

User and Staff FEL/Light Sources Publications

2008 Publications and Conferences

1. Gwyn P. Williams, "Electrons and lasers sing THz tune", *Nature Physics* **4** 356 (2008).
2. A. Afanasev, O.K. Baker, K.B. Beard, G. Biallas, J. Boyce, M. Minarni, R. Ramdon, M. Shinn, P. Slocum, "Experimental limit on Optical Photon Coupling to Light Neutral, Scalar Bosons", *Phys. Rev. Lett.* **101** 120401 (2008).
3. Carlos Hernandez-Garcia, Marcy Sutzman, "Electron Sources for Accelerators", *Physics Today*, **61** 44 (2008).
4. George R. Neil and the JLab FEL Team, "A Green Field Fourth Generation Light Source. Invited Talk APS Meeting March 2008.
5. Michael J. Kelley, George R. Neil, "Free Electron Lasers", Chapter 6.1; *Landolt-Bornstein New Series VIII/1B2*, 189-201 (2008).
6. Joan E. Thomas, Michael J. Kelley, "Interaction of mineral surfaces with simple organic molecules by diffuse reflectance IR spectroscopy (DRIFT)" *J. Coll. Int. Sci.*, **322** 516 (2008).
7. Hui Tian, Sean G. Corcoran, Charles E. Reece, Michael J. Kelley, "The Mechanism of electropolishing of niobium in hydrofluoric sulfuric acid electrolyte", *J. Electrochemical Soc.*, **155** D563 (2008).
8. Michelle Shinn, Stephen Benson, David Douglas, Pavel Evtushenko, Christopher Gould, Joseph Gubeli, David Hardy, Kevin Jordan, George Neil, Daniel Sexton, and Shukui Zhang, "Operation of the Jefferson Lab Free Electron Laser at high irradiances", 2007 Boulder Damage Symposium - to be published in *Proc. SPIE Vol.* **6720**.
9. C. Liu and S. Zhang, "Study of the singular radius and surface boundary constraints in refractive beam shaper design", *Optics Express* **16** 6675 (2008).
10. S. L. Hulbert and G.P. Williams, "Synchrotron radiation sources", submitted to the *Handbook of Optics*.
11. Powers, T, Tennant, C., "Implications of Incomplete Energy Recovery In SRF ERL Linacs", 2007 Workshop on Energy Recovery Linacs, to be published.
12. R. Kazimi, A. P. Freyberger, C. Hovater, G. A. Krafft, F. Marhauser, T. E. Plawski, C. E. Reece, J. Sekutowicz, C. Tennant, M. G. Tiefenback, H. Wang, "Observation and Mitigation of Multipass BBU in CEBAF", *Proceedings of the European Particle Accelerator Conference, EPAC-08*, page 2722.
13. F. Marhauser, W. Clemens, G. Cheng, G. Ciovati, E.F. Daly, D. Forehand, J. Henry, P. Kneisel, S. Manning, R. Manus, R.A. Rimmer, C. Tennant, H.

Wang, "Status and Test Results of High Current 5-cell SRF Cavities Developed at JLAB", Proceedings of the European Particle Accelerator Conference, EPAC-08, page 886.

14. C. Park, K. E. Wise, J. H. Kang, J.-W. Kim, G. Sauti, S. E. Lowther, P. T. Lillehei, M. W. Smith, E. J. Siochi, and J. S. Harrison, and K. Jordan, "Multifunctional nanotube polymer nanocomposites for aerospace applications: adhesion between SWCNT and polymer matrix", Adhesion Society Meeting, Austin TX, Feb (2008).
15. M.A. Holloway, R.B. Fiorito, A.G. Shkvarunets, P.G. O'Shea, S.V. Benson, D. Douglas, P. Evtushenko, K. Jordan, "Multicomponent measurements of the Jefferson Lab energy recovery linac electron beam using optical transition and diffraction radiation", Phys. Rev. ST Accel. Beams **11** 082801 (2008).

2007 Publications

1. S. Benson, G. Biallas, J. Boyce, D. Bullard, J. Coleman, D. Douglas, F. Dylla, R. Evans, P. Evtushenko, A. Grippo, C. Gould, J. Gubeli, D. Hardy, C. Hernandez-Garcia, K. Jordan, J. M. Klopff, W. Moore, G. Neil, T. Powers, J. Preble, D. Sexton, M. Shinn, C. Tennant, R. Walker, S. Zhang and G.P. Williams, "The 4th Generation Light Source at Jefferson Lab", Nucl. Instrum. Methods **A582**, 14-17 (2007).
2. P. Schaaf, R. Serna, J. Lunney and E. Fogarassy, "Laser Synthesis and Processing of Advanced Materials", Applied Surface Science **254** 789 (2007).
3. D. Höche, M. Shinn, G. Rapin and P. Schaaf, "FEM Simulations of the laser plasma interaction during FEL laser nitriding of titanium", Applied Surface Science **254** 888 (2007).
4. D. Höche, G. Rapin, J. Kaspar, M. Shinn and P. Schaaf, "Free Electron laser nitriding of metals: from basic physics to industrial applications", Applied Surface Science **253** 8041 (2007).
5. D. Höche, M. Shinn, J. Kaspar, G. Rapin, and P. Schaaf, "Laser pulse structure dependent texture of FEL synthesized TiNx coatings", J. Phys. D: Applied Physics **40** 818 (2007).
6. H.P. Freund, M. Shinn and S.V. Benson, "Simulation of a high average power free-electron laser oscillator", Physical Review Special Topics – Accelerators and Beams, **10** 030702 (2007).
7. J. P. Ozelis, R. Carcagno, C. M. Ginsburg, Y. Huang, R. Nehring, B. Norris, V. Poloubotko, R. Rabehl, I. Rakhno, C. Reid, T. Peterson, D. A. Sergatskov, C. Sylvester, M. Wong, C. Worel, A. Yuan, "Initial results from Fermilab's vertical test stand for SRF cavities", Proceedings of the 13th. International Workshop on RF Superconductivity, Peking University, China (2007).
<http://www.pku.edu.cn/academic/srf2007/download/proceedings/WEP15.pdf>

8. George R. Neil, Steve Benson, Dave Douglas, and Tom Powers, "High Average Power ERL FELs", Proceedings of the 13th. International Workshop on RF Superconductivity, Peking University, China (2007).
<http://www.pku.edu.cn/academic/srf2007/download/proceedings/FR102.pdf>
9. C. K. Sinclair, P. A. Adderley, B. M. Dunham, J. C. Hansknecht, P. Hartmann, M. Poelker, J. S. Price, P. M. Rutt, W. J. Schneider, M. Steigerwald, "Development of a high average current polarized electron source with long cathode operational lifetime", Phys. Rev. ST Accel. Beams **10**, 023501 (2007).
10. S. Zhang, "A Simple Bi-convex Refractive Laser Beam Shaper", Journal of Optics A: Pure and Applied Optics, **9** (2007) 945-950
11. George H. Biallas, Nathan Belcher, David Douglas, Tommy Hiatt, Kevin Jordan, "Combined Panofsky Quadrupole & Corrector Dipole", Proceedings of PAC 07, Albuquerque, New Mexico, p. 602.
12. Jianxun Yan, Daniel Sexton, Albert Grippo, Steven Moore, Kevin Jordan, "Ethernet Based Embedded IOC for FEL Control Systems", Proceedings of ICALEPCS 2007, Knoxville, Tennessee, p. 720.
13. Stephen Benson, Kevin Beard, George Biallas, James Boyce, Donald Bullard, James Coleman, David Douglas, H. Dylla, Richard Evans, Pavel Evtushenko, Carlos Hernandez-Garcia, Albert Grippo, Joseph Gubeli, David Hardy, Kevin Jordan, Rui Li, Steven Moore, George Neil, Thomas Powers, Daniel Sexton, Michelle Shinn, Christopher Tennant, Richard Walker, Shukui Zhang, "High Power Operation of the JLab IR FEL Driver Accelerator", Proceedings of PAC 07, Albuquerque, New Mexico, p. 79.
14. Kevin Jordan, Stephen Benson, David Douglas, Carlos Hernandez-Garcia, George Neil, "JLAMP: An Amplifier Based FEL in the JLab SRF ERL Driver", Proceedings of PAC 07, Albuquerque, New Mexico, p. 1329.
15. M.A. Holloway, R.B. Fiorito, P.G. O'Shea, A.G. Shkvarunets, S.V. Benson, W. Brock, J.L. Coleman, D. Douglas, R. Evans, P. Evtushenko, K. Jordan, D. Sexton, "RMS Emittance measurements using optical transition radiation interferometry at the Jefferson", Proceedings of PAC 07, Albuquerque, New Mexico, p. 2645.
16. M.A. Holloway, "Emittance measurements of the Jefferson Lab Free Electron Laser using optical transition radiation", Masters Thesis, Advisor P. O'Shea, U. Maryland 2007.
17. George R. Neil, "Applications for Energy Recovering Free Electron Lasers", Proceedings of PAC 07, Albuquerque, New Mexico, p. 132.
18. Kevin Jordan, D. Douglas, S.V. benson, P. Evtushenko, "FEL-accelerator related diagnostics", Proceedings of the 8th International Topical Meeting on Nuclear Applications and Utilization of Accelerators (AccApp'07), Pocatello, Idaho. ANS Order #: 700330 ISBN: 0-89448-054-5.

19. Guimei Wang, Yu-Chiu Chao, Pavel Evtushenko, George R. Neil, "Study of Generic Front-end Designs for ERL Based Light Sources", Proceedings of PAC 07, Albuquerque, New Mexico, p. 3345.
20. P. Evtushenko, S. Benson, D. Douglas, G.R. Neil, "National High Magnetic Field Laboratory FEL Injector Design Consideration, Proceedings of PAC 07, Albuquerque, New Mexico, p. 1323.
21. Chris Tennant, "An Analytical Investigation of the BBU Threshold Current for Off-axis Injection and Reinjection in an ERL", Jefferson Lab Technical Note TN-07-011.
22. J.M. Klopff, A. Greer, J. Gubeli, G.R. Neil, M. Shinn, T. Siggins, D. Waldman, G.P. Williams, A. Todd and V. Christina, "The Jefferson Lab high power THz user facility", Nucl. Instrum. Methods **A582**, 114-116 (2007).
23. T. H. Wong, M. C. Gupta, and C. Hernandez-Garcia, "Nanosecond laser pulse-induced electron emission from multiwall carbon nanotubes film", Nanotechnology, **18** 135705 (2007).
24. D. Douglas, K. Beard, J. Eldred, P. Evtushenko, A. Jenkins, W. Moore, L. Osborne, D. Sexton, C. Tennant, "Simplified Charged Particle Beam Transport Modeling using Commonly Available Commercial Software" Proceedings of PAC 07, Albuquerque, New Mexico, p. 3651.
25. Gary Guangfeng Cheng, Edward Daly, Robert Rimmer, Mircea Stirbet, Lynn Vogel, Haipeng Wang, Katherine Wilson, "RF-Thermal-Structural Analysis of a Waveguide Higher Order Mode Absorber", Proceedings of PAC 07, Albuquerque, New Mexico, p. 605.
26. George Neil, "Frontier Accelerator Technologies", Proceedings of the 8th International Topical Meeting on Nuclear Applications and Utilization of Accelerators (AccApp'07), Pocatello, Idaho. ANS Order #: 700330 ISBN: 0-89448-054-5.
27. Peter Kneisel, Richard Bundy, Gianluigi Ciovati, William Clemens, Daniel Forehand, Stephen Manning, Robert Manus, Robert Rimmer, Gary Slack, Larry Turlington, Haipeng Wang, "Preliminary Results from Prototype Niobium Cavities for the JLab Ampere-Class FEL", Proceedings of PAC 07, Albuquerque, New Mexico, p. 2487.
28. Robert Rimmer, Richard Bundy, Gary Guangfeng Cheng, Gianluigi Ciovati, Edward Daly, Richard Getz, James Henry, William Robert Hicks, Peter Kneisel, Stephen Manning, Robert Manus, Karl Smith, Mircea Stirbet, Larry Turlington, Lynn Vogel, Haipeng Wang, Katherine Wilson, Genfa Wu, "JLab High-Current CW Cryomodels for ERL and FEL", Proceedings of PAC 07, Albuquerque, New Mexico, p. 2493.
29. Haipeng Wang, Robert Rimmer, Genfa Wu, "Simulation and Measurements of a Heavily HOM-Damped Multi-cell SRF Cavity Prototype", Proceedings of PAC 07, Albuquerque, New Mexico, p. 2496.

30. A.W. Thomas, G. P. Williams and the Jefferson Lab team, "The Free Electron Laser at Jefferson Lab: The Technology and the Science", Proceedings of IEEE **95**, 1679 (2007).
31. J. M. Klopff and P. Norris, "Probing nonequilibrium dynamics with white-light femtosecond pulses", Applied Surface Science **253**, 6305 (2007)
32. Michelle D. Shinn, "Experience and plans of the JLab FEL Facility as a user facility", Proceedings of FEL 2007, Novosibirsk, Russia, p. 491.
33. A. Otto, P. Lilie, P. Dumas, C. Hirschmugl, M. Pilling, G. P. Williams, "Anisotropic electric surface resistance of Cu(110)", New Journal of Physics **9** 288 (2007).
34. S. Benson, D. Douglas, G.R. Neil, M. Shinn and G.P. Williams, "The 4th Generation Light Source at Jefferson Lab", Synchrotron Radiation News **20#6** 12 (2007).
35. T. H. Wong, M. C. Gupta, and C. Hernandez-Garcia, "Nanosecond laser pulse-induced electron emission from multi-wall carbon nanotube film", Nanotechnology **18** 135705 (2007).

2006 Publications JLab FEL

1. D.R. Douglas, K.C. Jordan, L. Merminga, E.G. Pozdeyev, C.D. Tennant, H. Wang, T.I. Smith, S. Simrock, I.V. Bazarov and G.H. Hoffstaetter, "Experimental investigation of multibunch, multipass beam breakup in the Jefferson Laboratory Free Electron Laser Upgrade Driver", Physical Review Special Topics – Accelerators and Beams **9** 064403 (2006).
2. Gwyn P. Williams, "Filling the THz Gap", Reports on Progress in Physics **69** 301 (2006).
3. R. Rox Anderson, William Farinelli, Hans Laubach, Dieter Manstein, Anna N. Yaroslavsky, Joseph Gubeli III, Kevin Jordan, George R. Neil, Michelle Shinn, Walter Chandler, Gwyn P. Williams, Steven V. Benson, David R. Douglas, H.F. Dylla, "Selective photothermolysis of lipid-rich tissues: A free electron laser study", Lasers in Surgery and Medicine **38** 913 (2006).
4. P. Schaaf, M. Shinn, E. Carpenne and J. Kaspar, "Direct Laser Synthesis of functional coatings by FEL treatments", J. Laser Micro/Nanoengineering **1** 129 (2006).
5. Z.M. Zhu and M. J. Kelley, "ToF-SIMS analysis of a fluorocarbon-grafted PET with a gold cluster ion source", Applied Surface Science **252** 6619 (2006).
6. N.D. Theodore, B.C. Holloway, D.M. Manos, R. Moore, C. Hernandez, T. Wang and H.F. Dylla, "Nitrogen-implanted silicon oxynitride: A coating for suppressing field emission from stainless steel used in high voltage applications", IEEE Transactions on Plasma Science, **34** 1074 (2006).

7. Hui Tian, Charles E. Reece, Michael J. Kelley, Shancai Wang, Lukasz Pulczynski, Kevin E. Smith, Matthew, "Surface studies of niobium chemically polished under conditions for superconducting radio frequency (SRF) cavity production", *Appl. Surf. Sci.* **253** 1236 (2006).
8. Gwyn P. Williams and the Jefferson Lab Team, "Next Generation Accelerator-based Light Sources for IR Microscopy and Spectroscopy", *J. Infrared Physics and Technology* **49** 104 (2006).
9. G.R. Neil, C. Behre, S.V. Benson, M. Bevins, G. Biallas, J. Boyce, J. Coleman, L.A. Dillon-Townes, D. Douglas, H. F. Dylla, R. Evans, A. Grippo, D. Gruber, J. Gubeli, D. Hardy, C. Hernandez-Garcia, K. Jordan, M.J. Kelley, L. Merminga, J. Mammosser, W. Moore, N. Nishimori, E. Pozdeyev, J. Preble, R. Rimmer, M. Shinn, T. Siggins, C. Tennant, R. Walker, G.P. Williams, S. Zhang, "The JLab High Power ERL Light Source", *Nucl. Instr. & Methods* **A557** 9 (2006).
10. M. Shinn, C. Behre, S. Benson, D. Douglas, F. Dylla, C. Gould, J. Gubeli, D. Hardy, K. Jordan, G. Neil, S. Zhang, "Xtreme Optics – the behavior of cavity optics for the Jefferson Lab Free Electron Laser", *Proc. SPIE Boulder Damage Symposium XXXVIII*, **SPIE 6403** page 64030Y-1 (2006).
11. S. Zhang, S. Benson, D. Douglas, D. Hardy, G. Neil and M. Shinn, "Longitudinal phase space characterization of electron bunches at the JLab FEL facility", *Proceedings of the 28th International FEL Conference (FEL06)* page 740 (2006).
12. P. Evtushenko, J. Coleman, K. Jordan, M. Klopff, G. Neil and G. Williams, "Bunch length measurements at the JLab FEL using coherent transition and synchrotron radiation", *Beam Instrumentation Workshop, Batavia, IL, May 1-4, 2006*, *AIP Conference Proceedings* **868** 193 (2006).
13. D. Sexton, P. Evtushenko, K. Jordan, J. Yan, S. Dutton, W. Moore, R. Evans, and J. Coleman, "Development of BPM Electronics at the JLAB FEL", *AIP Conf. Proc.* **868** 298 (2006).
14. S. Zhang, S. Benson, J. Hansknecht, D. Hardy, G. Neil and M. Shinn, "Phase noise comparison of short pulse laser systems", *Proceedings of the 28th International FEL Conference (FEL06)* page 466 (2006).
15. G. R. Neil, C. Behre, S. V. Benson, M. Bevins, G. Biallas, J. Boyce, J. Coleman, L.A. Dillon-Townes, D. Douglas, H. F. Dylla, R. Evans, A. Grippo, D. Gruber, J. Gubeli, D. Hardy, C. Hernandez-Garcia, K. Jordan, M. J. Kelley, L. Merminga, J. Mammosser, W. Moore, N. Nishimori, E. Pozdeyev, J. Preble, R. Rimmer, M. Shinn, T. Siggins, C. Tennant, R. Walker, G. P. Williams, and S. Zhang, "The JLab High Power ERL Light Source", *Nuclear Instr. & Methods* **A557** 9 (2006).
16. Hutton, "Push-Pull, a new ERL concept", *Nuclear Instr. & Methods* **A557** 220 (2006).

17. E. Pozdeyev, C. Tennant, J.J. Bisagnano, M. Sawamura, R. Hajima and T.I. Smith, "Multipass beam breakup in energy recovery linacs", Nuclear Instr. & Methods **A557** 176 (2006).
18. A.P. Freyberger and G.A. Krafft, "Summary report of synchronization, diagnostics and instrumentation", Nuclear Instr. & Methods **A557** 370 (2006).
19. R.A. Rimmer, "Higher-order mode calculations, predictions and overview of damping schemes for energy recovering linacs", Nuclear Instr. & Methods **A557** 259 (2006).
20. D. H. Dowell, J.W. Lewellen, D. Nguyen and R. Rimmer, "The status of normal conducting RF guns, a summary of the ERL2005 workshop", Nuclear Instr. & Methods **A557** 61 (2006).
21. T. Rao, A. Burrill, X.Y. Chang, J. Smedley, T. Nishita, C. Hernandez-Garcia, M. Poelker, E. Seddon, F.E. Hannon, C.K. Sinclair, J. Lewellen, and D. Feldman, "Photocathodes for the energy recovery linacs", Nuclear Instr. & Methods **A557** 124 (2006).
22. C.F. Conrad, M. J. Kelley and C.J. Chisholm-Brause, "Creating mixed Fe/Al coatings on planar gamma Al₂O₃ surfaces", Journal of Colloid and Interface Science **295** 318 (2006).
23. Stephen Benson, David Douglas, Pavel Evtuschenko, Kevin Jordan, George Neil, and Tom Powers, "Operational aspects of high power energy recovery linacs", Proceedings of LINAC 2006, page 115 (2006).
24. G. Neil, S. V. Benson, D. Douglas, P. Evtushenko, T. Powers, "On the Design Implications of Incorporating an FEL in an ERL", Proceedings of the 28th International FEL Conference (FEL06), page 273 (2006).
25. H. Freund, S. V. Benson, M. D. Shinn, "Simulation of Mirror Distortion in Free-Electron LASER Oscillators", Proceedings of the 28th International FEL Conference (FEL06) page 477 (2006).
26. P. Evtushenko, J. L. Coleman, K. Jordan, J. M. Klopff, G. Neil, G. P. Williams, "Bunch Length Measurements at JLab FEL", Proceedings of the 28th International FEL Conference (FEL06) page 736 (2006).
27. M. Tecimer, L. C. Brunel, J. van Tol, G. Neil, "A Design Study of a FIR/THz-FEL for High Magnetic Field Research", Proceedings of the 28th International FEL Conference (FEL06) page 327 (2006).
28. Stephen Benson, Michelle Shinn, "Harmonic Lasing Characterization at Jefferson Lab", Proceedings of the 28th International FEL Conference (FEL06) page 323 (2006).
29. F. E. Hannon and C. Hernandez-Garcia "Simulation and optimization of a 100 mA DC photo-injector" Proceedings of EPAC 2006, Edinburgh, Scotland, page 3550 (2006).
30. N. D. Theodore, H. F. Dylla, C. Hernandez, B. C. Holloway, D. M. Manos, R. Moore, and T. Wang, "Nitrogen-implanted silicon oxynitride: A coating for

suppressing field emission from stainless steel used in high-voltage applications" IEEE Transactions on Plasma Science, 34, 1074 (2006).

31. D. Sexton, P. Evtushenko, K. Jordan, J. Yan, S. Dutton, W. Moore, R. Evans, and J. Coleman, "Development of BPM Electronics at the JLAB FEL", AIP Conf. Proc. 868 298 (2006).

2005 Publications JLab FEL

1. H.F. Dylla and Steven T. Corneliussen, "John Ambrose Fleming and the Beginning of Electronics", J. Vac. Sci. Technol. **A23**, 1244 (2005).
2. C.D. Tennant, K.B. Beard, D.R. Douglas, K.C. Jordan, L. Merminga and E.G. Pozdeyev, "First observations and suppression of multipass, multibunch beam breakup in the Jefferson Laboratory free electron laser upgrade", Phys. Rev. Special Topics – Accelerators and Beams **8** 074403 (2005).
3. Zhengmao Zhu and Michael Kelley, "Poly(ethylene terephthalate) surface modification by deep UV (172 nm) irradiation", Applied Surface Science, **236**, Issue 1-4, Page(s) 416-425 (2005).
4. George Neil and the FEL Team, "The JLab IR Upgrade FEL Facility", Proceedings of the Joint 30th International Conference on Infrared and Millimeter Waves and The 13th International Conference on Terahertz Electronics, IEEE catalog 05EX1150, ISBN 0-7803-9348-1, Library of Congress 200592853, Williamsburg, pp 573-574 (September 2005).
5. Ettore Carpene, Michelle Shinn and Peter Schaaf, "Synthesis of highly oriented TiN coatings by free electron laser processing of titanium in nitrogen", Appl. Phys. **A80**, 1707-1710 (2005).
6. Ettore Carpene, Michelle Shinn and Peter Schaaf, "Free-electron Laser Surface Processing of Titanium in Nitrogen Atmosphere", Appl. Surface Science **247**, 307-312 (2005).
7. P. Schaff, M. Shinn, E. Carpene, J. Kaspar, "Direct Laser Synthesis of Functional Coatings", Proceedings of the Third Intl WLT-Conf on Lasers in Manufacturing, June 2005, 399 (2005).
8. Shukui Zhang, Stephen Benson, David Douglas, Carlos Hernandez-Garcia and others, "Temporal Characterization of Electron Beam Bunches with a Fast Streak Camera at the JLab FEL Facility", Proceedings of FEL 2005, 640 (2005).
9. James R Boyce, "The Jefferson Lab High Power Light Source", 7th International High energy Density and High Power RF Workshop, 13-17 Jun-05, Kalamata, Greece. D.K. Abe and G. S. Nusinovich eds. AIP Conference Proceedings **807** 348 (2006)

10. D. Hardy, S. Benson, M. Shinn, S. Zhang, "Incorporation of a PbSe array based spectrograph into EPICS using labview at the JLab FEL facility", Proceedings of FEL 2005, 180 (2005).
11. C. Hernandez-Garcia, T. Siggins, S. Benson, D. Bullard, H. F. Dylla, K. Jordan, C. Murray, G.R. Neil, M. Shinn and R. Walker, "A high average current DC GaAs photocathode gun for ERLs and FELs", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 3117 (2005).
12. A.M.M. Todd et al, "State-of-the-art electron guns and injector designs for energy recovery linacs (ERL)", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 2292 (2005).
13. J. Rathke, A. Ambrosio, M. Cole, E. Peterson, T. Schulteiss, H. Bluem, A.M.M. Todd, I. Campisi, E. Daly, J. Hogan, J. Mammoser, G. Neil, J. Preble, R. Rimmer, C. Rode, J. Sekutowicz, T. Whitlatch and M. Wiseman, "Design and fabrication of an FEL injector cryomodule", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 3724 (2005).
14. C. Tennant, D. Douglas, K. Jordan, L. Merminga, E. Pozdeyev, H. Wang, T.I Smith, I.V. Bazarov, G. Hoffstaetter and S. Simrock, "Experimental investigation of beam breakup in the Jefferson Lab. 10 kW FEL upgrade driver", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 369 (2005).
15. George Biallas, Stephen Benson, Tommy Hiatt, George Neil and Michael Snyder, "An 8 CM Period Electromagnetic Wiggler Magnet With Coils Made From Sheet Copper", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 4093 (2005).
16. J.G. Hubrig and G. H. Biallas, "Managing coil epoxy vacuum impregnation systems at the manufacturing floor level to achieve ultimate properties in state-of-the-art magnet assemblies", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 4260 (2005).
17. L.A. Dillon-Townes, M. Bevins, D.Kashy, S. Slachtouski, R. Lassiter, G. Neil, M. Shinn, J. Gubeli, C. Behre, D. Douglas, D. Waldman, G. Biallas, L. Munk, C. Gould, "Beam transport devices for the 10 kW IR Free Electron Laser at Jefferson Lab", Proceedings of 2005 Particle Accelerator Conference, Knoxville, TN, p. 1210 (2005).
18. R. Evans, A. Grippo & K. Jordan, "A versatile carrier board and associated timer module applications", 10th ICALEPCS Int. Conf. on Accelerator & Large Expt. Physics Control Systems, Geneva 10-14 Oct. TH3C.1-4O (2005).
19. Shukui Zhang, David Hardy, George Neil and Michelle Shinn, "Characterization And Performance Of A High-power Solid-state Laser For A High-current Photocathode Injector", Proceedings of FEL 2005, 351 (2005).
20. Richard Evans, Deborah Gruber, Daniel Sexton and Kevin Jordan, "DevLore - A Firmware Library and Web-Based Configuration Control Tool for Accelerator Systems Under Constant Development", 10th ICALEPCS Int.

Conf. on Accelerator & Large Expt. Physics Control Systems, Geneva 10-14 Oct. PO1.096-8 (2005).

21. Zhengmao Zhu and Michael Kelley, "Effect of deep UV (172 nm) irradiation on PET: ToF/SIMS analysis", *Applied Surface Science*, **231-232**, Page(s) 302-308, (2005).
22. J. Sekutowicz, S.A. Bogacz, D. Douglas, P. Kneisel, G.P. Williams, M. Ferrario, I. Ben-Zvi, J. Rose, J. Smedley, T. Srinivasan-Rao, L. Serafini, W.-D. Moeller, B. Peterson, D. Proch, S. Simrock, P. Colestock and J.B. Roesnzweig, "Proposed Continuous Wave Energy Recovery Operation of an X-ray Free Electron Laser", *Phys. Rev. Special Topics – Accelerators and Beams* **8**, 010701 (2005).
23. J.R. Boyce, "Intra-cavity Thomson Scattering," *Femtosecond Beam Science*, ed. M. Uesaka, World Scientific, Imperial College Press Section 2.5.2, 193-201 (2005).
24. S. Benson, D. R. Douglas, H. F. Dylla, J. Gubeli, K. Jordan, G. R. Neil, M. Shinn, S. Zhang and G.P. Williams, "High Power THz Generation from Sub-ps Bunches of Relativistic Electrons", *Mater. Res. Soc. Symp. Proc.* **850** MM4.3.1 (2005).
25. G. R. Neil, C. Behre, S. V. Benson, G. Biallas, J. Boyce, L.A. Dillon-Townes, D. Douglas, H. F. Dylla, R. Evans, A. Grippo, D. Gruber, J. Gubeli, C. Hernandez-Garcia, K. Jordan, M. J. Kelley, L. Merminga, J. Mammosser, N. Nishimimori, J. Preble, M. Shinn, T. Siggins, R. Walker, G. P. Williams and S. Zhang, "Producing ultrashort Terahertz to UV photons at high repetition rates for research into materials" *Mater. Res. Soc. Symp. Proc.* **850** MM4.1.1 (2005).
26. H. Frederick Dylla and Steven T. Corneliussen, "Free-Electron Lasers Come of Age", *Photonics Spectra*, p. 65, August 2005.
27. A. M. M. Todd, H. P. Bluem, V. Christina, R. H. Jackson, G. P. Williams and the Jefferson Laboratory FEL team, "High-Power THz Source Development", *Proceedings of the Joint 30th International Conference on Infrared and Millimeter Waves and The 13th International Conference on Terahertz Electronics*, IEEE catalog 05EX1150, ISBN 0-7803-9348-1, Library of Congress 200592853, Williamsburg, pp 497-498 (September 2005).

2004 Publications JLAB-FEL

1. Alex Bogacz, Jim Boyce, David Douglas, Andrew Hutton, Geoffrey Krafft, Lia Merminga, George Neil, Gwyn Williams, Jim Clarke, Mike Poole, Sue Smith and Vic Suller, "Sub-picosecond X-Rays from CEBAF at Jefferson Lab", *AIP Conference Proceedings* **705**, 29 (2004).
2. G.P. Williams, "High Power THz Synchrotron Sources", *Phil Trans. R. Soc. Lond.* **A362** 403 (2004).

3. George R. Neil and Gwyn P. Williams, "Evolution of the High Power THz Source Program at Jefferson Lab", *Infrared Physics and Technology* **45**, 389 (2004).
4. Christopher Behre, Stephen Benson, George Biallas, James Boyce, Christopher Curtis and Others, "First Lasing of the IR Upgrade FEL at Jefferson Lab", 3-Feb-05, Aug-04, *Journal Article - Nuclear Instruments & Methods in Physics Research*, **A528**, 19 (2004).
5. Carlos Hernandez-Garci, Kevin Beard, Stephen Benson, George Biallas and Others, "Performance and Modeling of the JLAB IR FEL Upgrade Injector", *Proceedings of FEL Conference, Trieste, Italy*, 558 (2004).
6. S. Zhang, S. Benson, D. Douglas, M. Shinn and G. P. Williams, "Short electron beam bunch characterization through measurement of terahertz radiation", *Proceedings FEL Conference, Trieste, Italy*, 562 (2004).
7. M. Shinn, C. Behre, S. Benson, M. Bevins, D. Bullard, J. Coleman, L. Dillon-Townes, T. Elliott, J. Gubeli, D. Hardy, K. Jordan, R. Lassiter, G. Neil, S. Zhang, "High Average Power Operation of a Scraper-Outcoupled Free Electron Laser", *Proceedings of the 2004 FEL Conference, Trieste, Italy*, 222 (2004).
8. S. Benson, D. Douglas, M. Shinn, K. Beard, C. Behre, G. Biallas, J. Boyce, H. F. Dylla, R. Evans, A. Grippo, J. Gubeli, D. Hardy, C. Hernandez-Garcia, K. Jordan, L. Merminga, G. R. Neil, J. Preble, T. Siggins, R. Walker, G. P. Williams, B. Yunn, S. Zhang, H. Toyokawa, "High Power Lasing in the IR Upgrade FEL at Jefferson Lab", *Proceedings of the 2004 FEL Conference, Trieste, Italy*, 229 (2004).
9. C. Tennant, D. Douglas, L. Merminga, E. Pozdeyev, T. Smith, "Suppression of Multipass, Multibunch Beam Breakup in Two Pass Recirculating Accelerators", *Proceedings of the 2004 FEL Conference, Trieste, Italy*, 590 (2004).
10. George H. Biallas, Stephen V. Benson, Tommy Hiatt, George Neil, Michael Snyder, "Making an Inexpensive Electromagnetic Wiggler Using Sheet Materials for the Coils", *Proceedings of the 2004 FEL Conference, Trieste, Italy*, 554 (2004).
11. Hernandez-Garcia, K. Beard C. Behre, S. Benson, G. Biallas, J. Boyce, D. Douglas, H. F. Dylla, R. Evans, A. Grippo, J. Gubeli, D. Hardy, K. Jordan, L. Merminga, W. Moore, G. Neil, J. Preble, M. Shinn, T. Siggins, R. Walker, B. Yunn, S. Zhang, "Longitudinal Space Charge Effects in the JLab IR FEL SRF Linac", *Proceedings of the 2004 FEL Conference, Trieste, Italy*, 363 (2004).
12. Swapan Chattopadhyay, Steven T. Corneliussen and Gwyn P. Williams, "Emerging Concepts, Technologies and Opportunities for Mezzo-scale Terahertz and Infrared Facilities", *Proceedings of EPAC, Lucerne Switzerland*, p. 2451, July 5-9, 2004.

13. W. Ibrahim, H. E. Elsayed-Ali, C. E. Bonner, M. Shinn, "Ultrafast Investigation of Electron Dynamics in Multi-Layer Metals, Int'l Journal of Heat and Mass Transfer **47**, 2261-2268 (2004).
14. Chien Aun Chan, Samuel Mickan, Gwyn Williams and Derek Abbott, "Terahertz calculations for the Australian synchrotron", SPIE **5277**, 404 (2004).
15. H. Bluem, A.M.M. Todd, I. Ben-Zvi, M.D. Cole, P. Colestock, D. Janssen, J. Lewellen, G.R. Neil, D.C. Nguyen, L. Phillips, J. Preble, J. Rathke, T. Schultheiss, T. Srinivasan-Rao, R.L. Wood, and L. Young, "Electron Injectors for Next Generation X-ray Sources". Int'l. Symp. On Optical Science & Technology SPIE 49th Annual Mtg., Denver, CO, 2-6 August (2004); Proc. SPIE, Vol. **5534**, S.G. Biedron, ed., 132-143 (2004).

2003 Publications JLAB-FEL

1. H. Dylla, "Development of ultrahigh and extreme high vacuum technology for physics research", J. Vac. Sci. Technol. **A21** S25 (2003).
2. H. Dylla and P. Redhead, "50 Years of Science, Technology and the AVS (1953-2003) An Introduction", J. Vac. Sci. Technol. **A21** IV-VI (2003).
3. Shinn, MD, "Operation of the Jefferson Lab FEL: optics lessons learned" Proceedings of the SPIE -4932 88 (2003).
4. J. Paul, G.P. Williams and F.M. Hoffmann, "Carbon Dioxide & Alkali Compound Formation: 1. Vibrational Characterization of Oxalate Intermediates", Surface Science **531** 244 2003.
5. Austin R H, Xie A H, van der Meer L, Shinn M, Neil G, "Self-trapped states in proteins" Nuclear Instruments and Methods **A507** 561 (2003).
6. G.L. Carr, M.C. Martin, W.R. McKinney, K. Jordan, G.R. Neil and G.P. Williams "Very High Power THz Radiation Sources" Journal of Biological Physics **29** 319-325 2003.
7. Freund H P, Douglas D, O'Shea P G, "Multiple-beam free-electron lasers", Nuclear Instruments and Methods **A507** 373 (2003).
8. E. Carpenne and P. Schaaf, "Pulsed laser processing of metals and semiconductors in reactive atmospheres: laser nitriding and carburizing", Mat. Res. Soc. Symp. Proc. **780** Y5.8.1 (2003).
9. Benson S, "Operation of an optical klystron with small dispersion", Nuclear Instruments and Methods **A507** 40 (2003).
10. Gwyn P. Williams, "Frontiers of Nanomaterial Research with Light from Particle Accelerators From the Atomic to the Nanoscale", C.T. Whelan and J.H. McGuire editors, Old Dominion University ISBN 0-9742874-0-7, p. 198 (2003).

11. Zhang S, Neil G, Shinn M, "Single-element laser beam shaper for uniform flat-top profiles", Optics Express **11** 1942 (2003).
12. George R. Neil, G. L. Carr, Joseph F. Gubeli III, K. Jordan, Michael C. Martin, Wayne R. McKinney, Michelle Shinn, Masahiko Tani, G. P. Williams and X.-C. Zhang, "Production of High Power Femtosecond Terahertz Radiation", Nuclear Instruments and Methods **A507** 537 2003.
13. George R. Neil, "FEL Oscillators" (Invited), Proc. 2003 Particle Accelerator Conf. Portland OR , May 12-16, 2003 p 181.
14. G. Lüpke, N. H. Tolk, L. C. Feldman, "Vibrational Lifetimes of Hydrogen in Silicon", J. Appl. Phys. **93**, 2316-33 2003.
15. A. Reilly, C. Allmond, S. Watson, J. Gammon and J-G. Kim, "Pulsed laser deposition with a high average power free electron laser: Benefits of subpicosecond pulses with high repetition rate" J. Appl. Phys. **93** 3098 (2003).
16. Austin R H, Xie A H, van der Meer L, Shinn M and Neil G, "Self-trapped states in proteins?", J. Phys-Condensed Matter **15** S1693 (2003).
17. M. N. Petrovich, A. Favre, D. W. Hewak, H. N. Rutt, A. C. Grippo, J. F. Gubeli III, K. C. Jordan, G. R. Neil, M. D. Shinn, "Near-IR Absorption of Ga:La:S and Ga:La:S:O Glasses by FEL-based laser calorimetry. Journal of Non-crystalline Solids, **326-327** 93-97 (2003).
18. Antony J. Bourdillon, Chris B. Boothroyd, Gwyn P. Williams and Yuli Vladimirovsky, "Near field x-ray lithography simulations for printing fine bridges", Journal of Physics D: Applied Physics, **36** 2471 (2003).
19. J.R. Boyce, D.R. Douglas, H. Toyokawa, W.J. Brown, F. Hartemann, "Sub-Picosecond, High Flux, Thomson X-ray Sources at Jefferson Lab's High Power FEL," Proc. 2003 Particle Accelerator Conf. Portland, OR, May 12-16, 2003, p. 938.
20. Y. Zhang, J.R. Boyce, Y. Derbenev, R. Li, "Image Charge Undulator: Theoretical Model and Technical Issues," Proc. 2003 Particle Accelerator Conf. Portland OR, May 12-16, 2003, p. 941.
21. Hernandez, T. Wang, T. Siggins, D. Bullard, H.F. Dylla, C. Reece, N.D. Theodore and D.M. Manos, "dc field-emission analysis of GaAs and plasma-source ion-implanted stainless steel", J. Vac. Sci. Technol. **A21** 1115 (2003).
22. M. D. Shinn, G. R. Baker, C. P. Behre, S. V. Benson, M. E. Bevins L. A. Dillon-Townes, H. F. Dylla, E. J. Feldl, J. F. Gubeli, R. D. Lassiter, F. D. Martin, and G. R. Neil, "Design of the Jefferson Lab IR Upgrade FEL optical cavity", Nuclear Instruments and Methods **A507** 196 (2003).

2002 Publications JLAB-FEL

1. G. Lupke, X. Zhang, B. Sun, A. Fraser, N. H. Tolk, and L. C. Feldman, "Structure-Dependent Vibrational Lifetimes of Hydrogen in Silicon", *Phys. Rev. Lett.* 88, 135501, 2002.
- a. Christodoulou, D. Lampiris, K. Polykandriotis, W.B. Colson, P.P. Crooker, S. Benson, J. Gubeli, and G.R. Neil "Free-electron-laser oscillator with a linear taper", *Phys. Rev. E* 66, 56502 (2002)
2. P. C. Eklund, B. K. Pradhan, U. J. Kim, Q. Xiong, J. E. Fischer, A. D. Friedman, B. C. Holloway, K. Jordan and M. W. Smith "Large-Scale Production of Single-Walled Carbon Nanotubes Using Ultrafast Pulses from a Free Electron Laser", *Nano Letters* 2 561 2002.
3. G.P. Williams, "Synchrotron and Free Electron Laser Sources of Infrared Radiation", *Handbook of Vibrational Spectroscopy*, Volume 1, page 341. J. M. Chalmers and P. R. Griffiths, editors, John Wiley and Sons, Chichester, UK 2002.
4. Petra Rudolf, Rasmita Raval Paul Dumas and Gwyn P. Williams, "Vibrational dynamics of fullerene molecules adsorbed on metal surfaces studied with synchrotron IR radiation" *Appl. Phys A* 75, 147 2002.
5. E. Carpenne, P. Schaaf, M. Han, K. P. Lieb, M. Shinn, "Reactive surface processing by irradiation with excimer laser, Nd: YAG laser, free electron laser and Ti:sapphire laser in nitrogen atmosphere", *Applied Surface Science*, 186 195 (2002).
6. G.L. Carr, M.C. Martin, W.R. McKinney, K. Jordan, G.R. Neil and G.P. Williams "High Power Terahertz Radiation from Relativistic Electrons", *Nature* 420 153-156 2002.
7. G.L. Carr, M.C. Martin, W.R. McKinney, K. Jordan, G.R. Neil and G.P. Williams "Very High Power THz Radiation at Jefferson Lab" *Journal of Physics in Medicine and Biology* 47 3761-3764 2002.
8. W. B. Colson, E. D. Johnson, Michael J. Kelley, H. A. Schwettman, "Putting Free-Electron Lasers to Work", *Physics Today*, 55#1, 35 2002.
9. P. Brierley, P. Dumas, M. Smith and G.P. Williams, "Performance of a Rapid-Scan Vacuum Michelson Interferometer at the NSLS", *Rev. Sci. Instr.* 73 1595 (2002).
10. G.P. Williams, "Far-IR/THz radiation from the Jefferson Lab FEL Energy Recovered Linac", *Rev. Sci. Instr.* 73 1461 (2002).
11. H. F. Dylla, A Hutton, G. Neil and G.P. Williams, "A New Dynamics Facility Combining a Storage Ring with a Synchronized FEL", *Rev. Sci. Instr.* 73 1414 2002.

12. J. Blau, T. Campbell, W. B. Colson, W. Ossenfort, G.R. Neil, S. V. Benson, H. F. Dylla, and M. Shinn, "Simulations of the 100kW TJNAF FEL Using a Short Rayleigh Length", Nuclear Instruments and Methods in Physics Research A483, 142 2002.
13. J. Blau, V. Bouras, W. B. Colson, A. Kalfoutzos, G.R. Neil, S. V. Benson, and H. F. Dylla, "Simulations of the 100kW TJNAF FEL Using a Step-Tapered Undulator" Nuclear Instruments and Methods in Physics Research A483, 138 2002.
14. G. R. Neil, S. V. Benson, G. Biallas, H. P. Freund, J. Gubeli, K. Jordan, S. Myers and M. D. Shinn, "Second Harmonic FEL Oscillation" Nuclear Instruments and Methods in Physics Research A483, 119 2002.
15. George R. Neil, "Trends and Opportunities in Light Source Development" Nuclear Instruments and Methods in Physics Research A483, 14 2002.
16. S. V. Benson, "What Have We Learned From the Kilowatt IR-FEL at Jefferson Lab?" Nuclear Instruments and Methods in Physics Research A483, 1 2002.
17. Stephen V. Benson, Joe Gubeli, and Michelle Shinn, "Mode Distortion Measurements on the Jefferson Lab IR FEL" Nuclear Instruments and Methods in Physics Research A483, 434 2002.
18. Lia Merminga, "RF Stability in Energy Recovering FELs: Theory and Experiment" Nuclear Instruments and Methods in Physics Research A483, 107 2002.
 - a. Christodoulou, D. Lampiris, K. Polykandriotis, W.B. Colson, and P.P. Crooker, S. Benson, J. Gubeli, and G.R. Neil, "Study of an FEL Oscillator with a Linear Taper " Phys. Rev. E, 66 056502 2002.
19. George R. Neil and Lia Merminga, "Technical Approaches for High Average Power FEL, Reviews of Modern Physics 74, 685 2002.
20. David L. Wetzel and Gwyn P. Williams, "Synchrotron infrared microscopy of retinal layers", Vibrational Spectroscopy 30 101-109 2002.
21. G.R. Neil, S.V. Benson, G. Biallas, J. Boyce, L.A. Dillon-Townes, D. Douglas, H.F. Dylla, R. Evans, A. Grippo, J. Gubeli, C. Hernandez-Garcia, K. Jordan, M. Kelley, G.A. Krafft, R. Li, J. Mammosser, L. Merminga, J. Preble, M. Shinn, T. Siggins, R. Walker, G. Williams, B. Yunn, S. Zhang, "Status of the Jefferson Lab IR/UV High Average Power Light Source", FEL 2002, Chicago, IL 8-13 Sept. 2002.
22. H. Fred Dylla, "New Tools for New Materials", The Industrial Physicist, 8#2, 24-25, 2002.
23. Sol M. Gruner, Don Bilderback, Ivan Bazarov, Ken Finkelstein, Geoffrey Krafft and Lia Merminga, Hasan Padamsee, Qun Shen, Charles Sinclair, Maury Tigner, "Energy recovery linacs as synchrotron radiation sources", Rev. Sci. Instr. 73 1402-1406, 2002.

24. William Hansen, Pete Fuqua, Frank Livingston, Adam Huang, Meg Abraham Dave Taylor, Siegfried Janson, and Henry Helvajian, "Laser Fabrication of Glass Microstructures", *The Industrial Physicist*, 833, 18-21, 2002.
25. Stephen V. Benson, George R. Neil, Michelle D. Shinn, "Lasing with a Near-Confocal cavity in a high power FEL", *Proc. SPIE Vol. 4632*, p. 115-121, *Laser and Beam Control Technologies*, Santanu Basu; James F. Riker; Eds. 2002.
26. N. Noginova, E. Arthur, R. Ulyssee, E.S. Gillman and C.E. Bonner, "Photoinduced Heating and Phase Transitions in CMR Materials", *Proceedings of the Electrochemical Society*, 690, F3.7 2002.
27. M.N. Petrovich, A. Favre, D.W. Hewak, H.N. Rutt, A.C. Grippo, J.F. Gubeli III, K.C. Jordan, G.R. Neil, M.D. Shinn, "Near-IR absorption of Ga:La:S and Ga:La:S:O glasses by FEL-based laser calorimetry", *Proceedings of the XIII International Symposium on Non-Oxide Glasses and New Optical Glasses (ISNOG XIII)*, Pardubice (Czech Republic), 678 2002.
28. George R. Neil, Steve Benson, George Biallas, James Boyce, L.A. Dillon-Townes, David Douglas, H. Fred Dylla, R. Evans, Al Grippo, Joe Gubeli, C. Hernandez-Garcia, Kevin Jordan, Geoffrey A. Krafft, Rui Li, J. Mammosser, Lia Merminga, Joe Preble, Michelle Shinn, Timothy Siggins, Richard Walker, Gwyn Williams, Byung Yunn, S. Zhang, "The Jefferson Lab Free Electron Laser Program", *Proceedings International Symposium on Infrared Free Electron Laser and its Application*, Tokyo, Japan, *Japan Journal of Applied Physics Suppl.* 41-1 15-19 (2002).
29. J.R. Boyce, S.V. Benson, C.L. Bohn, D.R. Douglas, R.F. Dylla, J.F. Gubeli, U. Happek, K. Jordan, G.A. Krafft, G.R. Neil, P. Piot, M.D. Shinn, G.P. Williams, "The Jefferson Lab Sub-picosecond X-ray Program" *Application of Accelerators in Research and Industry* ed. J.L. Duggan and I.L. Morgan, *AIP Conference Proceedings* 680, Denton TX, Nov. 12-16, 2002, pp 325-328.

2001 Publications JLAB-FEL

1. Lia Merminga and Stephen Benson, "Design Principles for a Compact High Average Power IR FEL" presented at the FEL Conference, Darmstadt, Germany, August 2001.
2. Edward Gillman, "First Results From the Scanning Near-Field Infrared Microscope at Jefferson Lab" presented at the FEL Conference, Darmstadt, Germany, August 2001.
3. S. Benson, J. Gubeli, G. R. Neil, "An Experimental Study of an FEL Oscillator with a Linear Taper" *Nuclear Instruments and Methods in Physics Research A* **475** 276 2001.

4. S.Benson, Michelle Shinn, G. R. Neil, "Transient Mirror Heating Theory and Experiment in the Jefferson Lab IR Demo FEL" Nuclear Instruments and Methods in Physics Research **A475** 531 2001.
5. Masahiko Tani, Shunsuke Kono, Ping Gu, Jingzhou Xu, X.-C. Zhang, Roland Kersting, Michelle Shinn, Joseph F. Gubeli, III, George Neil, "Generation of High Power THz Radiation with Femtosecond Free Electron Laser". Presented at CLEO Conference on Lasers and Electrooptics, Baltimore, MD, May 2001.
6. Masahiko Tani, Shunsuke Kono, Ping Gu, Jingzhou Xu, X.-C. Zhang, Roland Kersting, Michelle Shinn, Joseph F. Gubeli, III, George Neil, "Generation of THz Radiation by Using Femtosecond Free Electron Laser". Presented at Japan Society of Applied Physics Conference, Tokyo, Japan, March 28-31, 2001.
7. Masahiko Tani, Shunsuke Kono, Ping Gu, Kiyomi Sakai, Mamoru Usami, Michelle Shinn, Joseph F. Gubeli III, George Neil, Jingzhou Xu, Roland Kersting, X.-C. Zhang, "Generation of THz radiation by excitation of InAs with a femtosecond free-electron laser", in "Ultrafast Electronics and Optoelectronics" TOPS Vol.49, p.166-170 (2001).
8. M. Budde, G. Lüepke, et al., "Lifetime of Hydrogen and Deuterium Related Vibrational Modes in Silicon" Phys. Rev. Lett. **87**, 145501, 2001
9. H. Bluem, A. M. M. Todd and G. Neil, "Superconducting RF Injector for High-Power Free-Electron Lasers (FEL)". Proceedings: 2001 Particle Accelerator Conference, Peter W. Lucas, Sara Webber, editors, IEEE, Piscataway, NJ, 2001.
10. George R. Neil, S. V. Benson, G. Biallas, J. Gubeli, K. Jordan, S. Myers, and M. D. Shinn, "Second Harmonic FEL Oscillation, Phys. Rev. Lett. **87**, 084801 (2001).
11. S.L. Hulbert and G.P., Williams, "Synchrotron radiation sources." In Handbook of Optics: Classical, Vision, and X-Ray Optics, 2nd ed., vol. III, chap. 32. Michael Bass, Jay M. Enoch, Eric W. Van Stryland, and William L. Wolfe (eds.). New York: McGraw-Hill, pp. 32.1--32.20, 2001.
12. Paul Dumas and Gwyn P. Williams, "Surface Science and Microscopy Investigations using Infrared Synchrotron Radiation", Chemical Applications of Synchrotron Radiation, Part 1, page 356. Tsun-Kong Sham, editor, World Scientific, Singapore (2002).
13. A. Hutton, S. V. Benson, H. F. Dylla, O. Garza, R. R. Lauzé, R. T. May, G. R. Neil, S. L. Prior, G. P. Williams, N. W. Wilson, "A Synchronized FEL-Synchrotron Radiation Facility at Jefferson Lab", Proceedings: 2001 Particle Accelerator Conference, Peter W. Lucas, Sara Webber, editors, IEEE, Piscataway, NJ, 2001.
14. Gwyn P. Williams, "IR Investigations of Surfaces" Journal of Physics Condensed Matter **13**, 11367 (2001).

15. G.P. Williams, "Electron Binding Energies of the Elements" X-Ray Data Booklet, LBNL Pub 490 Rev.2. January 2001.
16. L.A. Loper, C.K.W Adu, G. Chen, B.K. Pradhan, P.C., A.D. Friedman, B.C. Holloway, M.W. Smith "Production of Single Walled Carbon Nanotubes using tunable radiation from a Free Electron Laser (FEL)", Presented at the American Physical Society meeting, March 2001.
17. L. Kreplak, F. Briki, Y. Duvault, J. Doucet, C. Merigoux, F. Leroy, J.L. Leveque, L. Miller, G.L. Carr, G.P. Williams and P. Dumas, Int. Journal of Cosmetic Science **23**, 369 (2001).
18. A. Christodoulou, D. Lampiris, W. B. Colson, P. P. Crooker, J. Blau, R. D. McGinnis, Steve Benson, Joseph Gubeli, George Neil, "Simulations of the TJNAF FEL with tapered and inversely tapered undulators", Nuclear Instruments and Methods in Physics Research, **A475**, 182 2001.
19. Joseph Gubeli, Rich Evans, Al Grippo, Kevin Jordan, Michelle Shinn, Tim Siggins, "Jefferson Lab IR demo FEL photocathode quantum efficiency scanner", Nuclear Instruments and Methods in Physics Research **A475**, 554 2001.
20. R. W. Thomson, L. R. Short, R. d. McGinnis, W. B. Colson, Michelle Shinn, Joseph Gubeli, K. C. Jordan, R. A. Hill, G. H. Biallas, R. L. Walker, George Neil, Steve Benson and Byung C. Yunn, "TJNAF free electron laser damage studies", Nuclear Instruments and Methods in Physics Research **A475**, 625 2001.
21. Charles Sinclair, Fred Dylla, Tim Siggins, D. Manos, T. J. Verhaus, "Dramatic Reduction of DC Field Emission from Large Area Electrodes by Plasma-Source Ion Implantation", Proceedings: 2001 Particle Accelerator Conference, Peter W. Lucas, Sara Webber, editors IEEE, Piscataway, NJ 2001.
22. Stephen V. Benson, Joe Gubeli, Michelle Shinn, "Coherent Harmonics in the Super-radiant Regime from an FEL", Proceedings 2001 Particle Accelerator Conference, Peter W. Lucas, Sara Webber, editors, IEEE, Piscataway, NJ 2001.
23. Joseph Gubeli, Rich Evans, Al Grippo, Kevin Jordan, Michelle Shinn and Tim Siggins "Jefferson Lab IR Demo FEL Photocathode Quantum Efficiency Scanner." Nucl. Instr. and Meth. in Physics Research **A475**, 554 2001.
24. H. Freund and G. R. Neil, "Dispersively Enhanced Bunching in High-Gain Free Electron Lasers." Nuclear Instruments and Methods in Physics Research **A475** 381-384 (2001).
25. H. Freund and G. R. Neil, "Nonlinear Harmonic Generation in Distributed Optical Klystrons, Nuclear Instruments and Methods in Physics Research **A475** 373 (2001).
26. Tim Siggins, Charles Sinclair, Court Bohn, Donald Bullard, David Douglas, Al Grippo, Joe Gubeli, Geoffrey A Krafft, Byung Yunn "Performance of the

Photocathode Gun for the TJNAF FEL." Nucl. Instr. And Meth., **A475**, 549 2001.

27. R. Li, "Sensitivity of the CSR Self-Interaction to the Local Longitudinal Charge Concentration of a Bunch" Nuclear Instruments and Methods in Physics Research **A475**, 498 2001.
28. S. V. Benson, G. Biallas, J. Boyce, D. Douglas, H. F. Dylla, R. Evans, A. Grippo, J. Gubeli, K. Jordan, G. Krafft, R. Li, J. Mammoser, L. Merminga, G. R. Neil, L. Phillips, J. Preble, M. Shinn, T. Siggins, R. Walker, and B. Yunn, "A 10 kW IRFEL Design For Jefferson Lab", Proceedings: 2001 Particle Accelerator Conference, Peter W. Lucas, Sara Webber, editors, IEEE, Piscataway, NJ, page 249 2001.
29. M. Budde, C. Parks Cheney, G. Lüpke, N. H. Tolk, L. C. Feldman, "Vibrational Dynamics of Bond-Center Hydrogen in Crystalline Silicon", Phys. Rev. B63, 195203-21 (2001).

2000 Publications JLAB-FEL

1. M. Budde, G. Lüepke, C. Parks Cheney, N. H. Tolk and L. C. Feldman., "Vibrational Lifetime of Bond-Center Hydrogen in Crystalline Silicon," Phys. Rev. Let. **85**, 1452 2000.
2. A. Xie, L. van der Meer, W. Houff, R.H. Austin, "Long-lived Amide-1 Vibrational Modes in Myoglobin" Phys. Rev Let. **84**, 5435 2000.
3. M. J. Kelley, "Materials Processing Research and Development Opportunities with the New Generation of FEL's," SPIE **3888** 598 2000.
4. Michael J. Kelley; "Surface processing and micromaching of polyimide driven by a high-average power infra-red free electron laser:, Mat.Res.Soc.Symp.Proc. "Laser-Solid Interactions for Materials Processing" Mat. Res, Soc. Symp. Proc., D. Kumar et al. eds., **617**, 2000
5. S.V. Benson et al., "Jefferson Lab Free-Electron Laser Starts Operation with Sustained Lasing at the Kilowatt Level," Synchrotron Radiation News, **13** (4), 13, July/August 2000).
6. G. R. Neil, S. Benson, G. Biallas, C. L. Bohn, D. Douglas, H. F. Dylla, R. Evans, J. Fugitt, A. Grippo, J. Gubeli, R. Hill, K. Jordan, R. Li, L. Merminga, P. Piot, J. Preble, M. Shinn, T. Siggins, R. Walker, B. Yunn, "Sustained Kilowatt Lasing in a Free-Electron Laser with Same-Cell Energy Recovery," Phys. Rev. Let. **84**, 662 2000.
7. M. Shinn, "High Power Free-Electron Lasers - A New Laser Source for Materials Processing," SPIE. **4065**, 434 2000.
8. H. F. Dylla et al., "Applications of the Jefferson Lab Free Electron Laser for Photobiology," SPIE. **3925** 40 2000.

9. S. V. Benson, G. R. Neil, C. L. Bohn, G. Biallas, D. Douglas, F. Dylla, J. Fugitt, K. Jordan, G. Krafft, L. Merminga, J. Preble, M. Shinn, T. Siggins, R. Walker and B. Yunn, "A Kilowatt Average Power Laser for Sub-Picosecond Materials Processing," SPIE. **3889** 309 2000.
10. M. Shinn et al., "The Jefferson Lab FEL User Facility," SPIE. **3902**, 355 2000.
11. S. Benson, M. Shinn G. Neil, and T. Siggins, "First Demonstration of 5th Harmonic Lasing in a FEL," Nucl. Instr. and Meth. presented at the FEL 2000 conference, Hamburg FRG.
12. Lia Merminga, P. Alexeev, Steve Benson, A. Bolshakov, Lawrence Doolittle, David Douglas, Curt Hovater, George Neil "First Experimental Data on the FEL-RF Interaction at the Jefferson Lab IRFEL," presented at the FEL 2000 conference, Hamburg FRG.
13. G. R. Neil, S. V. Benson, G. Biallas, C. L. Bohn, D. Douglas, H. F. Dylla, R. Evans, J. Fugitt, J. Gubeli, R. Hill, K. Jordan, G. Krafft, R. Li, L. Merminga, D. Oepts, P. Piot, J. Preble, M. Shinn, T. Siggins, R. Walker, B. Yunn, "First Operation of an FEL in the Same-Cell Energy Recovery Mode," Nucl. Instr. and Meth. Phys. Res. **A445** 192 2000.
14. R. Li, "Bunch Self-Interaction via Coherent Synchrotron Radiation: Theory, Simulation and Experiment." Presented at the 42nd Annual APS Division of Plasma Physics Mtg., October 23-27, 2000, Quebec, Canada.
15. L. Merminga, "An Energy-Recovery Electron Linac-on-Proton Ring Collider," Talk and Paper submitted to the Proceedings of the 2nd EPIC Workshop, MIT, September 2000.
16. S. Benson, "A High Average Power, Ultra-fast Source for Materials Processing." Presented at APS Opto Southeast 2000, Charlotte, NC, September 2000.
17. Lia Merminga, Geoffrey Krafft, Christoph Leemann, Ron Sundelin, Joseph Bisognano "Specifying HOM-Power Extraction Efficiency in a High Average Current, Short Bunch Length SRF Environment," Linac 2000, Aug 21-25, 2000, Monterey, California, eConf C000821:THc04,2000.
18. R. Li, "Analysis and Simulation on the Enhancement of the CSR Effects.: To be published in the LINAC 2000 Conference Proceedings, August 2000.
19. C. Hovater, J. Delayen, L. Merminga, T. Powers, C. Reece, "RF Control Requirements for the CEBAF Energy Upgrade Cavities," Linac 2000, Monterey California, Aug. 2000, eConf C000821:TUc12,2000.
20. D. Douglas for the FEL Team, "The Jefferson Lab 1 kW IR FEL." Linac 2000, Aug 21-25, 2000, Monterey, California.
21. D. Douglas, S. V. Benson, G. A. Krafft, R. Li, L. Merminga and B. C. Yunn, "Driver Accelerator Designator for the 10kW Upgrade of the Jefferson Lab IR FEL." Linac 2000, Aug 21-25, 2000, Monterey, California.

22. G. R. Neil et al, "Kilowatt Lasing in a Free Electron Laser. To be published in conference proceedings of EPAC 2000, June 26-30, 2000, Vienna, Austria.
23. R. Li, "Analysis and Simulation of the Coherent Synchrotron Radiation Effect in a Bunch Compression Chicane." To be published in conference proceedings of EPAC 2000, June 26-30, 2000, Vienna, Austria.
24. K. Jordan, R. Evans, A. Grippo and R. Hill, "A Video Distribution and Analog Monitoring System for the JLab FEL." Submitted for publication in the proceedings of the Beam Instrumentation Workshop, May 2000, Cambridge, MA.
25. S. V. Benson, G. R. Neil, and M. D. Shinn, "Measurement and Modeling of Mirror Distortion in a High Power FEL," Submitted for publication in SPIE, **3931B**, 243-250, January 23-28, 2000.
26. M. Hein, P. Dumas, A. Otto and G. P. Williams, "The interaction of CO with C₂H₄ or Cs on Cu(111) observed by friction with the conduction electrons" Surf. Sci., **465** 249 (2000).
27. L. M. Miller, G.L. Carr, M. Jackson, P. Dumas and G.P. Williams, "The Impact of Infrared Synchrotron Radiation in Biology: Past, Present and Future", Synchrotron Radiation News, **13.5** 31, 2000.
28. G.P. Williams, "Intense, broadband far-IR / THz radiation from the JLab FEL", Jefferson Lab Technical Note, December 2000.

1999 Publications JLab-FEL

1. G. R. Neil, "High Power FEL's Driven By RF Superconducting Linacs." To be published in proceedings of the 9th Workshop on RF Superconductivity, Santa Fe, NM, November 1-5, 1999.
2. G. R. Neil, and H. F. Dylla, "The Jefferson Laboratory High Power Free Electron Laser." Presented at the 2nd Annual Directed Energy Symposium, Kirtland, AFB, NM, November 1-5, 1999.
3. C. J. Curtis, J. C. Dahlberg, W. A. Oren, And K. J. Tremblay, K. J., "The Measurement of the Optical Cavity Length for the Infrared Free Electron Laser." In proceedings of IWAA99, Grenoble, France, October 18-21, 1999.
4. S. V. Benson, "FEL Source Characteristics," in AIP Conf. Proceedings 498, 1999 Workshop on Nonneutral Plasmas, (Princeton, NJ, 1999), Oral presentation.
5. H. F. Dylla, "Laser Applications in Microelectronic and Optoelectronic Manufacturing IV" SPIE. **3618** 388 1999.
6. H. P. Freund and G. R. Neil, "Free-Electron Lasers: Vacuum Electronic Generators of Coherent Radiation at Frequencies Beyond Microwaves," IEEE. **87**, No. 5, May 1999, pp. 782-803.

7. S. Benson, G. Biallas, C. L. Bohn, I. E. Campisi, D. Douglas, R. Evans, R. Hill, K. Jordan, G. A. Krafft, R. Li, L. Merminga, G. R. Neil, P. Piot, J. Preble, M. Shinn, T. Siggins and R. Walker, "First Results on Energy Recovery in the Jefferson Lab IRFEL," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **4**, pp. 2456-58.
8. S. Benson, "High Average Power Free-Electron Lasers," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **1**, pp. 212-216.
9. G. Biallas, D. Bullard, D. Douglas, A. Guerra, L. Harwood, T. Hiatt, J. Karn, T. Menefee, K. Sullivan, K. Tremblay, R. Wolfley, V. Christina, T. Schultheiss and F. Tepes, "Making Dipoles to Spectrometer Quality Using Adjustments During Measurement," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **5**, pp. 3306-08.
10. C. L. Bohn, S. Benson, G. Biallas, I. Campisi, D. Douglas, R. Evans, J. Fugitt, R. Hill, K. Jordan, G. Krafft, R. Li, L. Merminga, G. Neil, P. Piot, J. Preble, M. Shinn, T. Siggins, R. Walker, B. Yunn, "Performance of the Accelerator Driver of Jefferson Laboratory's Free-Electron Laser," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **4**, pp. 2450-52.
11. Campisi, D. Douglas, C. Hovater, G. Krafft, L. Merminga, and B. Yunn, "Beam Current Limitations in the Jefferson Lab FEL: Simulations and Analysis of Proposed Beam Break-up Experiments," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **2**, pp. 1177-79.
12. Campisi, D. Douglas, L. Merminga, and B. Yunn, "Beam Breakup Simulations for the Jefferson Lab FEL Upgrade," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **2**, pp. 1170-72.
13. R. Li, "The Impact of Coherent Synchrotron Radiation on the Beam Transport of Short Bunches," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **1**, pp. 118-122.
14. V. Nguyen, L. Phillips, and J. Preble, "Development of a 50 kW CW L-Band Rectangular Window for Jefferson Lab FEL Cryomodule," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **2**, pp. 1459-61.
15. P. Piot, G. A. Krafft, K. Jordan, A. Grippo, J. Song, "Performance of the Electron Beam Diagnostics at Jefferson Lab's High Power Free Electron Laser," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **3**, pp. 2229-31.
16. T. Schultheiss, V. Christina, M. Cole, J. Rathke, T. Elliott, V. Nguyen, L. Phillips, and J. Preble, "A High Thermal Conductivity Waveguide Window for use in a Free Electron Laser," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **2**, pp. 780-782
17. K. Tremblay, G. Biallas, D. Douglas, and J. Karn, "Magnetic Measurement of the PI Bend Dipole Magnets for the IR-FEL at the Thomas Jefferson National Accelerator Facility," in Proceedings of 1999 IEEE Particle Accelerator Conference,, **5**, pp. 3312-14.

18. B. Yunn, "Physics of JLab FEL Injector," in Proceedings of 1999 IEEE Particle Accelerator Conference, **4**, pp. 2453-55.
19. A. Otto, M. Hein, P. Dumas and G. P. Williams, "Diffuse Scattering of the Conduction Electrons by an Adsorbate: an Experimental Study Using Synchrotron Infrared Radiation", SPIE Vol **3775** 174 (1999).
20. Petra Rudolf, Rasmita Raval Paul Dumas and Gwyn P. Williams, "Vibrational dynamics of fullerene molecules adsorbed on metal surfaces studied with synchrotron IR radiation" SPIE Vol **3775** 182 (1999).
21. L. Nahon, E. Renault, M. Couprie, D. Nutarelli, D. Garzella, F. Polack, P. Dumas, G. Carr and G.P. Williams, "Two-color Experiments Combining the UV-Storage Ring Free Electron Laser and the SA5 IR Beamline at Super-ACO", SPIE Vol **3775** 145 (1999).
22. G.P. Williams, "Infrared Synchrotron Radiation: Review of Properties and Prospectives", SPIE Vol **3775** 2 (1999).
23. Lisa M. Miller, G. Lawrence Carr, Gwyn P. Williams, Michael Sullivan and Mark R. Chance "Biological Infrared Microspectroscopy at the NSLS", SR199: Eleventh US National Conference. Editors: P. Pianetta, J. Arthur, S. Brennan, AIP conference proceedings Melville, New York. **521** 47 (1999).
24. Dylla H F, Biallas G, Dillon Townes L A, Feldl E, Myneni G R, Parkinson J, Preble J, Siggins T, Williams S, and Wiseman M "Design and installation of a low particulate, ultrahigh vacuum system for a high power free-electron laser", J. Vac. Sci. & Technol. **17** 2113 (1999).
25. Merminga L, Alexeev P, Benson S, Bolshakov A, Doolittle L and Neil G, "Analysis of the FEL-RF interaction in recirculating, energy-recovering linacs with an FEL" Nuclear Instruments and Methods **A429** 58 (1999).
26. Benson S, Biallas G, Bohn C, Douglas D, Dylla H F, Evans R, Fugitt J, Hill R, Jordan K, Krafft G, Legg R, Li R, Merminga L, Neil G R, Oepts D, Piot P, Preble J, Shinn M, Siggins T, Walker R, and Yunn B, "First lasing of the Jefferson Lab IR Demo FEL" Nuclear Instruments and Methods **A429** 27 (1999).