



**Florida State University**  
**ARF News Special Feature**  
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*44th President of ARF (2022-23)*  
**Kirby Kemper**

# Kirby Kemper

EMERITUS PROFESSOR

**Summary of Research Interests:**  
Nuclear Experiment



I came to FSU in 1968 as a postdoctoral fellow in experimental nuclear physics because at that time FSU was the hottest accelerator lab in the US. FSU had recently installed a new accelerator and the young faculty hired as part of that effort had made several significant nuclear physics discoveries.

In 1968, postdocs funded on grants were allowed to teach and I wanted to see if I would enjoy teaching. I had worked at a National Laboratory and knew I enjoyed research. I also knew that if I accepted a permanent position at a university, I would be required to teach. So I volunteered to teach an undergraduate class. I was assigned to teach a section of a one semester basic physics course and with mentoring by the course originator, Steve Edwards, found I very much enjoyed teaching.

All too soon it became time to look for a permanent job. As luck would have it, the chair of the Physics Department was retiring and another of the senior faculty was going on sabbatical, thereby freeing up funds for a new position in the department. Senior colleagues met with the Dean, who was Bob Lawton, and proposed that the available funds be used to hire me. Unbeknownst to me, Dean Lawton's daughter had been in my physics class and must have discussed the class with her father because Dean Lawton said he had heard of me. He also approved my hiring. So I joined the faculty in the Fall of 1971, rising to full professor in 1979, and have been at FSU ever since.

Some Selected Publications:

$^{54}\text{Fe}(d, p)^{55}\text{Fe}$  and the evolution of single neutron energies in the  $N = 29$  isotones L. A. Riley, C. S. Hay, L. T. Baby, A. L. Conley, P. D. Cottle, J. Esparza, K. Hanselman, B. Kelly, K. W. Kemper, K. T. Macon, G. W. McCann, M. W. Quirin, R. Renom, R. L. Saunders, M. Spieker, and I.

Wiedenhöver Phys. Rev. C 106, 064308 (2022)

Compatibility of the asymptotic normalization coefficient for the  $^{14}\text{C}^{13}\text{B} + p$  overlap extracted from the  $^{14}\text{C}(^{11}\text{B}, ^{12}\text{C})^{13}\text{B}$  reaction with  $^{14}\text{C}(d, ^3\text{He})^{13}\text{B}$

data N. Keeley, K. W. Kemper, and K. Rusek, Phys. Rev. C 106, 014623 (2022)

Observation of a Near-Threshold Proton Resonance in  $^{11}\text{B}$  E. Lopez-Saavedra, S. Almaraz-Calderon, B. W. Asher, L. T. Baby, N. Gerken, K. Hanselman, K. W. Kemper, A. N. Kuchera, A. B. Morelock, J. F. Perello, E. S. Temanson, A. Volya, and I. Wiedenhöver,

Phys. Rev. Lett. 129, 012502 (2022)

Impact of nucleon transfer channels on complete fusion of  $^6,^7\text{Li} + ^{58}\text{Ni}$  near the Coulomb barrier

Vandana Tripathi, K. W. Kemper, L. T. Baby, P. C. Bender, S. L. Tabor, and N. Keeley Phys. Phys Rev.C 104, 054605 (2021)

Influence of halo single-neutron transfer on near barrier  $^{15}\text{C} + ^{12}\text{C}$  total fusion N. Keeley, K. W. Kemper, K. Rusek Eur. Phys. J. A 57, 168 (2021)

## Selected Publications:

### [Precise measurement of near-barrier \$^8\text{He}+^{208}\text{Pb}\$ elastic scattering: Comparison with \$^6\text{He}\$](#)

G. Marquinez- Duran, I. Martel, A. M. Sanchez-Benitez, L. Acosta, R. Berjillos, J. Duenas, K. Rusek, N. Keeley, M. A. G. Alvarez, M. J. G. Borge, A. Chbihi, C. Cruz, M. Cubero, J. P. Fernandez-Garcia, B. Fernandez-Martinez, J. L. Flores, J. Gomez-Camacho, K. W. Kemper, J. A. Labrador, M. Marques, A. M. Moro, M. Mazzocco, A. Pakou, V. V. Parkar, N. Patronis, V. Pesudo, D. Pierroutsakou, R. Raabe, R. Silvestri, N. Soic, L. Standylo, I. Strojek, O. Tengblad, R. Wolski, and Z. Abou-Haidar Phys. Rev. C 94, 064618 (2016)

### [Strong multistep interference effects in \$^{12}\text{C}\(d,p\)\$ to the \$9/2^+\_{1}\$ state in \$^{13}\text{C}\$](#)

N. Keeley, K. W. Kemper and K. Rusek  
Phys. Rev.C 92, 054618 (2015)

### [New measurement of the \$\alpha\$ asymptotic normalization coefficient of the \$1/2^+\$ state in \$^{17}\text{O}\$ at 6.356 MeV that dominates the \$^{13}\text{C}\(\alpha,n\)^{16}\text{O}\$ reaction rate at temperatures relevant for the s process.](#)

M. L. Avila, G. V. Rogachev, E. Koshchiy, L. T. Baby, J. Belarge, K. W. Kemper, A. N. Kuchera, and D. Santiago-Gonzalez  
Phys. Rev. C 91, 048801 (2015)

### [Single particle strengths and mirror states in \$^{15}\text{N}\$ - \$^{15}\text{O}\$ below 12 MeV](#)

C. E. Mertin, D. D. Caussyn, A. M. Crisp, N. Keeley, K. W. Kemper, O. Momotyuk, and A. Volya  
Phys. Rev. C 91, 044317 (2015)

### [\$\alpha\$ -cluster asymptotic normalization coefficients for nuclear astrophysics](#)

M. L. Avila, G. V. Rogachev, E. Koshchiy, L. T. Baby, J. Belarge, K. W. Kemper, A. N. Kuchera, and D. Santiago-Gonzalez  
Phys. Rev. C 90, 042801(R) (2014)

### [Dynamic polarization potentials and dipole polarizabilities of \$^{11}\text{Li}\$ , \$^6\text{He}\$ and \$^6\text{Li}\$ compared](#)

N. Keeley, K. W. Kemper and K. Rusek  
Phys. Rev. C 88 (2013) 017602

[<sup>25</sup>Si and <sup>29</sup>S studied via single neutron knockout reactions](#)

R. R. Reynolds, P. D. Cottle, A. Gade, D. Bazin, C. M. Campbell, J. M. Cook, T. Glasmacher, P. G. Hansen, T. Hoagland, K. W. Kemper, W. F. Mueller, B. T. Roeder, J. R. Terry, and J. A. Tostevin  
Phys. Rev. C 81, 067303 (2010).

[Isotopic effects in elastic and inelastic <sup>12</sup>C+<sup>16,18</sup>O scattering](#)

A.T. Rudchik, Yu. O. Shyrma, K.W. Kemper, K. Rusek, E.I. Koshchy, S. Kliczewski, B. G. Novatsky, O.A. Ponkratenko, E. Piasecki, G. P. Romanyshyna, Yu.M.Stepanenko, I. Strojek, S. B. Sakuta, A. Budzanowski, L. Głowacka, I. Skwirczyńska, R. Siudak, J. Choiński, and A. Szczurek  
Eur. Phys. J.A 44, 221 (2010).

[Multi-elemental characterization of organic liquid samples by use of a 13 MeV <sup>6</sup>Li<sup>3+</sup> beam](#)

J.A. Liendo, M.A. Bernal, A.C. González, D.D. Caussyn, N.R. Fletcher, O.A.Momotyuk, R.M. Muruganathan, B.T. Roeder, I. Wiedenhöver, T. Fischer, K.W. Kemper, P. Barber and L. Sajo-Bohus  
Nucl. Instrum. Meth. B267, 3424 (2009).

[<sup>8</sup>Li optical potential from <sup>7</sup>Li\(<sup>18</sup>O,<sup>17</sup>O\)<sup>8</sup>Li reaction analysis](#)

A.T. Rudchik, Yu.M.Stepanenko, K.W. Kemper, A. A. Rudchik, O.A. Ponkratenko, E.I. Koshchy, S. Kliczewski, K. Rusek, A. Budzanowski, S.Yu. Mezhevych, Val. M. Pirnak, I. Skwirczyńska, R. Siudak, B. Czech, A. Szczurek, V. V. Uleshchenko, J. Choiński, and L. Głowacka  
Nucl. Phys. A831, 139 (2009).

[<sup>14</sup>C\( \$\alpha,\gamma\$ \) reaction rate](#)

E. D. Johnson, G. V. Rogachev, J. Mitchell, L. Miller, and K. W. Kemper  
Phys. Rev. C 80, 045805 (2009).

[Elastic Scattering and reactions of light exotic beams](#)

N. Keeley, N. Alamanos, K. W. Kemper and K. Rusek  
Prog. in Part. and Nucl. Physics 63, 396 (2009).

[Extreme  \$\alpha\$ -clustering in the <sup>18</sup>O nucleus](#)

E.D.Johnson, G.V.Rogachev, V.Z.Goldberg, S.Brown, D.Robson, A.M.Crisp, P.D.Cottle, C.Fu, J.Giles, B.W.Green, K.W.Kemper, K.Lee, B.T.Roeder, and R.E.Tribble  
Eur.Phys.J. A 42, 135 (2009).

[Rotational and neutron-hole states in <sup>43</sup>S via the neutron knockout and fragmentation reactions](#)

L.A. Riley, P. Adrich, T.R. Baugher, D. Bazin, B.A. Brown, J.M. Cook, P.D. Cottle, C.Aa. Diget, A. Gade, D.A. Garland, T. Glasmacher, K.E. Hosier, K.W. Kemper, A. Ratkiewicz, K.P. Siwek, J.A. Tostevin, and D. Weisshaar  
Phys. Rev. C 80, 037305 (2009).

[Comparison of  \$^7\text{Li}\$ ,  \$^7\text{Be}+^9\text{Be}\$  elastic scattering in the coupled-reaction-channels approach](#)

.T. Rudchik, K.W. Kemper, V. O. Romanyshyn, O.A. Ponkratenko, V. M. Kyryanchuk and V. V. Uleshchenko  
Eur. Phys. J. A41, 31 (2009).

[Selectivity of the one-neutron knockout reaction on  \$^{45}\text{Cl}\$  and the collapse of the  \$N=28\$  shell closure](#)

L.A. Riley, P. Adrich, T.R. Baugher, D. Bazin, B.A. Brown, J.M. Cook, P.D. Cottle, C.Aa. Diget, A. Gade, D.A. Garland, T. Glasmacher, B.A. Hartl, K.E. Hosier, K.W. Kemper, A. Ratkiewicz, K.P. Siwek, D.C. Stoken, J.A. Tostevin, and D. Weisshaar  
Phys.Rev. C 79, 051303 (2009).

[\$^8\text{Be}\$  scattering potentials from reaction analyses](#)

V. O. Romanyshyn, A.T. Rudchik, K.W. Kemper, S. Kliczewski, E.I. Koshchy, O.A. Ponkratenko, K. Rusek, A. Budzanowski, J. Choiński, B. Czech, L. Głowacka, S.Yu. Mezhevych, Val. M. Pirnak, V.A. Plujko, A. A. Rudchik, I. Skwirczyńska, R. Siudak and A. Szczurek  
Phys. Rev. C79, 054609 (2009).

[Single-neutron energies near  \$N=28\$  and the absence of the  \$N=34\$  shell closure in the  \$\text{Ti}\$  isotopes](#)

P.D. Cottle and K.W. Kemper  
Phys. Rev. C 78, 037304 (2008).

[\$d\_{5/2}\$  proton hole strength in neutron-rich  \$^{43}\text{P}\$ : Shell structure and nuclear shapes near  \$N=28\$](#)

L.A. Riley, P. Adrich, T.R. Baugher, D. Bazin, B.A. Brown, J.M. Cook, P.D. Cottle, C.Aa. Diget, A. Gade, D.A. Garland, T. Glasmacher, K.E. Hosier, K.W. Kemper, T. Otsuka, W.D.M. Rae, A. Ratkiewicz, K.P. Siwek, J.A. Tostevin, Y. Utsuno, and D. Weisshaar  
Phys. Rev. C 78, 011303 (2008).

[Structure of the  \$N=27\$  isotones derived from the  \$^{44}\text{Ar}\(d,p\)^{45}\text{Ar}\$  reaction](#)

L. Gaudefroy, O. Sorlin, F. Nowacki, D. Beaumel, Y. Blumenfeld, Z. Dombrádi, S. Fortier, S. Franchoo, S. Grévy, F. Hammache, K. W. Kemper, K.-L. Kratz, M. G. St. Laurent, S. M. Lukyanov, L. Nalpas, A. N. Ostrowski, Yu.-E. Penionzhkevich, E. C. Pollacco, P. Roussel, P. Roussel-Chomaz, D. Sohler, M. Stanoiu, and E. Tryggestad  
Phys. Rev. C78, 034307 (2008).

[\$^6\text{Li}\$  and  \$^6\text{He}\$  elastic scattering from  \$^{12}\text{C}\$  and the effect of direct reaction couplings](#)

N. Keeley, K. W. Kemper, O. Momotyuk and K. Rusek  
Phys. Rev C77, 057601 (2008).

[Survey of  \$^{17}\text{O}\$  excited states selectively populated by five-particle transfer reactions](#)

A. M. Crisp, B. T. Roeder, O. A. Momotyuk, N. Keeley, K. W. Kemper, F. Maréchal,

K. Rusek, W. Weintraub, and M. Wiedeking  
Phys. Rev. C77, 044315 (2008).

*Formvar characterization by use of forward elastic scattering*

J. A. Liendo, A. C. González, D. D. Caussyn, N. R. Fletcher, O. A. Momotyuk, R. M. Muruganathan, B. T. Roeder, I. Wiedenhoever, T. Fischer, K. W. Kemper, P. Barber, L. Sajo-Bohus  
Nuclear Instruments and Methods in Physics Research B 266, 323 (2008).

*Nanocharacterization of Proton Radiation Damage on Magnetically Oriented Epoxy*

M.S. Al-Haik, S. Trinkle, O. Momotyuk, B. T. Roeder, K. Kemper, M. Y. Hussaini, and K. J. Malloy  
International Journal of Polymer Anal. Charact. 12, 413 (2007).

*Isotopic effects in the  ${}^7\text{Li}+{}^{10,11}\text{B}$  elastic and inelastic scattering*

A.T. Rudchik, V. O. Romanyshyn, E.I. Koshchy, A. Budzanowski, K.W. Kemper, K. Rusek, V.D. Chesnokova, J. Choiński, B. Czech, L. Głowacka, S. Kliczewski, V.M. Kyryanchuk, S.Yu. Mezhevych, A.V. Mokhnach, O.A. Momotyuk, O.A. Ponkratenko, R. Siudak, I. Skwirczyńska, and A. Szczurek  
Eur. Phys. J. A33, 317 (2007).

*Spectroscopy of  ${}^{36}\text{Mg}$ : Interplay of Normal and Intruder Configurations at the Neutron-Rich Boundary of the "Island of Inversion"*

A. Gade, P. Adrich, D. Bazin, M. D. Bowen, B. A. Brown, C. M. Campbell, J. M. Cook, S. Ettenauer, T. Glasmacher, K. W. Kemper, S. McDaniel, A. Obertelli, T. Otsuka, A. Ratkiewicz, K. Siwek, J. R. Terry, J. A. Tostevin, Y. Utsuno, and D. Weisshaar  
Phys. Rev. Lett. 99, 072502 (2007).