



**Fiscal Year 2008 Self-Evaluation
Contractor Performance Evaluation and
Measurement Plan**

**SLAC National Accelerator Laboratory
Volume 1, Science and Technology, Goals 1 – 3**

Publications Appendix

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Publication Summary

This year, InfoMedia Solutions (IMS) processed a total of 625 scientific and technical information (STI) documents and made all appropriate copies publicly accessible. During this year, all processed documents were reported using OSTI's XML harvesting method.

SLAC identifies STI publication products as preprints, preprint leaks, and reprints, as defined below.

Preprint	Original manuscript submitted to SLAC for publication. When preprints are published, preprint numbers are assigned and electronic announcement records are harvested by OSTI that include a link to the electronic version.
Preprint Leak	Manuscript submitted to SLAC after publication elsewhere, but the original manuscript is available to SLAC. When preprints leaks are published preprint numbers are assigned and electronic announcement records are harvested by OSTI that include a link to the electronic version.
Reprint	Manuscript first published elsewhere—typically a journal—and the original manuscript is not available to SLAC. SSRRL makes up the bulk of reprints due to the proprietary nature of that work. When reprints are processed, reprint numbers are assigned and electronic announcement records are harvested by OSTI, but a link to the text from the SLAC publications server is not provided.

The FY08 figures reflect a year of serious budget and resource shortages at the laboratory. Despite these reductions, most of the day-to-day preprint processing was managed in a timely manner. However, the work to register and report leaked documents was put on-hold pending availability of programming support to analyze and repair some problems with scripted workflows in the system. At the time of this report, there were approximately 300 leaked documents in the queue for processing.

Table 1: Total OSTI Announcements Reported

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
Total STI reported to OSTI	886	1,156	1,244	1,580	1,207	974	1,252	625*

Table 2: OSTI Preprint Announcements

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
Preprints	260	305	299	417	418	463	521	380
Preprint Leaks	69	207	435	438	370	263	250	197
Total Submitted to OSTI	329	512	734	855	788	726	771	577
Leaks as % of Total	21%	40%	59%	51%	47%	36%	32%	34%

Table 3: OSTI Reprint Announcements

	FY01	FY02	FY03	FY04	FY05	FY06	FY07	FY08
SSRL Reprints	57	499	176	528	318	180	446	32
SLAC-HEP Reprints	500	145	334	207	101	68	35	16
Total Submitted to OSTI	557	644	510	735	419	248	481	48

* Backlog of 300 leaked documents not included in this number.

Due to resource and budget issues, planned STI projects were put on hold. With a recent reallocation of existing resources and the imminent hiring of some fixed-term resources, it is hoped that more progress can be made in FY09.

For overall citation numbers and other details, visit the SPIRES SLAC Program Publications Lists webpage¹.

¹ http://www.slac.stanford.edu/spires/slac/program_review/index.html

BES/BER**Stanford Synchrotron Radiation Laboratory (SSRL)**

Note: Publications with a beam line staff member as author/co-author has been marked with a *.

2008 Peer-Reviewed Journal Articles (to date)

1. R. J. Abergel, M. C. Clifton, J. C. Pizarro, J. A. Warner, D. K. Shuh, R. K. Strong and K. N. Raymond, "The Siderocalin/Enterobactin Interaction: A Link between Mammalian Immunity and Bacterial Iron Transport", *J. Am. Chem. Soc.* **130**, 11524 (2008)
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10. Y. Arai, "Spectroscopic Evidence for Ni(II) Surface Speciation at the Iron Oxyhydroxides-Water Interface", *Environ. Sci. Technol.* **42**, 1151 (2008)
11. L. L. Araujo, R. Giulian, B. Johannessen, D. J. Llewellyn, P. Kluth, G. de M. Azevedo, D. J. Cookson and M. C. Ridgway, "Structural Characterization of Ge Nanocrystals in Silica Amorphised by Ion Irradiation", *Nucl. Instrum. Meth. Phys. Res. B* (2008) doi: 10.1016/j.nimb.2008.03.175
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4. T. Cuk, "Investigation of the High-Tc Phase Diagram Using Optical Spectroscopies and High Pressure", *Stanford University*, 2007; Advisor: Z.-X. Shen
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36. Hau-Riege, S.; London, R.; Bogan, M.; Chapman, H.; Burgh, M., "Damage-resistant single-pulse optics for x-ray free electron lasers: Damage to VUV, EUV, and X-ray Optics", *Proc. Of SPIE Vol. 6586*, 65860T, 2007

Presentations

1. M. Gühr, "High harmonic generation in Molecules: Amplitude and Phase measurements", Physics Colloquium, Berlin, Berlin, Germany 2007
2. M. Gühr, "High harmonic generation on from Multiple Orbitals" ISTCP VI, Vancouver, Canada, 2008
3. M. Gühr, "High harmonic generation in Molecules", SPRC 2008, Stanford, USA 2008
4. Y. Acremann, "X-ray Microscopy and Magnetism", October 3, 2007, SSRL User's Meeting 2007, Stanford, USA
5. Y. Acremann, "Ultrafast magnetism", November 21, 2007, Ultrafast Materials Science Workshop, Santa Fe
6. Y. Acremann, "Magnetization reversal by spin torque: Towards a unified picture", January 24, 2008, X-ray Magnetic Scattering and Spectroscopy (XRMS08), Hamburg, Germany
7. Y. Acremann, "Ultrafast spin manipulation in solids", February 3, 2008, Ultrafast Phenomena in Cooperative Systems (UPCS) Gordon Research Conference, Il Ciocco, Italy
8. Y. Acremann, "Magnetization dynamics: ultra-fast and ultra-small", March 5, 2008, DOE-BES review of the Advanced Light Source, Berkeley, USA
9. Y. Acremann, "Optical Probing of X-ray Transients", June 21, 2008, X-ray pump-probe workshop, SLAC, Stanford, USA
10. Pat Hillyard, "Theoretical and Ultrafast X-ray Diffraction Studies of Crystal Stability in Highly Excited InSb", 34th Annual SSRL Users' Meeting, October 1-2, 2007

11. Kelly Gaffney, "Research Opportunities at the X-ray Pump Probe Endstation at the LCLS", SSRL 34th Users' Meeting, October 1-2, 2007
12. Kelly Gaffney, "Ultrafast x-ray scattering studies of structural dynamics", American Chemical Society National Meeting, New Orleans, LA, April 7, 2008
13. Kelly Gaffney, "Experimental and theoretical studies of carrier dependent lattice stability in semiconductors", SPIE High Power Laser Ablation 2008, Taos, NM April 21, 2008
14. Kelly Gaffney, "Making Molecular Movies", Low Energy Electrodynamics in Solids 2008, Whistler, BC Canada, July 3, 2008
15. Kelly Gaffney, "X-ray Free Electron Laser Science", Stanford-Berkeley Synchrotron Summer School, Menlo Park, CA, August 21, 2008
16. Sungnam Park, "Hydrogen-Bond Structural Dynamics in Aqueous Ionic Solutions", Ulsan National Institute of Science and Technology, Ulsan, Korea, May 22, 2008
17. Sungnam Park, "Hydrogen-Bond Structural Dynamics in Aqueous Ionic Solutions", Department of Chemistry, Korea University, Seoul, Korea, June 13, 2008
18. Sungnam Park, "Hydrogen-Bond Structural Dynamics in Aqueous Ionic Solutions", Advanced Photonics Research Institute (APRI), Gwangju Institute of Science and Technology (GIST), Gwangju, Korea, June 17, 2008
19. P.B. Hillyard, "Application of Ultrafast X-rays to the Study of Time-Dependent Semiconductor Properties", Applied Materials, Sunnyvale, CA, August, 2008
20. Aaron Lindenberg, "New Opportunities in Ultrafast X-ray Science", EPSCoR (Experimental program to stimulate competitive research), Oak Ridge National Laboratory, Oak Ridge, Tennessee, July 23, 2008
21. Aaron Lindenberg, "Femtosecond x-ray studies of nanoscale nucleation dynamics", Innovative dynamic studies of materials at the nanoscale, ECI, Gyeong-ju, Korea, June 29, 2008
22. A. Schertz, "Spectroscopy with FEL radiation", Atomic, Molecular & Optical Science Instrument (AMO) Proposal Workshop, June 2008 (Stanford, USA)
23. A. Schertz, "Lensless Imaging with Multiple-wavelength Resonant Coherent Scattering", SSRL-LCLS Users' meeting, Oct. 2007 (Stanford, USA)
24. A. Schertz, "Overview of Coherent scattering program at SSRL", SSRL-LCLS Users' meeting 2007, Oct. 2007 (Stanford, USA)
25. P. Bucksbaum, "Atomic Attophysics," AMO Gordon Conference, Tilton, NH, July 2007
26. P. Bucksbaum, "Advances in time-resolved x-ray science: Tutorial, from Synchrotrons to X-ray FEL's", Frontiers in Optics, San Jose, September 18, 2007
27. P. Bucksbaum, "PULSE: The Center for Photon Ultrafast Laser Science and Engineering", AMOS Contractors' Meeting, September 10, 2007
28. P. Bucksbaum, "Advances in time-resolved x-ray science", Tutorial for Frontiers in Optics Meeting, September 18, 2007
29. P. Bucksbaum, "LCLS Science Perspective", LCLS-SSRL Users Meeting, October 2, 2007
30. P. Bucksbaum, "Fundamental science challenges for soft x-ray FEL research in the 21st Century: Quantum Coherence and Quantum Control", LBNL Workshop on Future Light Sources, Berkeley, October 9, 2007
31. P. Bucksbaum, "LCLS Science Perspective", X-ray and Neutron Contractor's Meeting, October 19, 2007

32. P. Bucksbaum, "Strong-field Control of Molecules", Atomic and Molecular Interactions GRC, July 10, 2008
33. P. Bucksbaum, "Picosecond (not femto- or attosecond) AMO X-ray Opportunities", SPX at ANL, May 9, 2008
34. P. Bucksbaum, "Ultrafast Quantum Control", U. Chicago Physics Colloquium, Jan 17, 2008
35. P. Bucksbaum, "Structure of aligned molecules viewed with short wavelength radiation", Time Resolved X-rays 2008, Dresden, August, 2008
36. P. Bucksbaum, "Ultrafast Quantum Control" KSU Physics Colloquium, March 31, 2008
37. P. Bucksbaum, "NSF Panel on Light Source Facilities AMO Physics Applications: a fruitful partnership", Invited talk to the NSF panel on light source facilities, LLNL, Jan 10, 2008
38. P. Bucksbaum, "Ultrafast imaging and control of atoms and molecules", MIT Spectroscopy Lab Symposium, MIT, Feb 27, 2008
39. P. Bucksbaum, "Strong-field Control of Molecules", Multiphoton GRC, June 9, 2008
40. P. Bucksbaum, "Ultrafast Quantum Control", ORNL Director's Colloquium, Feb 26, 2008
41. P. Bucksbaum, "Ultrafast Quantum Control", UIUC Mat. Sci. Colloquium, Feb, 2008
42. Douglas W. Broege, Ryan N. Coffee, Phil H. Bucksbaum, "Impulsive Alignment of Hot, Centrifugally Distorted Molecules", CLEO/QELS 2008
43. Joseph P. Farrell, Brian K. McFarland, Markus Guehr, Philip H. Bucksbaum, "Observation of an Intensity Dependent Minimum and Harmonic Dependent Linewidths in the High Harmonic Spectrum of Nitrogen", CLEO/QELS 2008
44. David M. Cardoza, Andrei C. Florean, James L. White, Roseanne J. Sension, Philip H. Bucksbaum, "Probing Excited State Dynamics of Retinal Isomerization in Bacteriorhodopsin", CLEO/QELS 2008
45. Brian K. McFarland, Joseph P. Farrell, Markus Guehr, Philip H. Bucksbaum, "High Harmonic Spectral Minimum and Phase in Argon and Nitrogen", CLEO/QELS 2008
46. B. McFarland, J. Farrell, P. Bucksbaum, M. Guehr, "Intensity Dependent Interference Structures in High Harmonic Generation", DAMOP 2008
47. J. Farrell, B. McFarland, M. Guehr, P. Bucksbaum, "HOMO-1 Contribution in High Harmonic Generation", DAMOP 2008
48. D. Broege, R. Coffee, and P. Bucksbaum, "Strong Field impulsive alignment in the presence of high temperatures and large centrifugal distortion", DAMOP 2008
49. C. Herne, P. Bucksbaum, "Orientation of asymmetric-top water molecules with shaped terahertz fields", DAMOP2008
50. A. Florean, D. Cardoza, J. White, J. Lanyi, R. Sension, and P. Bucksbaum, "Coherent Control of Retinal Isomerization in Bacteriorhodopsin in the High Intensity Regime", DAMOP2008
51. Ryan Coffee, "Molecular alignment with an eye toward ultrafast x-rays", PASI Meeting
52. M. Gühr, B. K. McFarland, J. P. Farrell and P. H. Bucksbaum, "HOMO-1 contribution in High Harmonic Generation", Invited talk at Ultrafast 2008, Italy
53. M. Bogan, "Experimental Results from FLASH", 2009 Particle Accelerator Conference, Vancouver, BC, Canada, May 4-8, 2009

54. M. Bogan, "Targeting the XFEL bull's eye: Substrate-free sample delivery", International Workshop on Science with and Instrumentation for Ultra-fast Coherent Diffraction Imaging of Single Particles, Clusters and Bio-Molecules at the European XFEL, Uppsala, Sweden, November 21, 2008
55. M. Bogan, "Bringing the Bio to LCLS", PULSE Seminar, SLAC, August 7, 2008
56. M. Bogan, "Single Particle X-ray Diffractive Imaging", Arizona State University, Tempe, Arizona, April 11, 2008
57. M. Bogan, "Enabling Technologies for Single Particle X-ray Diffractive Imaging at FLASH", LBNL, February 13, 2008
58. M. Bogan, "Enabling Technologies X-ray Diffractive Imaging", DESY/University of Hamburg, Hamburg, Germany, November 14, 2007
59. M. Bogan, "Femtosecond Diffractive Imaging of Nanoparticles", Structure and Dynamics of Free and Supported Nanoparticles Using Short Wavelength Radiation, Erice, Italy, July 2007
60. M. Bogan, "LCLS Instrument Challenges for Bioimaging – Sample Injection", UK – SLAC Roundtable Discussion on Biological Applications of X-ray FELs, SLAC, April 24, 2007

Stanford Institute for Materials and Energy Science (SIMES)

SIMES had important publications in scientific journals including *Science* (2) and *Nature* (3). The fabrication of two novel superconductors led to two papers in *Nature* with experiments using neutron scattering and photoemission. Another angle-resolved photoemission experiment led to publication in *Nature* revealing the presence of two competing states in cuprate superconductors. The pioneering angle and time resolved photoemission experiment led to publication in *Science*. Investigations of nano-diamond led to a publication in *Science* on new insights on the nature of monochromatized electron emission from novel surfaces.

HEP

Accelerator Research Division

Advanced Accelerator R&D (AARD) - Laser Acceleration

SLAC work on laser acceleration was featured in three invited talks, and 17 papers (three refereed).

AARD - Plasma Wakefield Acceleration

The E-167 and FACET collaboration have strong publication and conference presentation histories with substantial educational components (one PhD completed in 2007, two more in progress). They had four invited talks, 20 conference papers and five refereed publications.

Advanced Computations Department (ACD)

Most of ACD scientific results are published in conference proceedings, with a total of 16 published papers, including a peer-reviewed paper published in the *Journal of Computational Physics*. ACD staff gave 7 invited talks at various conferences and meetings.

Ph.D. Thesis. A Stanford graduate student, supervised by ACD staff, successfully defended his thesis, "Parallel hp-adaptive mesh refinement for electromagnetic field solvers using three dimensional vector finite element methods and its application to accelerator structures", in May 2008.

Advanced Microwave Technology Research (ATR)

ATR members published 34 papers in FY08 and two in refereed journals.

Advanced Beam Physics (ABP)

Member of ABP published 23 conference papers and three papers in refereed journals.

LHC-Accelerator Research Group (LHC-AR)

LHC-AR members gave invited talks at Beams07 and published 5 papers in FY08.

Next Linear Collider Test Accelerator (NLCTA)

Work conducted at the NLCTA was featured in 4 invited talks and 21 papers (three refereed).

Astrophysics

In the calendar year 2007, there were 179 papers including members of the SLAC astrophysics program in the authorship list. This is an underestimate of the number of papers over the past fiscal year, which will be available in January.

B-Factory

BABAR

- Number of articles submitted to refereed journals: 61
- Number of invited talks by *BABAR* collaborators: 136
- Number of new physics results presented at ICHEP2008: 90 (3 plenary talks)
- As of the end of FY08, the total number of submitted (published) *BABAR* papers is 375 (360, for a total number of citations of 11450 and an h-index of 52).
- The number of publications (and their average citations) in *Phy. Rev. Lett.* are 161 (42), and the corresponding numbers in *Phys. Rev. D.* are 176 (21).
- Since the start of data taking, the *BABAR* collaborators have presented 890 invited talks at major conferences.

PEP-II

The PEP-II staff published about 10 technical papers in scientific conferences in FY08 to document the advances in the performance of PEP-II. These publications have been in strong demand from the designers of other future accelerators including NSLS-II, Super-B, and BEPC-II.

Enriched Xenon Observatory (EXO)

The EXO collaboration has published several papers in either NIM or the Physical Review covering technical issues relating to the R&D for EXO200, the R&D for barium tagging, or the radiopurity qualification of materials used for construction of the apparatus. In FY08, one additional paper appeared in NIM.

ILC Program

Results from the E166 experiment were published in Physical Review Letters (Vol 100, No. 21, 30 May, 2008). The T-474/491 collaboration published a reviewed paper, *Cavity BPM System Tests for the ILC Spectrometer*, in NIM-A, Vol 592 (3) July 2008, Pages 201-217.

SLAC work on linear colliders was featured in invited talks at LCWS07, EPAC and AAC and in more than 35 conference papers.

Two Ph.D. theses are expected in 2008 from the ESA experiments. Christine Clarke successfully completed her PhD in March 2008 from Oxford U. on T-488. Victoria Blackmore is expected to complete in fall 2008 from Oxford U. on T-487.

This year SLAC has participated as authors in the following documents:

- ILC Reference Design Report Volume 4 – Detectors
- ILC Reference Design Report: ILC Global Design Effort and World Wide Study
- An electromagnetic calorimeter for the silicon detector concept (Pranama 69:1025-1030,2007)
- Silicon Detectors at the ILC (STD6 Hiroshima)

Klystron/Microwave Department

1. S. Döbert, R. Fandos, A. Grudiev, S. Heikkinen, J. A. Rodriguez, M. Taborelli, W. Wuensch, C. Adolphsen, L. Laurent, “High Power Test Of An X-Band Slotted-Iris Accelerator Structure At NLCTA”, Proceedings of PAC07, Albuquerque, New Mexico, USA WEPMN070 and SLAC-PUB-12788
2. David H. Dowell, Erik Jongewaard, James Lewandowski, Cecile Limborg-Deprey, Zenghai Li, John Schmerge, Arnold Vlieks, Juwen Wang, Liling Xiao (SLAC) , “The Development of the Linac Coherent Light Source RF Gun”, SLAC-PUB-13401, Sep 24, 2008. 33pp. Published in ICFA Beam Dynamics Newsletter
3. R. Akre, Invited talk on LCLS LLRF control system at the AACW
4. R. Akre, Review Panel Member for Fiber optic interferometer for LCLS experimenters built by LBNL
5. L. Laurent, “Pulse Heating, Surface Analysis, and Hardness Testing”, 2nd Collaboration Meeting on X-band Accelerator Structure Design and Test Program, KEK, May 2008

Scientific Computing

In FY08 SLAC Scientific Computing itself published 10 papers in refereed journals and published conference proceedings. In addition, members of the group were among authors in over 100 papers from the broader SLAC science program.

Theoretical Physics

In FY08, the SLAC HEP theory group produced 73 papers. About 45 of these were submitted to refereed journals; of these, 35 have already been accepted for publication. The other articles will appear in conference proceedings and reports.