion Collisions and the Nuclear Equation of State; P. Danielewicz, *ibid.*
- Search for Electron-Positron Lines in Heavy-Ion Collisions; S.M. Austin, Symposium in Honor of John P. Schiffer, Argonne, Illinois, May 6-7, 1996
- Probing Low Density Nuclear Matter; M.B. Tsang, First Catania Relativistic Ion Study, Acicastello, Italy, May 27-31, 1996
- Stability of Weakly Nonlinear Dynamical Systems; M. Berz, Meeting on Nonlinear Dynamics 96, Springfield, Missouri, May 29 - June 1, 1996.
- The Coupled Cyclotron Project at the NSCL; D.J. Morrissey, Fourth International Conference on Radioactive Nuclear Beams, Omiya, Japan, June 4-7, 1996.
- Overview of the NSCL Radioactive Beam Program; B.M. Sherrill, *ibid.*
- Isomer Beams in Projectile Fragmentation; W. Benenson, Workshop on Isomer Beams, GANIL, France, June 1996
- Direct Observation of the Inversion of Flow; R. Lemmon, Nuclear Chemistry Gordon Conference, New Hampshire, June 16-21, 1996.
- Nuclear Temperature Thermometers; M.B. Tsang, *ibid.*
- Pi-Pi and Pi-Rho Contributions to Dielectron Production; K. Haglin, International Conference on Hadrons in Dense Matter, Darmstadt, Germany, July 3-5, 1996.
- Rigorous Bounds for Stability Times in Storage Rings; M. Berz, Beam Dynamics and Optimization 1996, St. Petersburg, Russia, July 4, 1996.
- Theory Panel Overview; W. Bauer, Workshop on Intermediate-Energy Heavy Ion Reactions, East Lansing, Michigan, July 12-13, 1996
- Different Aspects of Multi Fragment Emission; G.J. Kunde, *ibid.*
- Transverse Flow and Radial Flow; G.D. Westfall, *ibid.*
- #-Fragmentation and Orbiting in Intermediate Energy Heavy-Ion Collisions; R.J. Charity, *ibid.*
- #-The Evolutionary Nature of Multifragment Decay: Statistical and Dynamical Pictures; R.T. de Souza
- #-Role of Thermally Driven Expansion and Multifragment Decays; R. Lacey, *ibid.*
- #-Multifragmentation Studies at NSCL with the MULTICS+MINIBALL Apparatus; P. Milazzo, *ibid.*
- #-Multifragmentation: A Reaction to End All Reactions; L.G. Moretto, *ibid.*
- #-Complex Nuclear Reaction Mechanisms: New Insights and Perspectives; W.U. Schröder, *ibid.*

Rigorous Bounds on Survival Times for Motion around Elliptical Fixed Points; M. Berz, Second World Congress on Nonlinear Analysis, Athens, Greece, July 16, 1996.

Infinitely Small Numbers and Their Use in Beam Physics; M. Berz, SIAM Annual Meeting, Kansas City, July 22-25, 1996.

Deformation in the Neutron Rich Sulfur Isotopes  $^{40}\text{S}$  and  $^{42}\text{S}$ ; T. Glasmacher, Conference on Nuclear Structure at the Limits, Argonne, Illinois, July 22-26, 1996.

Structure and Reactions of Drip-Line Nuclei; P.G. Hansen, *ibid.*

Nuclear Structure at the Limits of Resolution: Looking through Individual Wave Functions; V. Zelevinsky, *ibid.*

Taylor Models, Small Numbers, and Large Accelerators: Proving Long-Term Stability of Weakly Nonlinear Systems; M. Berz, SIAM Symposium on Verification Theory, Techniques and Software, Kansas City, July 26, 1996.

Production and Study of Heavy  $rp$ -Process Nuclei with Fragmentation of Heavy Ions; B.M. Sherrill, International Conference on Nuclei in the Cosmos IV, South Bend, Indiana, July 1996.

Core Fragment Momentum Distributions and the Halo Wave Function; B.M. Sherrill, Gull Lake Conference on Nuclear Physics Near the Drip Lines, Gull Lake, Michigan, August 21-24, 1996.

First Experiments with the S800 Spectrograph; S.M. Austin, International Workshop on Physics of Unstable Beams, São Paulo, Brazil, August 28 - September 1, 1996.

Dynamical Fission Timescales in Hot Rotating Nuclei; M. Thoennessen, Third International Conference on Dynamical Aspects of Nuclear Fission, Cast'a-Papiernicka, Slovak Republic, August 30 - September 4, 1996.

Three Lectures; W. Bauer, 1996 Seminar on Hot Nuclear Research, Lanzhou, China, August 1996.

Isospin Dependence of the Nuclear Equation of State; W. Bauer, International Workshop on Physics of Unstable Beams, Serra Negra, São Paulo, Brazil, August 1996.

Status of the MSU/NSCL Deflector; H.G. Blosser, Electrostatic Deflector Workshop, Catania, Italy, September 2, 1996.

High Intensity Extraction in Superconducting Cyclotron; H.G. Blosser, *ibid.*

Giant Dipole Resonances in Hot Nuclei with Inelastic Alpha Scattering; M. Thoennessen, XXXI Zakopane School of Physics "Trends in Nuclear Physics", Zakopane, Poland, September 3-11, 1996.

High Current Cyclotron Studies at the NSCL; H.G. Blosser, XXX European Cyclotron Progress Meeting, Catania, Italy, September 4-6, 1996.

My Knowing of Francesco Resmini; H.G. Blosser, *ibid.*

Computational Differentiation with Remainder Bounds; M. Berz, International Conference on Modeling and Computing in Physics, Dubna, Russia, September 16-21, 1996.

A New High-Resolution Separator for High Intensity Secondary Beams; D.J. Morrissey, 13th International Conference on Electromagnetic Isotope Separators and Techniques Related to their Applications, Bad Dürkheim, Germany, September 23-27, 1996.

Differential Algebras with Remainder and Rigorous Proofs of Long-Term Stability; M. Berz, Fourth Conference on Computational Accelerator Physics, Williamsburg, Virginia, September 24-27, 1996.

- Time Scale of Fission in Hot Nuclei; M. Thoennessen, Conference on Chaotic Phenomena in Nuclear Physics, Aghia Pelaghia, Greece, September 28 - October 3, 1996.
- Self-Organized Criticality; W. Bauer, XIX Reuniao de Trabalho Sobre Fisica Nuclear no Brasil, Aguas de Lindoia, São Paulo, Brazil, September 1996.
- The Systematic Error in HBT Formulas; S. Pratt, HBT Workshop, Trento, Italy, September 1996.
- Finding a New Region of Deformation with Radioactive Ion Beams; T. Glasmacher, American Physical Society Division of Nuclear Physics Fall Meeting, Cambridge, Massachusetts, October 2-5, 1996.
- Overview of the Nature of Halo Nuclei; B.M. Sherrill, *ibid.*
- Status of Flow, EOS, and Transport Models; P. Danielewicz, Town Meeting on Hot and Dense Nuclear Matter and Quark-Gluon Plasma, Turin, Italy, October 4-5, 1996.
- Compression and Expansion in Central Collisions; P. Danielewicz, International Research Workshop on Heavy Ion Physics at Low, Intermediate, and Relativistic Energies Using  $4\pi$  Detectors, Poiana Brasov, Romania, October 7-14, 1996.
- Structure of the Heavy Carbon Isotopes from Core Momentum Distributions; B.M. Sherrill, International Workshop on the Physics of Halo Nuclei, European Centre for Nuclear Theory, Trento, Italy, October 7-17, 1996.
- Nuclear Halos: Introductory Remarks; P.G. Hansen, *ibid.*
- Understanding the Unbound Subsystems of Halo Nuclei; M. Thoennessen, *ibid.*
- Multifragment Disintegrations in Intermediate-Energy Heavy-Ion Collisions; C.K. Gelbke, International Symposium on Large-Scale Collective Motion of Atomic Nuclei, Brolo (Messina), Italy, October 15 - 19, 1996.
- Transverse Flow and Radial Flow; G.D. Westfall, International Research Workshop on Heavy Ion Physics at Low, Intermediate, and Relativistic Energies Using  $4\pi$  Detectors, Romania, October 1996.
- Many-Body Quantum Chaos through Properties of Individual Wave Functions; V. Zelevinsky, Research Conference on Nuclear Physics: Chaotic Phenomena in Nuclear Physics, Crete, Greece, October 1996.
- The NSCL Radioactive Beams Facility; T. Glasmacher, 14th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas, November 6-9, 1996.
- Coulomb Excitation of Neutron-Rich Nuclei; T. Glasmacher, *ibid.*
- Particle Fragmentation RIB Studies at MSU; P.F. Mantica, *ibid.*
- Moment Measurements of Exotic Nuclei; P.F. Mantica, *ibid.*
- #-Measurement of  $^{81}\text{Kr}$  in the Atmosphere; P. Collon, *ibid.*
- #-Nucleon-Induced Secondaries; J.L. Romero, *ibid.*
- Self-Organization; W. Bauer, Studienstiftung des Deutschen Volkes Fourth Annual USA Symposium, Dallas, Texas, November 23, 1996.
- Infinitely Small Numbers and Almost Infinitely Large Accelerators; M. Berz, *ibid.*
- Multifragmentation in Central Collisions Between Heavy Nuclei; W.G. Lynch, Workshop on Phase Transitions in Nuclear Collisions, Copenhagen, Denmark, November 27-30, 1996.

Self-Organized Criticality; W. Bauer, Workshop on Hadronic Phase Transitions, Copenhagen, Denmark, November 1996.

Reconstructing the Final Stage of Heavy Ion Collisions; S. Pratt, *ibid.*

Polarized Proton Beam Dynamics; V. Balandin, Particle Beam Stability and Nonlinear Dynamics Symposium, Santa Barbara, California, December 3-5, 1996.

From Taylor Series to Taylor Models and Remainder Differential Algebra with Interval Arithmetic; M. Berz, *ibid.*

Differential Algebraic Techniques and Applications (4 lectures); M. Berz, DESY/KFA Symposium on Mathematical Aspects of Accelerator Physics, Bad Honnef, Germany, December 9-13, 1996.

First Experiments to Study the GDR in Exotic Nuclei - Initial Results and Future Possibilities; M. Thoennessen, International Workshop on Nuclear Giant Resonances, European Centre for Nuclear Theory, Trento, Italy, December 9-20, 1996.

Study of the GDR in Hot Nuclei With Inelastic Scattering; M. Thoennessen, *ibid.*

Experiments with Radioactive Beams; P.G. Hansen, Lecture at the Dedication of the Holifield Radioactive Beam Facility, Oak Ridge, Tennessee, December 12, 1996.

## MSU THESIS TITLES

1. "Evolution of Fission-Like Reactions in Medium Energy Heavy Ion Collisions," Jaeyong Yee, January 3, 1996
2. "Subthreshold Pion Production from Characterized Events in Ne + Al Reactions," Stefan Hannuschke, January 30, 1996.
3. "Collective Flow in Intermediate Energy Heavy-Ion Collisions," Robert Pak, April 4, 1996
4. "Chaos in Semi-Classical and Quantum Models of Nuclei," David A. McGrew, July 9, 1996
5. "Transitional Phenomena in Intermediate-Energy Heavy-Ion Reactions," Nathan Thomas Boden Stone, July 23, 1996.
6. "Structure of the Proton Unbound Nucleus  $^{11}\text{N}$ ," Afshin Azhari, August 19, 1996.
7. "Ground State of  $^{10}\text{Li}$  and  $^{13}\text{Be}$ ," Shigeru Yokoyama, September 25, 1996.
8. "Design Construction, and Use of the Neutron Wall Array in Measuring the  $^8\text{Li}(n,\gamma)^9\text{Li}$  Astrophysics Reaction," Philip D. Zecher, November 7, 1996.
9. "Projectile Fragmentation of Krypton Isotopes at Intermediate Energies," Raman Pfaff, November 22, 1996.
10. "Multifragmentation of  $^{84}\text{Kr} + ^{197}\text{Au}$  at Beam Energies of  $E/A = 35, 55, 70, 100, 200,$  and  $400$  MeV," Cornelius F. Williams, December 16, 1996.

## THESES AT OTHER UNIVERSITIES BASED IN PART ON EXPERIMENTS AT THE NSCL

1. "Activity Measurements of Importance to Stellar Nucleosynthesis," Jörn Meissner, University of Notre Dame, 1996
2. "Multifragmentation in Intermediate Energy  $^{129}\text{Xe}$ -Induced Heavy-Ion Reactions," Kin Tso, University of California, Berkeley, Report LBNL-38884, 1996.

## NSCL PAN - PHYSICS OF ATOMIC NUCLEI PROGRAM, SUMMER 1996

E. Kashy, W. Lynch, R. Ronningen, S.L.Wolfe, B. Sherrill, T. Glasmacher, M. Thoennessen, and D.J.Morrissey.

Summer 1996 represented the third year of an NSCL outreach program for Pre-college teachers and students. The goal is to provide these teachers and students with the opportunity to interact with the research faculty, and to learn some basic nuclear physics. They also carry out simple nuclear experiments to illustrate some of the basic concepts and properties.

The first of the two week program is 'Teacher's week', during which teachers go through the program with any students present. During the second week, students take part in a rather similar program, with much of the instruction divided among the participating teachers. Each is in charge of a small group of students, and guides the student through the laboratory and problem solving components of the program. This format was designed to insure that the teachers would encounter most of the material twice: once with their fellow teachers and then again as they help run the program during the second week.

The first week's program included several hours of 'Experiments/Demonstrations of Physics Fundamentals' (E.Kashy) and these were repeated the second week for both teachers and students.

Several informal discussions with NSCL Faculty were held during the first week. They included

- *Element formation* with B. Sherrill
- *Waves in Nuclei* with T. Glasmacher
- *Unstable Nuclei* with M. Thoennessen
- *Nuclear Chemistry* with D.J. Morrissey
- *Radiation and the Environment* with R. Ronningen

Three hands-on laboratory experiments, taken for the the ISP 209L physics laboratory course were conducted by W. Lynch. These were

- Probability vs. Average
- Radioactive Background and Common Sources of Radiation
- Neutron Activation of  $^{109}\text{Ag}$  and Radioactive Decay of  $^{110}\text{Ag}$

In order to buttress the concepts presented and discussed, a set of problems specifically written for this program was used. The problems were developed as part of an MSU-REU program by S.L.Wolfe. The teacher solved problems and answered conceptual questions in a friendly, non-judgmental environment using MSU's networked software system CAPA, which provides a Computer-Assisted Personalized Approach for feedback on problems. Three problems sets (40 problems) reinforced their understanding with minimum amount of stress, as teacher were free to discuss questions and to help each-other when the computer responded incorrect. The following week, the teachers supervised and helped students with these problems, thus further confirming their own understanding.

Janet Bronson, a chemistry teacher at Jackson high-school, presented the result of a pilot project in which the CAPA software was used in a classroom size network setting (vs the internet) for her students. John Plough, a physics teacher at East Lansing HS also reported of his success in obtaining support for a

similar program for his physics students, with a commercial enterprise providing part of funds<sup>1</sup> Both of these teachers had participated in an earlier NSCL PAN program.

The summer '96 program included 8 teachers and 34 students (from 11 schools). With increased support from the Provost office, we can now allow this outreach program to grow, and expect to be able to accommodate 16 teachers in summer 1997. Some of the administrative tasks for the '96 program were carried out by T. Kheen and S. Snyder.

---

<sup>1</sup>Coca-Cola company



# ALL-UNIVERSITY OUTREACH SCIENCE CHALLENGE FOR HIGH SCHOOL STUDENTS

E. Kashy, D. J. Morrissey, Y. Tsai, and N.E. Davis

The primary goal of the Science Challenge is to collaborate with high school teachers in motivating and challenging students to improve, and then demonstrate, their understanding of science. The Challenge reaches students throughout the midwest via the Internet. It provides high school teachers and students an opportunity to become familiar with the Internet and to use the CAPA system developed at Michigan State University while increasing their understanding of science.

The 1996-97 Science Challenge included 8 teachers and 350 students from Michigan and Ohio. It provided both challenging problems and physical puzzles to the teachers and students in the fields of physics and chemistry. Two sets of CAPA problems were prepared, coded, and tested for the Challenge by the participating teachers and the MSU faculty and staff members. There was a shared common introductory set of problems focusing on basic mathematical skills. The second set was restricted to the particular science. Both quantitative and qualitative conceptual problems were included. The problems were developed and chosen during two teacher workshops at Michigan State University. During the workshops the physical puzzles were selected from an assortment already developed. Three physical experiments were chosen as puzzles by the participating high school teachers with the goal of having students perform (and repeat) the experiments, observe the phenomena and then propose explanations. The students were free to seek information from ANY source and consult anyone other than the participating teacher in order to formulate their answer. The puzzles chosen this year were:

1. Model of the Forces in Nuclear Fusion
2. Image Formation and Rotational Motion
3. Curie Point (temperature) of iron
4. Magnetic levitation of a rotating top.

The comments from teachers and students were very positive, and many of their suggestions will be included in subsequent programs. This coming fall, Biology will be added to the Challenge and we expect a considerable increase in the number of teachers and students participating.

## VISITORS IN 1996

- Fred Abegglen (Texas A&M)  
 Dileep Agnihotri (University of Rochester)  
 Hidetoshi Akimune (RCNP, Osaka University)  
 Kjell Aleklett (Uppsala University)  
 Glen Allbritton (Caltech)  
 Ken Amos (University of Melbourne)  
 Yoshiaki Ando (Rikkyo University)  
 Aaron Andrus (Univ. of Michigan at Dearborn)  
 Tim Antaya (Babcock and Wilcox, Lynchburg, VA)  
 Dan Archer (Lawrence Livermore National Lab)  
 Monia Assenard (Nantes, France)  
 Yakov Azimov (St. Petersburg)  
 Charles Barton (Clark University)  
 Steffen Bass (University of Frankfurt)  
 Nicholas Bateman (Yale University)  
 Oleg Batenkov (Khlopin Radium Institute, St. Petersburg)  
 Fred Becchetti (University of Michigan)  
 John Becker (Lawrence Livermore National Lab)  
 David Becker (Oakland University)  
 Michael Belbot (University of Notre Dame)  
 Cornelius Bennhold (George Washington Univ)  
 Monique Bernas (Orsay)  
 Lee Bernstein (Lawrence Livermore National Lab)  
 Mark Bird (National High Magnetic Field Lab)  
 Thomas Blue (Ohio State University)  
 Jim Blue (retired from NASA)  
 Alexander Botvina (Hahn Meitner Institute, Berlin)  
 Todd Bredeweg (Indiana Univ Cyclotron Facility)  
 Daeg Brenner (Clark University)  
 Nicolae Carjan (CENBG, Bordeaux)  
 Nelson Carlin (University of São Paulo, Brazil)  
 Antonio Caruso (Catania, Italy)  
 Rick Casten (Yale University)  
 Jacob Chacko (Nuclear Science Centre, Delhi)  
 Bob Charity (Washington University)  
 Mao Bai Chen (Institute of Nuclear Research in Shanghai, China)  
 Dave Christen (Oak Ridge National Laboratory)  
 Marcus Chromik (Ludwig Maximillimus Univ, Munich)  
 Philippe Collon (University of Vienna)  
 Nicola Colonna (INFN, Bari)  
 Earl Cornell (Indiana University Cyclotron Facility)  
 Paul Cottle (Florida State University)  
 Izuru Daito (RCNP, Osaka University)  
 Steve Danczyk (Texas A&M University)  
 B.V. Danilin (Kurchatov Institute in Moscow)  
 Debashis Dasgupta (Argonne National Laboratory)  
 Brian Davin (Indiana University Cyclotron Facility)  
 Andrew Davis (Caltech)  
 Romualdo de Souza (Indiana University Cyclotron Facility)  
 Ferenc Deák (Eötvös Lorand University, Hungary)  
 James Dempsey (Washington University)  
 Romeo DiBiasi (Catania, Italy)  
 Ben Djerroud (University of Rochester)  
 Vladimir Dmitriev (Budker Institute of Nuclear Physics, Novosibirsk)  
 Chris Dobelbowe (Ohio State University)  
 Tony Dolezal (University of Toronto)  
 Brian Dougherty (Jet Propulsion Lab)  
 Victor Efros (Kurchatov Institute in Moscow)  
 Henning Esbensen (Argonne National Laboratory)  
 John Fendrich (Argonne National Laboratory)  
 Victor Flambaum (New South Wales University)  
 Chuck Foster (Indiana Univ Cyclotron Facility)  
 Brian Foy (Clark University)  
 Sebastian Fritz (GSI)  
 Mamoru Fujiwara (RCNP, Osaka University)  
 Ning Gan (Oak Ridge National Laboratory)  
 Hans Geissel (GSI)  
 Ron Gill (Brookhaven National Laboratory)  
 Nunzio Giudice (INFN, Catania)  
 Nina Golubeva (Institute for Nuclear Research of the Russian Academy of Sciences, Moscow)  
 Claudius Gross (GSI)  
 Kanthode Gundu Rao (Univ of Mich at Dearborn)  
 Xiaofeng Guo (Iowa State University)  
 Piyush Gupta (Nuclear Science Centre, Delhi)  
 Stefan Hannuschke (Lufthansa)  
 Karl Hanold (Univ of California at San Diego)  
 David Hardtke (Ohio State University)  
 Maggie Hellström (GSI)  
 David Hertzog (University of Illinois)  
 Stefan Hirzebruch (IPN, Orsay)  
 David Hofman (National Laboratory)  
 Helmut Hofmann (Technical University, Munich)  
 Ákos Horváth (Eötvös Lorand Univ, Hungary)  
 Wen Chien Hsi (Indiana University)  
 Patrick Hui (University of Pennsylvania)  
 Kazuo Ieki (Rikkyo University, Japan)  
 Josetta Immé (INFN, Catania)  
 Duane Ingram (Rock Valley College, Illinois)  
 K. Ishibashi (RCNP, Osaka University)  
 Yoshiyuki Iwata (Rikkyo University)  
 Jamal Jalilian-Marian (University of Minnesota)  
 Quin Janecke (University of Michigan)  
 Keith Jewell (Florida State University)  
 Björn Jonson (Chalmers University of Technology)  
 Joe Kapusta (University of Minnesota)  
 Jirohta Kasagi (Tohoku University)  
 Declan Keane (Kent State University)

Kirby Kemper (Florida State University)  
 Rich Kerchner (Oak Ridge National Laboratory)  
 I. Khriplovich (Budker Institute)  
 George Kim (Texas A&M)  
 Ádám Kiss (Eötvös Lorand University, Hungary)  
 Che Ming Ko (Texas A&M)  
 Volker Koch (Lawrence Berkeley National Lab)  
 Paul Koehler (Oak Ridge National Laboratory)  
 James Kolata (University of Notre Dame)  
 Robert Kryger (Florida)  
 Walter Kutschera (University of Vienna)  
 Kris Kwiatkowski (Indiana University)  
 Wai-Kwong Kwok (Argonne National Laboratory)  
 Mu Lee (University of Michigan)  
 T.S. Lee (Argonne National Laboratory)  
 Richard Leske (Caltech)  
 Felix Liang (University of Washington)  
 J.O. Liljenzin (Uppsala University)  
 Ziwei Lin (Columbia)  
 Michael Lisa (Ohio State University)  
 Jay Liu (University of Houston)  
 Walter Loveland (Oregon State University)  
 Valentina Maddalena (INFN, Catania)  
 Michael Maier (Lawrence Berkeley National Lab)  
 Achakala Malyadri (Nuclear Science Centre, New Delhi)  
 Francois Marechal (IPN, Orsay)  
 Indranil Mazumdar (Nuclear Science Centre, New Delhi)  
 Ryan Mcleod (University of Michigan at Dearborn)  
 Dave Mercer (University of Colorado)  
 John Millener (Brookhaven National Laboratory)  
 Samantha Moore (Oberlin College)  
 Alex Mueller (ISPN Orsay)  
 Horst Mueller (IUCF)  
 Aruna Nadasen (Univ of Michigan at Dearborn)  
 Witek Nazarewicz (University of Tennessee)  
 Ron Nelson (Los Alamos National Laboratory)  
 J. Neumann (Kent State University)  
 Linda Nieman (Univ of Michigan at Dearborn)  
 Chiara Nociforo (INFN, Catania)  
 Ed Norbeck (University of Iowa)  
 Wolfgang Nörenberg (GSI)  
 Hiroshi Noto (Hokusei Gakuen University, Sapporo, Japan)  
 Tom O'Donnel (University of Michigan)  
 Victor Obot (Texas Southern University)  
 Tariq Odeh (GSI)  
 Vijay Pandharipande (University of Illinois)  
 A. Papash (INFN Catania)  
 Richard Pardo (Argonne National Laboratory)  
 Drew Parks (University of Houston)  
 S.D. Paul (Tata Institute of Fundamental Research, Bombay)  
 Donald Peterson (University of Notre Dame)  
 Josef Pochodzalla (GSI)  
 Pavel Pogodin (University of Iowa)  
 Rubehn Portuges (Indiana Univ Cyclotron Facility)  
 Giovanni Raciti (INFN Catania)  
 Yuri Razskazouskiy (Oakland University)  
 Martin Reiser (University of Maryland)  
 Giorgio Riccobene (INFN Catania)  
 Jean Richert (Strasbourg)  
 Achim Richter (University of Darmstad)  
 Werner Richter (University of Stellenbosch)  
 Lee Riedinger (University of Tennessee)  
 Danilo Rifuggiato (Catania)  
 Lew Riley (Florida State University)  
 Don Roberts (University of Michigan)  
 Paolo Romano (INFN, Catania)  
 Phil Roos (University of Maryland)  
 Andrea Saija (INFN, Catania)  
 A.A. Sakharuk (Brest State University, Belarus)  
 Chhanda Samanta (Saha Institute, Calcutta)  
 Maria Sanchez-Vega (Uppsala University)  
 Peter Santi (University of Notre Dame)  
 Demetrios Sarantites (Washington University)  
 Hugo Schelin (Federal Center for Technical Education, Curitiba)  
 Udo Schroeder (University of Rochester)  
 Peter Schuck (ISN Grenoble)  
 Dirk Schwalm (Max-Planck Institute in Heidelberg)  
 Peter Schwandt (Indiana Univ Cyclotron Facility)  
 Carsten Schwarz (GSI)  
 Bruce Sears (Caltech)  
 Zoltán Seres (Central Research Institute, Hungary)  
 Michael Sevilla (Oakland University)  
 Concettina Sfienti (INFN Catania)  
 Dan Sisan (University of Michigan at Dearborn)  
 Wojtek Skulski (University of Rochester)  
 Lee Sobotka (Washington University)  
 Valentin Sokolov (Budker Institute of Nuclear Physics in Novosibirsk, Russia)  
 George Souliotis (Oregon State University)  
 Irena Stone (Oxford University, U.K.)  
 Nick Stone (Oxford University, U.K.)  
 Kruno Subotic (Institute for Nuclear Science, Belgrade)  
 Tiina Suomijarvi (IPN, Orsay)  
 Eric Suraud (University of Toulouse)  
 Oleg Sushkov (University of New South Wales)  
 Noriyaki Takahashi (Osaka)  
 Noboru Takigawa (Tohoku University)  
 Isao Tanihata (RIKEN)  
 Peter Thierolf (University of Munich)  
 Heiko Timmers (ANU in Canberra)  
 Jan Töke (University of Rochester)  
 Hiroshi Toki (Osaka University)  
 Bill Topping (Ferris State)  
 Wolfgang Trautmann (GSI)

Robert Varner (Oak Ridge National Laboratory)  
Vic Viola (Indiana University)  
Johannes von Schwarzenberg (University of Notre  
Dame)  
Rick Vondrasek (Argonne National Laboratory)  
Gang Wang (Indiana University)  
David Ward (Chalk River)  
Bob Warner (Oberlin College)  
Henry Weller (Duke University)  
Shen Wenquin (Texas A&M University)  
Mark Wiedenbeck (Jet Propulsion Lab)  
Howard Wieman (Lawrence Berkeley National Lab)  
Jeff Winger (Mississippi State University)  
Phil Woods (University of Edinburgh)  
Jeff Woollard (Ohio State University)  
Gordon Wozniak (Lawrence Berkeley Nat'l Lab)  
Alan Wuosmaa (Argonne National Laboratory)  
Hong Ming Xu (Texas A&M University)  
Ricardo Yanez (Uppsala University)  
Lin-Bo Yang (University of Iowa)  
Sherry Yennello (Texas A&M University)  
Emilio Zappala (Catania, Italy)  
Ed Zganjar (Louisiana State University)  
Mikhail Zhukov (Chalmers Univ of Technology)  
Jim Zimmerman (University of Michigan)  
Lissa Zyromski (Oregon State University)