

NBSIR 88-3097

*DeWeese W =*  
*0.07 2/25/88*

# METROLOGY FOR ELECTROMAGNETIC TECHNOLOGY: A BIBLIOGRAPHY OF NBS PUBLICATIONS

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Edited by  
Mary E. DeWeese

National Bureau of Standards  
U.S. Department of Commerce  
Boulder, Colorado 80303

August 1988

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NBSIR 88-3097

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Electromagnetic Technology Division  
Center for Electronics and Electrical Engineering  
National Engineering Laboratory  
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U.S. DEPARTMENT OF COMMERCE, C. William Verity, Secretary  
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director



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METROLOGY FOR ELECTROMAGNETIC TECHNOLOGY:  
A BIBLIOGRAPHY OF NBS PUBLICATIONS

Mary E. DeWeese, Editor

This bibliography lists the publications of the personnel of the Electromagnetic Technology Division of NBS in the period from January 1970 through publication of this report. A few earlier references that are directly related to the present work of the Division are also included.

Key words: cryoelectronics; electromagnetic metrology; lasers; optical fibers; superconducting materials

INTRODUCTION

R. A. Kamper

The Electromagnetic Technology Division was formed during the reorganization of NBS in April 1978 by combining parts of the former Electromagnetics and Cryogenics Divisions. It develops measurement methods and standards and provides metrological support for laser systems, optical communication equipment, cryoelectronics, superconductors, and other unusual electrical engineering materials. For the individual staff members of the division, the reorganization brought a realignment of long-term goals but little immediate discontinuity in their work. It therefore makes good sense that this bibliography should cover a period beginning some time before the reorganization, so as to include at least the more recent origins of the present work of the division. The editors have attempted to include all work published by the present staff members of the division, while they were employees of NBS, in the period from January 1970 through publication of this report. There are a few exceptions, where work that is totally unrelated to the present program has been excluded or where work by authors now in other parts of NBS has been included because of its special significance. A few papers on various topics published before 1970 have also been included because of their direct relationship to the present program.

Several other sources may be useful to the reader who is interested in activities at NBS connected with electromagnetic metrology. A companion bibliography to this one lists the publications of the Electromagnetic Fields Division: NBSIR 85-3040. Its topics include metrology for antennas, satellite communications equipment, microwave metrology, electromagnetic waveform metrology, electromagnetic interference, and hazard. An excellent summary of the whole field of electromagnetic metrology as it stood in 1967 was published as a special issue of the IEEE Proceedings (vol. 55; June 1967). Advances in the following decade were described in two other special issues of the same journal (vol. 66, April 1978; and vol. 74, January 1986).

## A Note on Abbreviations

Most readers are familiar with the commonly used abbreviations for the names of the professional journals that appear in this bibliography. Some publication series are peculiar to NBS and may call for explanation. They are:

NBSIR - NBS Interagency/Internal Report  
NBS TN - NBS Technical Note  
NBS SP - NBS Special Publication  
NBS HB - NBS Handbook  
NBS JRES - NBS Journal of Research  
NBS MN - NBS Monograph

## Purchase Procedures and Document Availability

NBS Technical Notes, Special Publications, Handbooks, Journals of Research, and Monographs may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Orders must be accompanied by postal money order, express money order, or check made out to the Superintendent of Documents.

NBS Interagency/Internal Reports (NBSIRs) may be purchased from the National Technical Information Service, Springfield, VA 22161. Orders must be accompanied by postal money order, express money order, or check made out to NTIS.

Reprints of papers published in non-NBS media may be available in limited quantities from the authors.

## Acknowledgments

A large part of the labor of preparing a bibliography is spent on collecting and arranging the material. We thank Sheila Aaker, Frances Brown, Kit Kline, and Jessie Page for their assistance with these chores. The prime source of material was the NTIS file. This was supplemented with material supplied by individual authors.



## OPTICAL ELECTRONIC METROLOGY

Interlaboratory Comparison of Far-Field Methods for Determining Mode Field Diameter Using Both Gaussian and Petermann Definitions;

Drapela, T. J.

in NBS SP 748; Sep 88.

Electrically Calibrated Photothermal Deflection Measurement for Separating Channel Waveguide Loss Mechanisms;

Hickernell, R. K.; Larson, D. R.; Phelan, R. J., Jr.

in NBS SP 748; Sep 88.

Technical Digest, Symposium on Optical Fiber Measurements, 1988;

Day, G. W.; Franzen, D. L., eds.

NBS SP 748; Sep 88.

Calibration and Standardization Issues for the Optical Time-Domain Reflectometer

Danielson, B. L.

NBSIR 87-3078; Dec 87.

Superconductivity: Challenge for the Future;

Kamper, R. A.; Clark, A. F.

NBS JRES 92(6): 391-392; Nov-Dec 87.

Guided-Wave Reflectometry with Micrometer Resolution;

Danielson, B. L.; Whittenberg, C. D.

Appl. Optics, 26(14): 2836-2842; Jul 15, 87.

Microscope Objectives, Cover Slip, and Spherical Aberration;

Oates, C. W.; Young, M.

Appl. Optics 26(11): 2043; Jun 1, 87.

Metrology for Electromagnetic Technology: A Bibliography of NBS Publications;

Kline, K. E.; DeWeese-Bishop, M. E.

NBSIR 87-3074; Jun 87.

Image Processing Software for Optical Engineering;

Weppner, M. B.; Young, M.

NBSIR 87-3065; Apr 87.

Limits to the Precision of Electro-optic and Magneto-optic Sensors;

Day, G. W.; Hale, P. D.; Deeter, M.; Milner, T. E.; Conrad, D.; Etzel, S. M.

Electric Power Research Institute (EPRI) EL-5431, Vol. 1; Mar 87.

Attenuation Measurements on Deformed Optical Fibers;

Englesrath, A.; Danielson, B. L.; Franzen, D. L.

NBSIR 86-3052; 86.

Hybrid Computer-Optical Processing with Inexpensive Liquid Crystal Television;

Young, Matt; Weppner, Matthew

Proc., 1986 International Optical Computing Conf.; SPIE 700: 146-153; 86.

- Compact Fiber Sensors for the Measurement of Low Level Electric Currents;  
Day, G. W.  
Proc. 4th Intl. Conf. on Optical Fiber Sensors; Tokyo, Japan; p 81-84;  
Oct 86.
- Laser Induced Damage in Optical Materials: 1984;  
Sponsors: National Bureau of Standards, American Society for Testing and  
Materials, Office of Naval Research, Department of Energy, Defense Advanced  
Research Project Agency, Air Office of Scientific Research  
Proc. of Sixteenth Annual Symp. on Optical Materials for High Power  
Lasers; Oct 15-17, 1984; Boulder, CO; NBS-SP 727; Oct 86.
- Direct Measurement of the Spatial Modes of a Laser Pulse--Theory;  
Johnson, E. G.  
Appl. Opt. 25(17): 2967-2975; Sep 86.
- Technical Digest, Symposium on Optical Fiber Measurements, 1986;  
Day, G. W.; Franzen, D. L.  
NBS SP-720; Sep 86.
- Measurement Procedures for Optical Fiber and Related Components;  
Danielson, B. L.; Day, G. W.; Franzen, D. L.; Gallawa, R. L.; Kim, E.;  
Phelan, R. J.; Young, Matt  
Rome AFB, NY: RADC-TR-86-81; Aug 86.
- Metrology for Electromagnetic Technology: A Bibliography of NBS Publications;  
Kline, K. E.; DeWeese, M. E., eds.  
NBSIR 86-3048; Jun 86.
- Scratch-and-Dig Standard Revisited;  
Young, Matt  
Appl. Opt. 25(12): 1922-1928; Jun 86.
- Single Mode Fiber Dispersion Measurements using Optical Sampling with a  
Modelocked Laser Diode;  
Kanada, T.; Franzen, D. L.  
Opt. Lett. 11: 330-332; May 86.
- Fiber Bandwidth Measurement Using Pulse Spectrum Analysis;  
Yang, Shao; Gallawa, R. L.  
Appl. Opt. 25(7): 1069-1070; Apr 86.
- Low-Cost LCD Video Display for Optical Processing;  
Young, Matt  
Appl. Opt. 25(7): 1024-1026; Apr 86.
- Optical Power Meters: A Round Robin Test of Uncertainty;  
Gallawa, R. L.; Yang, Shao  
Appl. Opt. 25(7): 1066-1068; Apr 86.

- Standard Measurement Procedures for Characterizing Single-Mode Fiber;  
Franzen, D. L.  
Conf. Digest, Test & Measurement World Expo.; San Jose, CA; Apr 86.
- Transfer Standards for Energy and Power of Low-Level 1.064  $\mu\text{m}$  Laser Pulses  
and cw;  
Rasmussen, A. L.; Sanders, A. A.  
SPIE Optical Engineering 25(2): 277-285; Feb 86.
- A Comparison of Three Bandwidth Measurements Techniques for Optical Fibers;  
Yang, Shao; Gallawa, R. L.  
IEEE Trans. Instrum. Meas. IM-35(2): 187-194; Jan 86.
- Optical Waveform Measurement by Optical Sampling/Crosscorrelation with a Mode  
Locked Laser Diode;  
Kanada, T.; Franzen, D. L.  
Opt. Lett. 11(1): 4-6; Jan 86.
- Uncertainty Charts for RF and Microwave Measurements;  
Kamper, R. A.  
Proc. IEEE 74(1): 27-32; Jan 86.
- A Calorimeter for Measuring 1-15 kJ Laser Pulses;  
Simpson, P.; Johnson, E. G.  
Proc. SPIE; Aug 21-23, 1984; San Diego, CA; 499: 121-124; 85.
- Annealing of Bend-Induced Birefringence in Fiber Current Sensors;  
Day, G. W.; Etzel, S. M.  
IOOC-ECOC Tech. Digest, Vol. 1; Proc., European Conf. on Optical  
Communication; Oct 1-4, 1985; Venice, Italy; p 871-874; 85.
- A Sensitive, High Frequency, Electromagnetic Field Probe Using a  
Semiconductor Laser in a Small Loop Antenna;  
Phelan, R. J.; Larson, D.; Simpson, P.  
Proc. SPIE; Aug 19-23, 1985; San Diego, CA; 566: 300-306; 85.
- Interlaboratory Measurement Comparison Among Fiber Manufacturers to Determine  
the Effective Cutoff Wavelength and Mode-Field Diameter of Single-Mode Fiber;  
Franzen, D. L.  
Tech. Digest, Optical Fiber Communication Conf.; Feb 11-13, 1985;  
San Diego, CA; p 36; 85.
- Introduction to Fiber Optics: Short-Haul and Long-Haul Measurements and  
Applications, III;  
Gallawa, R. L.  
Proc. SPIE; Aug 21-23, 1985; San Diego, CA; 599: vi; 85.
- Laser Power and Energy Measurements and the NBS Laser Measurement Assurance  
Program (MAP);  
Case, W. E.; Sanders, A. A.  
Instrumentation/Measurement Technology Conf.; Mar 20-22, 1985; Tampa, FL;  
p 281-185; 85.

- Optical Fiber Sensors for the Measurement of Pulsed Electric Currents;  
Day, G. W.; McFadden, J. D. O.; Veesser, L. R.; Chandler, G. I.;  
Cernosek, R. W.  
Proc. NATO/AGARD (Advisory Group for Aerospace Research & Development),  
Guided Optical Structures in the Military Environment; Sep 23-27, 1985;  
Istanbul, Turkey; AGARD-CPP-383: p 8-1 to 8-9; 85.
- Pulse Spectrum Analysis Method of Measuring Fiber Bandwidth;  
Yang, S.; Alvarez, R.; Weimer, C.; Gallawa, R. L.  
Proc. SPIE; 559: 207-210; 85.
- Scratch Standards Should Not be Used to Predict Damage Threshold;  
Young, M.  
NBS SP-669; p 151-156; 85.
- Some Issues in Optical Fiber Bandwidth Measurement;  
Yang, S.; Gallawa, R. L.  
Proc. IEEE Instrumentation/Measurement Conf.; Mar 20-22, 1985; Tampa, FL;  
p 228; 85.
- The Scratch Standard is Not a Performance Standard;  
Young, M.  
Workshop on Optical Fabrication and Testing Digest; Jun 12-13, 1985;  
Cherry Hill, NJ; p ThAA4-1&2; 85.
- Tunable Scratch Standards;  
Young, M.; Johnson, E. G., Jr.; Goldgraben, R.  
Proc. SPIE, Jan 21-22, 1985; Los Angeles, CA; 525: 70-77; 85.
- Use of Mode Transfer Matrices in L.A.N. Loss Evaluation;  
Maisonneuve, J. M.; Churoux, P.; Gallawa, R. L.  
Proc. SPIE; Aug 21-23, 1985; San Diego, CA; 559: 182-185; 85.
- Detectors for Picosecond Optical Power Measurements;  
Phelan, R. J.; Larson, D.; Franzen, D. L.; Frederick, N. V.  
Proc. SPIE; Aug 21-23, 1984, San Diego, CA; 499: 34-37; Spring 85.
- Documentation of the NBS APD and PIN Calibration Systems for Measuring  
Peak Power and Energy of Low-Level 1.064  $\mu\text{m}$  Laser Pulses;  
Rasmussen, A.; Sanders, A.  
NBSIR 85-3032, Dec 85.
- Low-Level Germanium Detector Transfer Standard at 1.064  $\mu\text{m}$ ;  
Rasmussen, A.; Sanders, A.  
NBSIR 85-3041, Dec 85.
- The Scratch Standard is Only a Cosmetic Standard;  
Young, M.  
Laser Focus/Electro-Optics; 138-140; Nov 85.
- Determining the Mode-Field Diameter of Single-Mode Optical Fiber:  
An Interlaboratory Comparison;  
Franzen, D. L.; Srivastava, R.  
IEEE J. Lightwave Tech. LT-3(5): 1073-1077; Oct 85.

- Direct Measurement of the Electric Field of a Laser Pulse-Theory;  
Johnson, E. G.  
NBS TN 1084; Aug 85.
- Optical Time-Domain Reflectometer Specifications and Performance Testing;  
Danielson, B. L.  
Appl. Opt. 24: 2313-2322; Aug 1, 85.
- Pattern Recognition Using Incoherent OTF Synthesis and Edge Enhancement;  
Katzir, Y.; Young, M.; Glaser, I.  
Appl. Opt. 24(6): 863-867; Mar 15, 85.
- Determining the Effective Cutoff Wavelength of Single-Mode Fibers:  
An Interlaboratory Comparison;  
Franzen, D. L.  
IEEE J. Lightwave Tech. LT-3(1): 128-133; Feb 85.
- Intramodal Part of the Transfer Function for an Optical Fiber;  
Rodhe, P.  
IEEE J. Lightwave Tech. LT-3(1): 154-158; Feb 85.
- Redefining the Scratch Standards;  
Young, M.; Johnson, E. G., Jr.  
NBS TN-1080; Feb 85.
- The Bandwidth of a Multimode Fiber Chain;  
Rodhe, P.  
IEEE J. Lightwave Tech. LT-3(1): 145-154; Feb 85.
- Conference Report: Fiber Optics Emphasis on Single Mode;  
Franzen, D. L.; Day, G. W.  
1984 Optical Fiber Measurements Symp.; NBS JRes 90(1): 49; Jan-Feb 85.
- Fast Detectors and Modulators;  
Phelan, R. J.  
Chap. in Semiconductors and Semimetals; Academic Press, 21(D): 249-259;  
84.
- A Calorimeter for Measuring High-Energy Optical Pulses;  
Simpson, P. A.; Etzel, S. M.; Johnson, E. G., Jr.  
NBSIR 84-3008; Oct 84.
- Technical Digest, Symposium on Optical Fiber Measurements;  
Day, G. W.; Franzen, D. L.  
NBS SP-683; Oct 84.
- A Calorimeter for Measuring 1-15 kJ Laser Pulses;  
Simpson, P. A.; Johnson, E. J.  
Proc. SPIE; Aug 21-22, 1984; San Diego, CA; 499: 34-37; Aug 84.
- Attenuation of Multimode Fused Silica Optical Fibers Cooled to Liquid Helium  
Temperatures;  
Engelsrath, A.; Larson, D. R.; Phelan, R. J.; Franzen, D. L.  
Proc. SPIE; Aug 21-22, 1984; San Diego, CA; 499: 124-130; Aug 84.

- Detectors for Picosecond Optical Power Measurements;  
Phelan, R. J., Jr.; Larson, D. R.; Frederick, N. V.; Franzen, D. L.  
Proc. SPIE; Aug 21-22, 1984; San Diego, CA; 499: 34-37; Aug 84.
- Equivalent Step-Index Parameters in Single-Mode Fibers: Measurement and Applications;  
Srivastava, R.  
Proc. SPIE; Aug 21-22, 1984; San Diego, CA; 500: 27-36; Aug 84.
- The Use of Power Transfer Matrices in Predicting System Loss: Theory and Experiment;  
Maisonneuve, J. M.; Gallawa, R. L.  
Proc. SPIE; Aug 21-22, 1984; San Diego, CA; 500: 88-93; Aug 84.
- Using Optical Processing to Find the Beam Profile of a Laser Pulse (Theory);  
Johnson, E. G., Jr.  
Proc. SPIE; Aug 21-22, 1984, San Diego, CA; 499: 75-88; Aug 84.
- Measurement of Multimode Optical Fiber Attenuation: An NBS Special Test Service;  
Gallawa, R. L.; Chamberlain, G. E.; Day, G. W.; Franzen, D. L.; Young, M.  
NBSIR 83-1691; Feb 84.
- Some Trends in Optical Electronic Metrology;  
Sanders, A. A.  
Proc. 1984 Measurement Science Conf., Los Angeles, CA; Jan 84.
- A Computer Controlled System for Calibrating Detectors of TEA Laser Pulses;  
Simpson, P. A.  
Proc. 22nd Automatic rf Testing Group Conf.; Nov 3-4, 1983; Albuquerque, NM; ARFTG Fall Digest, p 25-36; 83.
- Birefringence Measurements in Single Mode Optical Fiber;  
Day, G. W.  
Proc. SPIE; Aug 21-24, 1983; San Diego, CA; 425: 72-79; 83.
- Fiber Optics: Short-Haul and Long-Haul Measurements and Applications;  
Gallawa, R. L., ed.  
Proc. SPIE; Aug 24-25, 1982; Vol. 355; 83.
- Submicrometer Interdigital Silicon Detectors for the Measurement of Picosecond Optical Pulses;  
Phelan, R. J.; Larson, D.; Frederick, N. V.; Franzen, D. L.  
Proc. SPIE; 425: 207-211; 83.
- Objective Measurements and Characteristics of Scratch Standards;  
Young, M.  
Proc. SPIE, Aug 1982, 3526: 86-92; Spring 83.
- Estimating Index Profiles of 1.3  $\mu\text{m}$  Single Mode Fibers by Near-Field Measurements at Blue Wavelengths;  
Kim, E. M.; Franzen, D. L.; Young, M.; Rodhe, P. M. (Guest Worker)  
IEEE J. Lightwave Tech. LT-1(4): 562-566; Dec 83.

Simulating the Scratch Standards for Optical Surfaces--Theory;

Johnson, E.

J. Appl. Opt. 22(24): 4056-4068; Dec 83.

Optical Fiber Characterization Attenuation, Frequency Domain Bandwidth, and Radiation Patterns;

Chamberlain, G. E.; Day, G. W.; Franzen, D. L.; Gallawa, R. L.; Kim, E. M.; Young, M.

NBS SP 637, Vol. II; Oct 83.

Linewidth Measurement by High-Pass Filtering--A New Look;

Young, M.

Appl. Opt. 22(13): 2022-2025; Jul 83.

Laser Measurements;

Sanders, A. A.

Proc. 1983 Measurement Science Conf., Jan 20-21, 1983; Palo Alto, CA; Jun 83.

Measurement of Multimode Optical Fiber Attenuation: An NBS Special Test Service;

Gallawa, R. L.; Chamberlain, G. E.; Day, G. W.; Franzen, D. L.; Young, M.

NBS TN 1060; Jun 83.

Optical Time-Domain Reflectometer Performance and Calibration Studies;

Danielson, B. L.

NBS TN 1064; Jun 83.

Two-Dimensional Near-Field Contouring of Optical Fiber Cores;

Kim, E. M.; Franzen, D. L.

Proc. SPIE; Jun 83.

EIA Fiber Performance Measurement Standards;

Gallawa, R.; Franzen, D. L.

Photonics Spectra, p 55-68; Apr 83.

Questions Students Ask;

Young, M.

Physics Teacher, p 194-195; Mar 83.

An Inter-Laboratory Measurement Comparison of Core Diameter on Graded-Index Optical Fibers;

Kim, E. M.; Franzen, D. L.

NBS SP 641; Oct 82.

A System for Measuring Energy and Peak Power of Low-Level 1.064  $\mu\text{m}$  Laser Pulses;

Sanders, A. A.; Rasumussen, A. L.

NBS TN 1058; Oct 82.

Measurement of the Core Diameter of Graded-Index Optical Fibers:

An Interlaboratory Comparison;

Kim, E. M.; Franzen, D. L.

Appl. Opt. 21(19): 3443-3450; Oct 82.

Technical Digest - Symposium on Optical Fiber Measurements, 1982;  
Franzen, D. L.; Day, G. W.; Gallawa, R. L., eds.  
NBS SP 641; Oct 82.

Beam-Profile Measurement of Pulses Using a Spatial Filter to Sample the Hermite Modes for a String of Pulses;  
Johnson, E. G.  
NBS TN 1057; Sep 82.

Documentation of the NBS C, K, and Q Laser Calibration Systems;  
Case, W. E.  
NBSIR 82-1676; Sep 82.

Optical Fiber Characterization;  
Day, G. W.; Danielson, B. L.; Franzen, D. L.; Kim, E.; Young, M., eds.  
NBS SP 637, Vol. 1; Jul 82.

Calibration Reticle for Optical Fiber Near-Field Core Diameter Measurements;  
Kim, E. M.; Franzen, D. L.  
CPEM Digest; May 82.

Characterization of a Concentric-Core Fiber;  
Danielson, B. L.; Franzen, D. L.; Gallawa, R. L.; Kim, E. M.; Young, M.  
NBSIR 82-1661; Apr 82.

On the Definition of Fiber Numerical Aperture;  
Gallawa, R. L.  
Electro-Optical Systems Design, p 47; Apr 82.

Quantum Noise Limits the Pispick Camera to Simple Objects;  
Young, M.  
J. Opt. Soc. Amer. 72(3): 402-403; Mar 82.

Optical Waveguide Communications Glossary;  
Gallawa, R. L., et al.  
NBS HB 140; Jan 82.

Book Review: Principles of Optical Fiber Measurements by D. Marcuse;  
Young, M.  
Laser Focus, p 118-119; Jan 82.

Long Optical Fiber Fabry Perot Interferometers;  
Franzen, D. L.; Kim, E.  
Appl. Opt. 20(23): 3991-3992; 81.

A Measurement Method for Determining the Optical and Electro-Optical Properties of a Thin Film;  
Larson, D.  
NBSIR 81-1652; Dec 81.



- An Optical Waveguide Communications Glossary, Revised;  
Hanson, A. G.; Bloom, L. R.; Day, G. W.; Young, M.; Gray, E. M.;  
Gallawa, R. L.  
NBS HB 140; Dec 81.
- Backscattered Signature Simulations;  
Danielson, B. L.  
NBS TN 1050; Dec 81.
- Book Review: Optical Fibre Communication (invited review);  
Gallawa, R.  
IEEE Spectrum, p 1; Nov 81.
- The Use of LEDs as YAG Laser Simulators;  
Young, M.  
Proc. Conf. Electro-Optics and Lasers; Nov 81.
- Optical Fiber Index Profiles by Refracted-Ray Scanning;  
Young, M.  
Appl. Opt. 20(19): 3415-3421; Oct 81.
- Measurement of Optical Fiber Bandwidth in the Frequency Domain;  
Day, G. W.  
NBS TN 1046; Sep 81.
- Standard Measurement Conditions and Test Results on Multimode Fibers;  
Franzen, D. L.  
Laser Focus, p 103-105; Aug 81.
- The Use of LEDs to Simulate Weak YAG-laser Beams;  
Young, M.  
NBS TN 1031; Revised Aug 81.
- Interlaboratory Measurement Comparison to Determine the Attenuation and  
Bandwidth of Graded-Index Fibers;  
Franzen, D. L.; Day, G. W.; Danielson, B. L.; Chamberlain, G. E.; Kim, E.  
Appl. Opt. 20(14): 2412-2419; 15 Jul 81.
- The Characterization of Optical Fiber Waveguides: A Bibliography with  
Abstracts, 1970-1980;  
Day, G. W.  
NBS TN 1043; Jun 81.
- Refracted-Ray Scanning (Refracted Near-Field Scanning) for Measuring Index  
Profiles of Optical Fibers;  
Young, M.  
NBS TN 1038; May 81.
- Present NBS Capability in Optical Fiber Measurements;  
Day, G. W.; Franzen, D. L.  
Proc. First Int. DoD/Industry Fiber Optics Standards Conf.; Washington,  
DC; Apr 81.

Results of an Interlaboratory Measurement Comparison Among Fiber Manufacturers to Determine Attenuation, Bandwidth, and Numerical Aperture of Graded Index Optical Fibers;

Franzen, D. L.; Day, G. W.; Danielson, B. L.; Kim, E.

Conf. Digest Third Intl. Conf. Integrated Optics & Optical Fiber Comm.;  
San Francisco, CA; Apr 81.

Results of an Inter-Laboratory Measurement Comparison to Determine the Radiation Angle (NA) of Graded Index Optical Fibers;

Franzen, D. L.; Kim, E.

Appl. Opt. 20(7): 1218-1220; Apr 81.

Sub-Nanosecond Electrical Modulation of Light with Hydrogenated Amorphous Silicon;

Phelan, R. J.; Larson, D. R.; Werner, P. E.

Appl. Phys. Lett. 38(8); Apr 15, 81.

Backscatter Measurements in Optical Fibers;

Danielson, B. L.

NBS TN 1034; Feb 81.

Measurement of Far-Field and Near-Field Radiation Patterns from Optical Fibers;

Kim, E.; Franzen, D. L.

NBS TN 1032; Feb 81.

Progress in Fiber Measurements;

Day, G. W.; Franzen, D. L.

Laser Focus, p 52-56; Feb 81.

A System for Characterizing Detectors for the Measurement of Power of CO<sub>2</sub> TEA Laser Pulses;

Simpson, P. A.

Proc. 11th Annual Electro-Optical Laser Conf.; Oct 23-25, 1979; Ind. and Sci. Conf. Management, Inc., 222 W. Adams St., Chicago, IL 60606; p 3999-4007; 80.

The Role of Backscatter Signatures in Optical Fiber Characterization;

Danielson, B. L.

Tech. Digest 1st Int. DoD Ind. Fiber Optics Congress; Apr 20, 1980;  
Washington, DC; 80.

Linearity and Resolution of Refracted Near-Field Scanning Techniques;

Young, M.

Digest, Symposium on Optical Fiber Measurements, NBS SP 597; Oct 80.

Technical Digest, Symposium on Optical Fiber Measurements, 1980;

Day, G. W.; Franzen, D. L., eds.

NBS SP 597; Oct 80.

A System for Measuring the Characteristics of High Peak Power Detectors of Pulsed CO<sub>2</sub> Laser Radiation;

Simpson, P. A.

NBS TN 1023; Sep 80.

- Calibration Technique for Refracted Near-Field Scanning of Optical Fibers;  
Young, M.  
Appl. Opt. 19: 2479-2480; Aug 80.
- Measuring Features of the Fluence at the Far Field of a CO<sub>2</sub> Pulsed Laser--  
An Issue Study With Suggestions on How To Do It;  
Johnson, E. G, Jr.  
NBSIR 80-1628; Apr 80.
- An Assessment of the Backscatter Technique as a Means for Estimating Loss  
in Optical Waveguides;  
Danielson, B. L.  
NBS TN 1018; Feb 80.
- Measurement of Optical Fiber Bandwidth in the Time Domain;  
Franzen, D. L.; Day, G. W.  
NBS TN 1019; Feb 80.
- Book review: Linear Systems, Fourier Transforms and Optics by J. D. Gaskill;  
Young, M.  
J. Opt. Soc. Amer. 69: 637-638; 79.
- LED Source for Determining Optical Detector Time Response at 1.06 Micrometers;  
Franzen, D. L.; Day, G. W.  
Rev. Sci. Instr. 50: 1029; 79.
- Measurement of Low Level Laser Pulses at 1.064  $\mu\text{m}$ ;  
Rasmussen, A. L.; Sanders, A. A.  
Measurements of Optical Radiation, SPIE 196: 96-103; 79.
- Measurement of Propagation Constants Related to Material Properties in High  
Bandwidth Optical Fibers;  
Franzen, D. L.; Day, G. W.  
IEEE J. Quantum Electron. QE-15(12); Dec 79.
- Continuous-Wave (Mode-Locked) Dye Laser with Unfolded Cavity;  
Young, M.  
Appl. Opt. 18: 3212; Oct 79.
- Limitations Imposed by Material Dispersion on the Measurement of Optical Fiber  
Bandwidth with Laser Diode Sources;  
Franzen, D. L.; Day, G. W.  
J. Opt. Soc. Amer. 69(10); Oct 79.
- Optical Waveguide Communications Glossary;  
Hanson, A. G.; Bloom, L. R.; Day, G. W.; Gallawa, R. L.; Gray, E. M.;  
Young, M.  
NTIA SP 79-4; Sep 79.
- Time Domain Pulse Measurements and Computed Frequency Response of Optical  
Communications Components;  
Andrews, J. R.; Young, M.  
NBSIR 79-1620; Sep 79.

- National Standards of a Powerful Sort;  
Sanders, A. A.  
Opt. Spectra 13: 45; Aug 79.
- Quality Assurance Program for the NBS, C, K, and Q Laser Calibration Systems;  
Case, W. E.  
NBSIR 79-1619; Aug 79.
- Design of a Reflection Apparatus for Laser Beam Profile Measurements;  
Johnson, E. G., Jr.  
NBS TN 1015; Jul 79.
- Fiber Measurements: Quality and Cost;  
Day, G. W.  
Proc. Int. Communications Conf., Boston; Jun 79.
- Attenuation Measurements on Optical Fiber Waveguides: An Interlaboratory  
Comparison Among Manufacturers;  
Day, G. W.; Chamberlain, G. E.  
NBSIR 79-1608; May 79.
- Conference on Optical Scattering Standards;  
Young, M.  
Proc. SPIE Conf.; Apr 79.
- Laser Beam Profile Measurements Using Spatial Sampling, Fourier  
Optics, and Holography;  
Johnson, Eric G., Jr.  
NBS TN 1009; Jan 79.
- A Simple First Positive System Nitrogen Laser for use in Optical  
Fiber Measurements;  
Franzen, D. L.; Danielson, B. L.; Day, G. W.  
IEEE J. Quantum Electron. QE-14: 548; 78.
- Measurement Problems in Multimode Optical Waveguides;  
Day, G. W.  
Proc. Int. Communications Conf.; Jun 1978; Toronto, Canada; Vol. 1; 78.
- Optical Fiber Phase Discriminator;  
Danielson, B. L.  
Appl. Opt. 17: 3665-3668; Nov 78.
- Improvements in a Calorimeter for High-Power CW Lasers;  
Chamberlain, G. E.; Simpson, P. A.; Smith, R. L.  
IEEE Trans. Instrum. Meas. IM-27: 81-86; Mar 78.
- Laser Far-Field Beam-Profile Measurements by the Focal Plane Technique;  
Day, G. W.; Stubenrauch, C. F.  
NBS TN 1001; Mar 78.

Fiber Optics Metrology at NBS;

Danielson, B.; Day, G.; Franzen, D.

Proc. Union Radio Scientifique Internationale Comm. Symp.; Oct 3-7, 1977;  
Lannion, France, (International Union of Radio Science, France); p 430-  
431; Dec 77.

Evaluating the Inequivalence and a Computational Simplification for  
the NBS Laser Energy Standards;

Johnson, Eric G., Jr.

Appl. Opt. 16: 2315-2321; Aug 77.

Measurement Procedures for the Optical Beam Splitter Attenuation  
Device BA-1;

Danielson, B. L.

NBSIR 77-858; May 77.

Proposed Standards for Ladar Signatures;

Danielson, B. L.

NBSIR 77-856; Apr 77.

An NBS Laser Measurement Assurance Program (MAP);

Sanders, A. A.; Cook, A. R.

Proc. Electro-Optical Systems Design Conf. 1976 and Int. Laser Exposition;  
Sep 14-16, 1976; New York, NY; p 277-280; 76.

Laser Action in Sputtered Metal Vapors;

McNeil, J. R.; Johnson, W. L.; Collins, G. J.; Persson, K. B.;

Franzen, D. L.

9th Int. Conf. on Quantum Electronics; Jun 14-16, 1976; Amsterdam, The  
Netherlands; p 162-163; 76.

Performance and Characteristics of Polyvinylidene Fluoride  
Pyroelectric Detectors;

Day, G. W.; Hamilton, C. A.; Gruzensky, P. M.; Phelan, R. J., Jr.

Proc. IEEE Symposium on Application of Ferroelectrics; Jun 9-11, 1975;  
Albuquerque, NM; Ferroelectrics 10: 99-102; 76.

Absolute Reference Calorimeter for Measuring High Power Laser Pulses;

Franzen, D. L.; Schmidt, L. B.

Appl. Opt. 15: 3115-3122; Dec 76.

Spectral Reference Detector for the Visible to 12 Micrometer Region;  
Convenient, Spectrally Flat;

Day, G. W.; Hamilton, C. A.; Pyatt, K. W.

Appl. Opt. 15: 1865-1868; Jul 76.

An Electrically Calibrated Pyroelectric Radiometer System;

Hamilton, C. A.; Day, G. W.; Phelan, R. J., Jr.

NBS TN 678; Mar 76.

Ultraviolet Laser Action from Cu II in the 2500-A Region;

McNeil, J. R.; Collins, G. J.; Persson, K. B.; Franzen, D. L.

Appl. Phys. Lett. 28: 207-209; Feb 76.

- Laser Attenuators for the Production of Low Power Beams in the Visible and 1.06 Micron Regions;  
Danielson, B. L.; Beers, Y.  
NBS TN 677; Jan 76.
- Radiometry without Standard Sources/Electrically Calibrated Pyroelectrics;  
Phelan, Robert J. Jr; Hamilton, Clark A.; Day, Gordon W.  
Proc. Society of Photo-Optical Instrumentation Engineers; Aug 17-22, 1975;  
San Diego, CA; Paper in Modern Utilization of Infrared Technology Civilian  
and Military, SPIE 62: 159-165; 75.
- Pyroelectric Radiometers Get Off the Drawing Board;  
Hamilton, C. A.; Phelan, R. J., Jr; Day, G. W.  
Opt. Spectra 9: 37-38; Oct 75.
- Improving Beam Measurement;  
Smith, R. L.; Sanders, A. A.  
Laser Focus, 70-71; Apr 75.
- Precision Beam Splitters for CO<sub>2</sub> Lasers;  
Franzen, D.L.  
Appl. Opt. 14: 647-652; Mar 75.
- A Pyroelectric Power Meter for the Measurement of Low Level Laser  
Radiation;  
Hamilton, C. A.; Day, G. W.  
NBS TN 665; Feb 75.
- The Polarization of PVF and PVF<sub>2</sub> Pyroelectrics;  
Phelan, R. J. Jr; Peterson, R. L.; Hamilton, C. A.; Day, G. W.  
Ferroelectrics 7: 375-377; 74.
- Current Status of NBS Low-Power Laser Energy Measurement;  
West, E. D.; Case, W. E.  
Proc. Conf. on Precision Electromagnetic Measurements; Jul 1-5, 1974;  
London, England; IEEE Trans. Instrum. Meas. IM-23: 422-425; Dec 74.
- Analysis of Response of Pyroelectric Optical Detectors;  
Peterson, R. L.; Day, G. W.; Gruzensky, P. M.; Phelan, R. J.  
J. Appl. Phys. 45: 3296-3303; Aug 74.
- Effects of Poling Conditions on Responsivity and Uniformity of Polarization  
of PVF<sub>2</sub> Pyroelectric Detectors;  
Day, G. W.; Hamilton, C. A.; Peterson, R. L.; Phelan, R. J., Jr;  
Mullen, L. O.  
Appl. Phys. Lett. 24: 456-458; May 74.
- Absolute, Pyroelectric Radiometers and Two Dimensional Arrays;  
Phelan, R. J., Jr; Peterson, R. L.; Klein, G. P.; Hamilton, C. A.;  
Day, G. W.  
Proc. American Electro-Optical Systems Design Conf.; New York, NY;  
p 117-123; 73.

- Comparison of the Laser Power and Total Irradiance Scales Maintained by the National Bureau of Standards;  
Geist, J.; Schmidt, L. B.; Case, W. E.  
Appl. Opt. 12: 2773-2776; Nov 73.
- Electrically Calibrated Pyroelectric Optical-Radiation Detector;  
Phelan, R. J., Jr; Cook, A. R.  
Appl. Opt. 10: 2494-2500; Oct 73.
- Continuous Laser-Sustained Plasmas;  
Franzen, D. L.  
J. Appl. Phys. 44: 1727-1732; Apr 73.
- Limitations of the Use of Vacuum Photodiodes in Instruments for the Measurement of Laser Power and Energy;  
Smith, R. L.; Phelan, R. J., Jr.  
Appl. Opt. 12: 795-798; Apr 73.
- Accurate Frequencies of Molecular Transitions Used in Laser Stabilization: The 3.39-Micrometer Transition in CH<sub>4</sub> and the 9.33- and 10.18-Micrometer Transitions in CO<sub>2</sub>;  
Evenson, K. M.; Wells, J. S.; Peterson, F. R.; Danielson, B. L.; Day, G. W.  
Appl. Phys. Lett. 22: 192-195; Feb 73.
- A Calorimeter for High Power CW Lasers;  
Smith, R. L.; Case, W. E.; Rasmussen, A. L.; Russell, T. W.; West, E. D.  
Proc. Precision Electromagnetic Measurements Conf., Jun 26-29, 1972;  
Boulder, CO; p 138-139; 72.
- High D\*, Fast, Lead Zirconate Titanate Pyroelectric Detectors;  
Mahler, R. J.; Phelan, R. J., Jr; Cook, A. R.  
Infrared Phys. 12: 57-59; 72.
- A Calorimeter for High-Power CW Lasers;  
Smith, R. L.; Russell, T. W.; Case, W. E.; Rasmussen, A. L.  
IEEE Trans. Instrum. Meas. IM-21: 434-438; Nov 72.
- Speed of Light from Direct Frequency and Wavelength Measurements of the Methane-Stabilized Laser;  
Evenson, K. M.; Wells, J. S.; Petersen, F. R.; Danielson, B. L.;  
Day, G. W.  
Phys. Rev. Lett. 29: 1346-1349; Nov 72.
- CW Gas Breakdown in Argon Using 10.6 Micrometer Laser Radiation;  
Franzen, D. L.  
Appl. Phys. Lett. 21: 62-64; Jul 72.
- Role of Infrared Frequency Synthesis in Metrology;  
Wells, J. S.; Evenson, K. M.; Day, G. W.; Halford, D.  
Proc. IEEE Lett. 60: 621-623; May 72.
- Gain Saturation Measurements in CO<sub>2</sub>, TEA Amplifiers;  
Franzen, D. L.; Jennings, D. A.  
J. Appl. Phys. 43: 729-730; Feb 72.

- Double Plate Calorimeter for Measuring the Reflectivity of the Plates and the Energy in a Beam of Radiation;  
Rasmussen, A. L.  
PATENT-3 622 245; patented 23 Nov 71.
- High D\* Pyroelectric Polyvinylfluoride Detectors;  
Phelan, R. J., Jr; Mahler, R. J.; Cook, A. R.  
Appl. Phys. Lett. 19: 337-338; Nov 71.
- Measurement of Laser Energy of Linear Components of Polarization at 1.060 Micron;  
Rasmussen, A. L.  
Rev. Sci. Instrum. 42: 1590-1593; Nov 71.
- Linear and Nonlinear Optical Properties of Trigonal Selenium;  
Day, G. W.  
Appl. Phys. Lett. 18: 347-349; Apr 71.
- Extension of Absolute Frequency Measurements to the cw He-Ne Laser at 88 THz (3.39 Micrometer);  
Evenson, K. M.; Day, G. W.; Wells, J. S.; Mullen, L. O.  
Appl. Phys. Lett. 20: 133-134; Feb 71.
- Some Optical Properties of Cesium Cupric Chloride;  
Day, G. W.; Gruzensky, P. M.  
Appl. Opt. 9: 2494-2795; 70.
- Laser Power and Energy Measurements;  
Jennings, D. A.; West, E. D.; Evenson, K. M.; Rasmussen, A. L.; Simmons, W. R.  
NBS TN 382; Oct 69.
- InSb-GaAsP Infrared to Visible Light Converter;  
Phelan, Robert J., Jr.  
Proc. IEEE 55: 1505-1502; Aug 67.
- InSb MOS Infrared Detector;  
Phelan, R. J., Jr.; Dimmock, J. O.  
Appl. Phys. Lett. 10: 55-7; Jan 67.
- Incoherent Source Optical Pumping of Visible and Infrared Semiconductor Lasers;  
Phelan, R. J., Jr.  
Proc. IEEE 54: 1119-20; Aug 66.
- Laser Emission by Optical Pumping of Semiconductors;  
Phelan, R. J., Jr.  
Proc. Quantum Electronics Conf., 435-441; Jul 65.



## CRYOELECTRONIC METROLOGY

- Precision of Series-Array Josephson Voltage Standards;  
Kautz, R. L.; Lloyd, F. L.  
Appl. Phys. Lett. 51(24): 2043-2045; Dec 14, 87.
- Activation Energy for Thermally Induced Escape from a Basin of Attraction;  
Kautz, R. L.  
Phys. Lett. A 125(6,7): 315-319; Nov 23, 87.
- A Josephson Array Voltage Standard at 10 Volts;  
Lloyd, F. L.; Hamilton, C. A.; Beall, J. A.; Go, D.; Ono, R. H.; Harris, R. E.  
Electron Device Letters EDL-8(10): 449-450; Oct 10, 87.
- Equivalent Flux Noise in a  $\text{YBa}_2\text{CuO}_x$  rf SQUID;  
Zimmerman, J. E.; Beall, J. A.; Cromar, M. W.; Ono, R. H.  
Proc., XVIII Intl. Conf. Low Temp. Phys., p 2125-2126; Aug 87.
- Operation of a  $\text{YBa}_2\text{Cu}_3\text{O}_x$  rf-SQUID at 81 K;  
Zimmerman, J. E.; Beall, J. A.; Cromar, M. W.; Ono, R. H.  
Appl. Phys. Lett. 57(8): 617-618; Aug 24, 87.
- Sinusoidal Response of dc SQUIDS for rf Power Measurements;  
Peterson, R. L.;  
NBS JRES 92(4): 253-259; Jul-Aug 87.
- Wide-Band Low Noise mm-Wave SIS Mixers with a Single Tuning Element;  
Raisanen, A. V.; Crete, D. G.; Richards, P. L.; Lloyd, Frances L.  
Intl. J. Infrared Millimeter Waves 7(12): 1835-52; 86.
- Modelling a Voltage-Locked Josephson Junction Array Amplifier: Gain, Input, Impedance, and Bandwidth;  
McDonald, D. G.  
J. Appl. Phys. 60(9): 3247-3257; Nov 86.
- Very Low Noise, Tightly Coupled, dc SQUID Amplifiers;  
Muhlfelder, B.; Beall, J. A.; Cromar, M. W.; Ono, R.  
Appl. Phys. Lett. 49(17): 1118-1120; Oct 86.
- High Accuracy in Physics;  
McDonald, D. G.  
Science, p 829; Aug 86.
- Low Noise SIS Mixer with Gain for 80-115 GHz;  
Lloyd, F. L.; Raisanen, A. V.; Crete, D. G.; Richards, P. L.  
ESA Workshop on a Space Base Submillimeter Astronomy Mission; Jun 4-7, 1986; Segovia, Spain; European Space Agency, Paris, France; Intl. J. Infrared and mm Waves; p 255-258; Aug 86.

Flux Limit of Cosmic-Ray Magnetic Monopole from a Multiply Discriminating Superconductive Detector;

Cromar, M.; Clark, A. F.; Fickett, F.  
Phys. Rev. Lett. 56(24): 2561-2563; Jun 86.

The NBS Josephson Array Voltage Standard;

Hamilton, C. A.; Kautz, R. L.; Lloyd, F. L.  
1986 CPEM Conf. Digest, Jun 23-27, 1986; Gaithersburg, MD; p 108-109;  
Jun 86.

Onset of Chaos in the rf-Biased Josephson Junction;

Kautz, R. L.; McFarlane, J. C.  
Phys. Rev. A 33(1): 498-509; Jan 86.

A Josephson Series Array Voltage Standard at One Volt;

Hamilton, C. A.; Lloyd, F. L.; Kautz, R. L.  
NCSL 1985 Workshop and Symp.; Jul 15-18, 1985; Boulder, CO; p 71-77; 85.

A Practical Josephson Voltage Standard at 1 V;

Hamilton, C. A.; Kautz, R. L.; Steiner, R. L.; Lloyd, F. L.  
IEEE Electron Device Lett. EDL-6(12): 623-625; Dec 85.

Broad-Band RF Match to a Millimeter-Wave SIS Quasi-Particle Mixer;

Raisanen, A. V.; McGrath, W. R.; Richards, P. L.; Lloyd, F. L.  
IEEE Trans. Microwave Theory Tech. MTT-33(12): 1495-1500; Dec 85.

Amplification by a Voltage Locked Array of Josephson Junctions;

McDonald, D. L.; Frederick, N. V.  
Appl. Phys. Lett. 47(5): 530-532; 1 Sep 85.

Chaos and Thermal Noise in the rf-Biased Josephson Junction;

Kautz, R. L.  
J. Appl. Phys. 58(1): 424-440; 1 Jul 85.

Near-Zero Bias Arrays of Josephson Tunnel Junctions Providing Standard Voltages Up to 1V;

Niemeyer, J.; Hinken, J. H.; Kautz, R. L.  
IEEE Trans. Instrum. Meas. IM-34(2): 185-187; Jun 85.

Design of Cryocoolers for Microwatt Superconducting Devices;

Zimmerman, J. E.  
Proc. Third Cryocooler Conf. on Refrigeration for Cryogenic Sensors & Electronic Systems; Sep 17-18, 1984; Boulder, CO; NBS SP 698, p 2-9;  
May 85.

Accurate Noise Measurements of Superconducting Quasiparticle Array Mixers;

McGrath, W. R.; Raisanen, A. V.; Richards, P. L.; Harris, R. E.;  
Lloyd, F. L.  
Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 212-215; Mar 85.

- Fabrication of a Miniaturized DCL Gate;  
Ono, R.; Beall, J.; Harris, R. E.  
Proc. Applied Superconductivity Conf., Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 846-849; Mar 85.
- Superconducting A/D Converter Using Latching Comparators;  
Hamilton, C. A.; Lloyd, F. L.; Kautz, R. L.  
Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 197-199; Mar 85.
- Well Coupled, Low Noise, dc SQUIDs;  
Muhlfelder, B.; Beall, J. A.; Cromar, M.; Ono, R.; Johnson, W.  
Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 427-429; Mar 85.
- Survey of Chaos in the rf-Biased Josephson Junction;  
Kautz, R. L.; Monaco, R.  
J. Appl. Phys. 57(3): 875-889; Feb 85.
- High Speed Superconducting A/D Converter;  
Hamilton, C. A.; Lloyd, F. L.; Kautz, R. L.  
Proc. 1984 Government Microcircuit Applications Conf.; Nov 6-8, 1984;  
Las Vegas, NV; p 140-143; 84.
- Recent Developments in Self-Contained Cryocoolers for SQUIDs and Other Low-Power Cryoelectronic Devices;  
Zimmerman, J. E.  
Proc. International Cryogenic Engineering Conf.; Aug 1-4, 1984; Helsinki, Finland; Butterworth, p 13-19; 84.
- Amplification by the Phase-Locking Mechanism in a 4-Junction SQUID;  
McDonald, D. G.  
Appl. Phys. Lett. 45(11): 1243-1245; Dec 1, 84.
- Microwave-Induced Constant-Voltage Steps at One Volt From a Series Array of Josephson Junctions;  
Niemeyer, J.; Hinken, H.; Kautz, R. L.  
Appl. Phys. Lett. 45(4): 478-480; Aug 84.
- Power Gain of a SQUID Amplifier;  
McDonald, D. G.  
Appl. Phys. Lett. 44(5): 556-558; Mar 84.
- Cryogenics;  
Zimmerman, J. E.  
Chapt. 3 in Biomagnetism: An Interdisciplinary Approach, Samuel J. Williamson, et al., eds., NATO Advanced Study Institute Publication, Vol. 66, p 43-67, New York: Plenum Press; 83.

Magnetic Quantities, Units, Materials, and Measurements;

Zimmerman, J. E.

Chapt. 2 in Biomagnetism: An Interdisciplinary Approach, Samuel J. Williamson, et al., eds., NATO Advanced Study Institute Publication, Vol. 66, p 17-42, New York: Plenum Press; 83.

A Cryocooler for Applications Requiring Low Magnetic and Mechanical Interference;

Zimmerman, J. E.; Daney, D. E.; Sullivan, D. B.

NASA Pub. 2287, p 95-106; Dec 83.

An Approach to Optimization of Low-Power Stirling Cryocoolers;

Sullivan, D. B.

Proc. 2nd Biennial Conf. Refrigeration for Cryogenic Sensors; Dec. 7-8, 1982; Greenbelt, MD; NASA Conf. Publ. 2287, p 95-106; Dec 83.

Chaos in Josephson Circuits;

Kautz, R. L.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 465-473; May 83.

Double Transformer Coupling to a Very Low Noise SQUID;

Cromar, M.; Muhlfelder, B.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 303-307; May 83.

8-Bit Superconducting A/D Converter;

Hamilton, C. A.; Lloyd, F. L.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3)1259-1261; May 83.

Microwave Mixing and Direct Detection Using SIS and SIS' Quasiparticle Tunnel Junctions;

Harris, R. E.; et al.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 490-493; May 83.

100 GHz Binary Counter Using SQUID Flip Flops;

Hamilton, C. A.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 1291-1291; May 83.

Operation of a Superconducting Analog-to-Digital Converter at Short Conversion Times;

Kautz, R. L.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 1186-1189; May 83.

Summary of the Proceedings of the 2nd Biennial Conf. Refrigeration for Cryogenic Sensors;

Zimmerman, J. E.

Cryogenics 23(5): 281-282; May 83.

- Superconducting Current Injection Transistor;  
VanZeghbroeck, B. J. (guest worker)  
Appl. Phys. Lett. 42(8): 736-738; Apr 83.
- Voltage and Current Expressions for a Two-Junction Superconducting Interferometer;  
Peterson, R. L.; McDonald, D. G.  
J. Appl. Phys. 54(2): 992-996; Feb 83.
- 100 GHz Binary Counter Based on DC SQUIDS;  
Hamilton, C. A.  
IEEE Electron Device Lett. EDL-3(11): 335-338; Nov 82.
- Electronically Adjustable Delay for Josephson Technology;  
Harris, R. E.; Wolf, P.; Moore, D. F.  
IEEE Electron Device Lett. EDL-3(9); Sep 82.
- High-Speed, Low-Crosstalk Chip Holder for Josephson Integrated Circuits;  
Hamilton, C. A.  
IEEE Trans. Instrum. Meas. IM-31(2): 29; Jun 82.
- Book review: Principles of Superconductive Devices and Circuits, by T. Van Duzer and C. W. Turner;  
McDonald, D. G.; Clark, A. F.  
Phys. Today, p 80; Feb 82.
- Analog Measurement Applications for High Speed Josephson Switches;  
Hamilton, C. A.; Lloyd, F. L.; Kautz, R. L.  
IEEE Trans. Magn. MAG-17(1): 577-82; Jan 82.
- A Study of Design Principles for Refrigerators for Low-Power Cryoelectronic Devices;  
Zimmerman, J. E.; Sullivan, D. B.  
NBS TN 1049; Jan 82.
- A Josephson Voltage Standard Using a Series Array of 100 Junctions;  
Kautz, R. L.; Costabile, G.  
IEEE Trans. Magn. MAG-17, 780; 81.
- Magnetic Auditory Evoked Fields: Interhemispheric Asymmetry;  
Reite, M.; Zimmerman, J. T.; Zimmerman, J. E.  
Electroencephalogr. Clin. Neurophys. 51: 388-392; 81.
- Superconducting Electronics;  
McDonald, D. G.  
Phys. Today 34: 36-47; 81.
- Mathematical Modelling of the Impedance of a Josephson Junction Noise Thermometer;  
Peterson, R. L.  
J. Appl. Phys. 52(12): 7321-7326; Dec 81.

- Design Limitations for Superconducting A/D Converters;  
Hamilton, C. A.; Lloyd, F. L.  
IEEE Trans. Magn. MAG-17(6): 3414-3419; Nov 81.
- Chaotic States of rf-Biased Josephson Junctions;  
Kautz, R. L.  
J. Appl. Phys. 52(10): 6241-6246; Oct 81.
- Low Noise Tunnel Junction dc SQUIDs;  
Cromar, M. W.; Carelli, P.  
Appl. Phys. Lett. 38(9): 723-725; May 81.
- Modelling the Impedance of a Josephson Junction Noise Thermometer;  
Peterson, R. L.; Van Vechten, D.  
Phys. Review B 24(6): 3588-3591; Sep 81.
- Measurement of Thermal Properties of Cryocooler Materials;  
Zimmerman, J. E.; Sullivan, D. B.; Kautz, R. L.; Hobbs, R. D.  
Proc. Conf. Refrigeration for Cryogenic Sensors and Electronic Systems;  
NBS SP 607, p 173-177; May 81.
- Operation of a Practical SQUID Gradiometer in a Low-Power Stirling Cryocooler;  
Sullivan, D. B.; Zimmerman, J. E.; Ives, J. T.  
Proc. Conf. Refrigeration for Cryogenic Sensors and Electronic Systems;  
NBS SP 607, p 186-194; May 81.
- Refrigeration for Cryogenic Sensors and Electronic Systems;  
Zimmerman, J. E.; Sullivan, D. B.; McCarthy, S. M., eds.  
NBS SP 607; May 81.
- The ac Josephson Effect in Hysteric Junctions: Range and Stability  
of Phase Lock;  
Kautz, R. L.  
J. Appl. Phys. 52(5): 3528-3541; May 81.
- Analog Measurement Applications for High Speed Josephson Switches;  
Hamilton, C. A.; Lloyd, F. L.; Kautz, R. L.  
IEEE Trans. Magn. MAG 17(1): 577-582; Jan 81.
- Behavior of the dc Impedance of an rf-Biased Resistive SQUID;  
Van Vechten, D.; Soulen, R. J., Jr.; Peterson, R. L.  
Proc. 2nd Intl. Conf. on Superconducting Quantum Interference Devices  
(SQUIDs), H. D. Wahlbohm; H. Lubbig, eds.; New York, Berlin: Walter  
de Gruyter & Co., p 569-584; 80.
- Cryogenics for SQUIDs;  
Zimmerman, J. E.  
Proc. 2nd Intl. Conf. on Superconducting Quantum Interference Devices  
(SQUIDs), H. D. Wahlbohm; H. Lubbig, eds.; New York, Berlin: Walter  
de Gruyter & Co., p 423-443; 80.
- Recent Progress in Cryoelectronics;  
Sullivan, D. B.; Hamilton, C. A.; Kautz, R. L.  
IEEE Trans. Instrum. Meas. IM-29: 319; 80.

Space Applications of Superconductivity: Digital Electronics;

Harris, R. E.

Cryogenics 20: 115; 80.

Transient Pool Boiling of Liquid Helium Using a Temperature Controlled Heater Surface;

Giarratano, P. J.; Frederick, N. V.

Advances in Cryogenic Engineering, K. D. Timmerhaus; H. A. Synder, eds.;

New York: Plenum Press, 25: 455-466; 80.

Turn-On Delays in Single Josephson Junction Devices;

Peterson, R. L.

Proc. 2nd Intl. Conf. on Superconducting Quantum Interference Devices (SQUIDs), H. D. Wahlbohm; H. Lubbig, eds. New York; Berlin: Walter

de Gruyter & Co., 685-702; 80.

Picosecond Applications of Josephson Junctions;

McDonald, D. G.; Peterson, R. L.; Hamilton, C. A.; Harris, R. E.;

Kautz, R. L.

IEEE Trans. Electron Devices ED-27(10): 1945-1965; Oct 80.

Induced Electronic Currents in the Alaska Oil Pipeline Measured by Gradient Fluxgate and SQUID Magnetometers;

Campbell, W. H.; Zimmerman, J. E.

IEEE Trans. Geosci. Remote Sensing GE-18(3): 244-250; Jul 80.

Cryocoolers for Geophysical SQUID Magnetometers;

Zimmerman, J. E.

Proc. SQUID Geophysics Workshop, Los Alamos, NM; Jun 80.

Space Applications of Superconductivity: Instrumentation for Gravitational and Related Studies;

Peterson, R. L.

Cryogenics, p 299-306; Jun 80.

A Superconducting 6-bit Analog-to-Digital Converter with Operation to  $2 \times 10^9$  Samples/Second;

Hamilton, C. A.; Lloyd F. L.

IEEE Electron Device Lett. EDL-1(5): 92-94; May 80.

Conversion Gain in mm-Wave Quasiparticle Heterodyne Mixers;

Shen, T. M.; Richards, P. L.; Harris, R. E.; Lloyd, F. L.

Appl. Phys. Lett. 36: 777-779; May 80.

Space Applications of Superconductivity: Microwave and Infrared Detectors;

Hamilton, C. A.,

Cryogenics, p 235-243; May 80.

On a Proposed Josephson-Effect Voltage Standard at Zero Current Bias;

Kautz, R. L.

Appl. Phys. Lett. 36(5): 386-388; Mar 80.

- Simple-Heating-Induced Josephson Effects in Quasiparticle-Injected Superconducting Weak Links;  
Kaplan, S. B.  
J. Appl. Phys. 51(3): 1682-1685; Mar 80.
- Superconductor Insulator-Superconductor Quasiparticle Junctions as Microwave Photon Detectors;  
Richards, P. L.; Shen, T. M.; Harris, R. E.; Lloyd, F. L.  
Appl. Phys. Lett. 36: 480-482; Mar 80.
- Space Applications of Superconductivity: Low Frequency Superconducting Sensors;  
Zimmerman, J. E.  
Cryogenics, p 3-10; Jan 80.
- Acoustic Matching of Superconducting Films to Substrates;  
Kaplan, S. B.  
J. Low Temp. Phys. 37: 343-365; 79.
- A Milliwatt Stirling Cryocooler for Temperatures below 4 K;  
Zimmerman, J. E.; Sullivan, D. B.  
Cryogenics 19: 170; 79.
- Miniaturization of Normal-State and Superconducting Strip-Lines;  
Kautz, R. L.  
NBS JRES 84: 247; 79.
- Quasiparticle Heterodyne Mixing in SIS Tunnel Junctions;  
Richards, P. L.; Shen, T. M.; Harris, R. E.; Lloyd, F. L.  
Appl. Phys. Lett. 34: 345; 79.
- Superconducting Devices;  
Zimmerman, J. E.; Sullivan, D. B.  
Yearbook of Science and Technology, McGraw-Hill; 79.
- Analysis of Threshold Curves for Superconducting Interferometers;  
Peterson, R. L.; Hamilton, C. A.  
J. Appl. Phys. 50(12): 8135-8142; Dec 79.
- A Superconducting Sampler for Josephson Logic Circuits;  
Hamilton, C. A.; Lloyd, F. L.; Peterson, R. L.; Andrews, J. R.  
Appl. Phys. Lett. 35: 718; Nov 79.
- Multiple-Quantum Interference Superconducting Analog-to-Digital Converter;  
Harris, R. E.; Hamilton, C. A.; Lloyd, F. L.  
Appl. Phys. Lett. 35: 720; Nov 79.
- Space Applications of Superconductivity;  
Sullivan, D. B.; Vorreiter, J. W.  
Cryogenics 19: 627-631; Nov 79.
- Very Low-Power Stirling Cryocoolers Using Plastic and Composite Materials;  
Sullivan, D. B.; Zimmerman, J. E.  
Intl. J. Refrig. 2: 211-213; Nov 79.



- Differential Capacitance Sensor as Position Detectors for Magnetic Suspension Densimeter;  
Frederick, N. V.  
Rev. Sci. Instrum. 50(9): 1154; Sep 79.
- Analog to Digital Conversion with a SQUID: Conditions for a Countable Pulse Train;  
Peterson, R. L.  
J. Appl. Phys. 50: 4231; Jun 79.
- Cryogenic Refrigeration System;  
Zimmerman, J. E.  
PATENT-4 143 520; patented 13 Mar 79.
- Quasiparticle Heterodyne Mixing in SIS Tunnel Junctions;  
Harris, R. L.; Lloyd, F. L.; Richards, P. L.; Shen, T. M.  
Appl. Phys. Lett. 34(5): 345-347; Mar 79.
- Sampling Circuit and Method Therefor;  
Hamilton, C. A.  
PAT-APPL-6-020 359; Filed 14 Mar 79.
- Attenuation in Superconducting Striplines;  
Kautz, R. L.  
IEEE Trans. Magn. MAG-15: 566-569; Jan 79.
- High-Speed Superconducting Electronics;  
Hamilton, C. A.; Harris, R. E.; Sullivan, D. B.  
GOMAC Digest, Vol. 7; 78.
- Human Magnetic Auditory Evoked Responses;  
Reite, M.; Edrich, J.; Zimmerman, J. T.; Zimmerman, J. E.  
Electroencephalogr. Clin. Neurophys. 45: 114-117; 78.
- Magnetic Phenomena of the Central Nervous System;  
Reite, M.; Zimmerman, J.  
Ann. Rev. Biophys. Bioeng. 7: 167-188; 78.
- Multiple Magnetic Flux Entry into SQUIDS: A General Way of Examining the  $\cos(\phi)$  Conductance;  
Peterson, R. L.; Gayley, R. I.  
Phys. Rev. B 18: 1198-1206; Aug 78.
- Automatic 300-4 K Temperature Cycling Apparatus;  
Hamilton, C. A.  
Rev. Sci. Instrum. Notes 49: 674-677; May 78.
- The Role of Superconductivity in the Space Program: An Assessment of Present Capabilities and Future Potential;  
Sullivan, D. B.  
NBSIR 78-885; May 78.

- Applications of Closed-Cycle Cryocoolers to Small Superconducting Devices;  
Zimmerman, J. E.; Flynn, T. M.  
Proc. Conf. held by the Office of Naval Research and the National Bureau  
of Standards, Oct 3-4, 1977; Boulder, CO; NBS SP 508; Apr 78.
- RF Instrumentation Based on Superconducting Quantum Interference;  
Sullivan, D. B.; Adair, R. T.; Frederick, N. V.  
Proc. IEEE 66: 454-463; Apr 78.
- Photolithographic Fabrication of Lead Alloy Josephson Junctions;  
Havemann, R. H.; Hamilton, C. A.; Harris, Richard E.  
J. Vac. Sci. Technol. 15: 392-395; Mar/Apr 78.
- Picosecond Pulses on Superconducting Striplines;  
Kautz, R. L.  
J. Appl. Phys. 49: 308-314; Jan 78.
- Possible Cryocoolers for SQUID Magnetometers;  
Zimmerman, J. E.; Radebaugh, R.; Siegwarth, J. D.  
Proc. 1st IC SQUID Conf., Oct 5-8, 1976; Berlin, Germany, Paper R-1044 in  
Superconducting Quantum Interference Devices and Their Applications,  
p 287-296; 77.
- Results, Potentials and Limitations of Josephson Mixer-Receivers at  
Millimeter and Long Submillimeter Wavelengths;  
Edrich, J.; Sullivan, D. B.; McDonald, D. G.  
IEEE Trans. Microwave Theory Tech. MTT-25: 476; 77.
- RF Power Measurements Using Quantum Interference in Superconductors;  
Sullivan, D. B.; Frederick, N. V.; Adair, R. T.  
Proc. IC SQUID (1st), Oct 5-8, 1976; Berlin, Germany; Paper R-1045 in  
Superconducting Quantum Interference Devices and Their Applications,  
p 355-363; 77.
- Superconducting Devices for Metrology and Standards;  
Kamper, R. A.  
Chap. 5 in Superconductor Applications: Squids and Machines; New York:  
Plenum Press, p 189-247; 77.
- Design of a Josephson-Junction Picosecond Pulser;  
McDonald, D. G.; Peterson, R. L.; Bender, B. K.  
J. Appl. Phys. 48: 5366-5369; Dec 77.
- Numerical Evaluation of the Response of a Josephson Tunnel Junction  
in an Arbitrary Circuit;  
Harris, R. E.  
J. Appl. Phys. 48: 5188-5190; Dec 77.
- Picosecond Pulse Generator Utilizing a Josephson Junction;  
McDonald, D. G.; Peterson, R. L.  
PAT-APPL-862 311; Filed 20 Dec 77.

- A Sampling Circuit and Method Therefor;  
Hamilton, C. A.  
PAT-APPL-853 354; Filed 21 Nov 77.
- High-Frequency Limitations of the Double-Junction SQUID Amplifier;  
Zimmerman, J. E.; Sullivan, D. B.  
Appl. Phys. Lett. 31: 360-362; Sep 77.
- RF Attenuation Measurement System Using a SQUID;  
Adair, R. T.; Frederick, N. V.; Sullivan, D. B.  
NBSIR 77-863; Sep 77.
- A Low-Noise Josephson Mixer for the 1 mm Wavelength Range;  
Edrich, J.; Sullivan, D. B.; McDonald, D. G.  
IEEE Trans. Microwave Theory Tech. MTT-25: 476-479; Jun 77.
- Squid Instruments and Shielding for Low-Level Magnetic Measurements;  
Zimmerman, J. E.  
J. Appl. Phys. 48: 702-710; Feb 77.
- Advances in the Use of SQUIDS for RF Attenuation Measurement;  
Frederick, N. V.; Sullivan, D. B.; Adair, R. T.  
IEEE Trans. Magn. MAG-13: 361-364; Jan 77.
- Analog Computer Studies of Frequency Multiplication and Mixing with  
the Josephson Junction;  
Risley, A. S.; Johnson, E. G., Jr; Hamilton, C. A.  
Proc. 1976 Applied Superconductivity Conf.; Stanford, CA; IEEE Trans.  
Magn. MAG-13: 381-384; Jan 77.
- Can Superconductivity Contribute to the Determination of the Absolute Ampere?;  
Sullivan, D. B.; Frederick, N. V.  
IEEE Trans. Magn. MAG-13: 396-399; Jan 77.
- Picosecond Pulses from Josephson Junctions: Phenomenological and  
Microscopic Analyses;  
Peterson, R. L.; McDonald, D. G.  
IEEE Trans. Magn. MAG-13: 887-890; Jan 77.
- Refrigeration for Small Superconducting Devices;  
Zimmerman, J. E.; Radebaugh, R.; Siegwarth, J. D.  
DKV Annual Meeting and Joint Meeting with the International Institute  
of Refrigeration; 13 Oct 1976; Munich, Germany; Rpt. No. CONF-7610104-1;  
76.
- The Human Magnetoencephalogram: Some EEG and Related Correlations;  
Reite, M.; Zimmerman, J. E.; Edrich, J.; Zimmerman, J. T.  
Electroencephalogr. Clin. Neurophys. 40: 59-66; 76.
- Strong-Coupling Correction to the Jump in the Quasiparticle Current  
of a Superconducting Tunnel Junction;  
Harris, R. E.; Dynes, R. C.; Ginsberg, D. M.  
Phys. Rev. B 14: 993-995; Aug 76.

- Strong-Coupling Correction to the Low-Frequency Electrical Conductivity of Superconductors and Josephson Junctions;  
Harris, R. E.; Ginsberg, D. M.; Dynes, R. C.  
Phys. Rev. B 14: 990-992; Aug 76.
- Intrinsic Response Time of a Josephson Tunnel Junction;  
Harris, R. E.  
Phys. Rev. B 13: 3818-3821; May 76.
- RF Applications of the Josephson Effect;  
Kamper, R. A.  
Microwave J. 19: 39-41; Apr 76.
- Modeling Josephson Junctions;  
McDonald, D. G.; Johnson, E. G.; Harris, R. E.  
Phys. Rev. B 13: 1028-1031; Feb 76.
- Accurate Rotational Constants, Frequencies, and Wavelengths from  $^{12}\text{C}^{16}\text{O}_2$  Lasers Stabilized by Saturated Absorption;  
Petersen, F. R., McDonald, D. G.; Cupp, J. D.; Danielson, B. L.  
Proc. Laser Spectroscopy Conf.; Jun 25-29, 1973; Vail, CO, p 555-569; 75.
- Josephson Weak-Link Devices;  
Silver, A. H.; Zimmerman, J. E.  
Applied Superconductivity, V. L. Newhouse, ed., Academic Press, p 1-80; 75.
- Tests of Cryogenic SQUID for Geomagnetic Field Measurements;  
Zimmerman, J. E.; Campbell, W. H.  
Geophysics 40: 269; 75.
- Cryogenic Direct Current Comparators and their Applications;  
Dziuba, R. F.; Sullivan, D. B.  
IEEE Trans. Magn. MAG-11: 716-719; Mar 75.
- Phase Slip, Dissipation, Bernoulli Effect, Parametric Capacitance, and Other Curious Features of the Josephson Effect;  
Zimmerman, J. E.  
IEEE Trans. Magn. MAG-11: 852-855; Mar 75.
- Review of Superconducting Electronics;  
Kamper, R. A.  
IEEE Trans. Magn. MAG-11: 141-146; Mar 75.
- Magnetic Properties of Internally Oxidized Copper;  
Fickett, F. R.; Sullivan, D. B.  
19th Annual Conf. Magnetism and Magnetic Materials; 1973; Boston, MA; AIP Conf. Proc. 18; 74.
- Review of Electromagnetic Measurements Using the Josephson Effect;  
Kamper, R. A.  
Proc. ISA Intl. Instrumentation-Automation Conf.; Oct 28-31, 1974; New York, NY, p 1-8; 74.

- RF Attenuation Measurements Using Quantum Interference in Superconductors;  
Adair, R. T.; Hoer, C. A.; Kamper, R. A.; Simmonds, M. B.  
CPEM Digest, IEE, London, England, p 4-5; 74.
- The Relationship of Josephson Junctions to a Unified Standard of  
Length and Time;  
McDonald, D. G.; Risley, A. S.; Cupp, J. D.  
Proc. 13th Intl. Conf. Low Temperature Physics; Aug 21-25, 1972; Boulder,  
CO; in Low Temperature Physics LT 13; p 542-549; 74.
- A Low-Temperature Direct-Current Comparator Bridge;  
Sullivan, D. B.; Dziuba, R. F.  
IEEE Trans. Instrum. Meas. IM-23: 256-260; Dec 74.
- RF Attenuation Measurements Using Quantum Interference in Superconductors;  
Adair, R. T.; Simmonds, M. B.; Kamper, R. A.; Hoer, C. A.  
IEEE Trans. Instrum. Meas. IM-23: 375-381; Dec 74.
- Advances in the Measurement of rf Power and Attenuation Using SQUIDS;  
Kamper, R. A.; Simmonds, M. B.; Adair, R. T.; Hoer, C. A.  
NBS TN 661; Sep 74.
- Josephson Junctions as Radiation Detectors from Millihertz to Terahertz;  
McDonald, D. G.  
IEEE J. Quantum Electron. QE-10: 776-777; Sep 74.
- An Application of Superconducting Quantum Interference Magnetometers to  
Geophysical Prospecting;  
Frederick, N. V.; Stanley, W. D.; Zimmerman, J. E.; Dinger, R. J.  
IEEE Trans. Geosci. Electron. GE-12: 102-103; Jul 74.
- Magnetic Studies of Oxidized Impurities in Pure Copper Using a SQUID System;  
Fickett, F. R.; Sullivan, D. B.  
J. Phys. F 4: 900-904; Jun 74.
- Josephson Junctions at 45 Times the Energy-Gap Frequency;  
McDonald, D. G.; Petersen, F. R.; Cupp, J. D.; Danielson, B. L.;  
Johnson, E. G., Jr.  
Appl. Phys. Lett. 24: 335-337; Apr 74.
- Low Temperature Direct Current Comparators;  
Sullivan, D. B.; Dziuba, R. F.  
Rev. Sci. Instrum. 45: 517-519; Apr 74.
- Superconducting Devices and Materials. Quarterly Literature Survey;  
Olien, N. A.; Goree, W. S.; Kamper, R. A.; Nisenoff, M.; Wolf, S. A.  
NBS Cryogenic Data Center, Boulder, CO, No. 74-1; Jan-Mar 74.
- Field-Usable Sharpless Wafers for Josephson Effect Devices at  
Millimeter Waves;  
Edrich, J.; Cupp, J. D.; McDonald, D. G.  
Revue de Physique Appliquee 9: 195-197; Jan 74.

Spectral Analysis of a Phase Locked Laser at 891 GHz: An Application of Josephson Junctions in the Far Infrared;

Wells, J. S.; McDonald, D. G.; Risley, A. S.; Jarvis, S.; Cupp, J. D.  
Revue de Physique Appliquee (Supplement to J. de Physique), France,  
9: 285-292; Jan 74.

Measurement of rf Power and Attenuation Using Superconducting Quantum Interference Devices;

Kamper, R. A.; Simmonds, M. B.; Hoer, C. A.; Adair, R. T.  
NBS TN 643; Aug 73.

Rotational Constants for  $^{12}\text{C}^{16}\text{O}_2$  From Beats Between Lamb-Dip-Stabilized Lasers;

Petersen, F. R.; McDonald, D. G.; Cupp, J. D.; Danielson, B. L.  
Phys. Rev. Lett. 31: 573-576; Aug 73.

Analog-Computer Studies of Mixing and Parametric Effects in Josephson Junctions;

Hamilton, C. A.  
J. Appl. Phys. 44: 2371-2377; May 73.

Portable Helium Dewars for Use with Superconducting Magnetometers;

Zimmerman, J. E.; Siegwarth, J. D.  
Cryogenics 13: 158-159; Mar 73.

Superconducting Devices and Materials;

Goree, W. S.; Nisenoff, M.; Wolf, S. A.; Kamper, R. A.;  
Olien, N. A.

Quarterly Literature Survey, No. 73-1, NBS Cryogenic Data Center; Boulder,  
CO; Jan-Mar 73.

A New Technique for RF Measurements Using Superconductors;

Kamper, R. A.; Simmonds, M. B.; Adair, R. T.; Hoer, C. A.  
Proc. IEEE 61: 121-122; Jan 73.

Flexible Laminates for Thermally Grounded Terminal Strips and Shielded Electrical Leads at Low Temperatures;

Radebaugh, R.; Frederick, N. V.; Siegwarth, J. D.  
Cryogenics 13: 41-43; Jan 73.

Possible Parametric Capacitance in Josephson Junctions;

Zimmerman, J. E.  
Phys. Lett. 42A: 375-376; Jan 73.

A Review of the Properties and Applications of Superconducting Point Contacts;

Zimmerman, J. E.  
Proc. Applied Superconductivity Conf.; May 1-3, 1972; Annapolis, MD;  
p 544-561; 72.

Precise Electrical Measurements at Low Temperature;

Sullivan, D. B.  
Proc. Applied Superconductivity Conf.; May 1-3, 1972; Annapolis, MD;  
p 631-639; 72.

- Quantum Mechanical Measurement of rf Attenuation;  
Kamper, R. A.; Simmonds, M. B.; Adair, R. T.; Hoer, C. A.  
Proc. Applied Superconductivity Conf.; May 1-3, 1972; Annapolis, MD;  
p 696-700; 72.
- Computation of Spectral Data for a Josephson Junction Circuit;  
Johnson, E. G., Jr.; McDonald, D. G.  
NBS TN 627; Nov 72.
- Developments in Cryoelectronics;  
Kamper, R. A.; Sullivan, D. B.  
NBS TN 630; Nov 72.
- Superconducting Quantum Interference Devices: An Operational Guide  
for rf-Biased Systems;  
Sullivan, D. B.  
NBS TN 629; Nov 72.
- Analog Computer Studies of Subharmonic Steps in Superconducting Weak  
Links;  
Hamilton, C. A.; Johnson, E. G., Jr.  
Phys. Lett. A 41: 393-394; Oct 72.
- Broadband Superconducting Quantum Magnetometer;  
Kamper, R. A.; Simmonds, M. B.  
Appl. Phys. Lett. 20: 270-272; Apr 72.
- Four-Hundredth-Order Harmonic Mixing of Microwave and Infrared Laser  
Radiation Using a Josephson Junction and a Maser;  
McDonald, D. G.; Risley, A. S.; Cupp, J. D.; Evenson, K. M.;  
Ashley, J. R.  
Appl. Phys. Lett. 20: 296-299; Apr 72.
- Low Temperature Voltage Divider and Null Detector;  
Sullivan, D. B.  
Rev. Sci. Instrum. 43: 499-505; Mar 72.
- Superconducting Devices and Materials. A Literature Survey;  
Goree, W. S.; Kamper, R. A.; Olien, N. A.  
Quarterly Reports, NBS Cryogenic Data Center; Boulder, CO; 4 issues;  
Mar 72.
- Josephson Effect Devices and Low-Frequency Field Sensing;  
Zimmerman, J. E.  
Cryogenics 12: 19-31; Feb 72.
- A Mechanical Superconducting Switch for Low Temperature  
Instrumentation;  
Siegwarth, J. D.; Sullivan, D. B.  
Rev. Sci. Instrum. 43: 153-154; Jan 72.

- Superconducting Materials;  
Kamper, R. A.  
Electron. Design Materials, 71-79; 71.
- Survey of Noise Thermometry;  
Kamper, R. A.  
Proc. 5th Symp. Temperature, Its Measurement and Control in Science and Industry; Jun 21-24, 1971; Washington, DC; 71.
- Mechanical Analogs of Time Dependent Josephson Phenomena;  
Sullivan, D. B.; Zimmerman, J. E.  
American J. Phys. 39: 1504-1517; Dec 71.
- Sensitivity Enhancement of Superconducting Quantum Interference Devices through the Use of Fractional-Turn Loops;  
Zimmerman, J. E.  
J. Appl. Phys. 24: 4483-4487; Oct 71.
- Observation of Noise Temperature in the Millikelvin Range;  
Kamper, R. A.; Siegwarth, J. D.; Radebaugh, R.; Zimmerman, J. E.  
Proc. IEEE 59: 1368-1369; Sep 71.
- Miniature Ultrasensitive Superconducting Magnetic Gradiometer and Its Use in Cardiography and Other Applications;  
Zimmerman, J. E.; Frederick, N. V.  
Appl. Phys. Lett. 19: 16-19; Jul 71.
- Resistance of a Silicon Bronze at Low Temperatures;  
Sullivan, D. B.  
Rev. Sci. Instrum. 42: 612-613; May 71.
- Harmonic Mixing of Microwave and Far-Infrared Laser Radiation Using a Josephson Junction;  
McDonald, D. G.; Risley, A. S.; Cupp, J. D.; Evenson, K. M.  
Appl. Phys. Lett. 18: 162-164; Feb 71.
- High-Frequency Limit of the Josephson Effect;  
McDonald, D. G.; Evenson, K. M.; Wells, J. S.; Cupp, J. D.  
J. Appl. Phys. 42: 179-181; Jan 71.
- Noise Thermometry with the Josephson Effect;  
Kamper, R. A.; Zimmerman, J. E.  
J. Appl. Phys. 42: 132-136; Jan 71.
- Recent Developments in Superconducting Devices;  
Zimmerman, J. E.  
J. Appl. Phys. 42: 30-37; Jan 71.
- Cryoelectronics;  
Kamper, R. A.  
Proc. Helium Society Symp.; Mar 23-24, 1970; Washington, DC; p 68-82; 70.



- Generation of Harmonics and Subharmonics of the Josephson Oscillation;  
Sullivan, D. B.; Peterson, R. L.; Kose, V. E.; Zimmerman, J. E.  
J. Appl. Phys. 41: 4865-4873; Nov 70.
- Magnetocardiograms Taken Inside a Shielded Room With a Superconducting  
Point-Contact Magnetometer;  
Cohen, D.; Edelsack, E. A.; Zimmerman, J. E.  
Appl. Phys. Lett. 16: 278-280; Apr 70.
- Some Applications of the Josephson Effect;  
Kamper, R. A.; Mullen, L. O.; Sullivan, D. B.  
NASA-CR-1565; NBS TN 381; Mar 70.
- Influence of External Noise on Microwave-Induced Josephson Steps;  
Kose, V. E.; Sullivan, D. B.  
J. Appl. Phys. 41: 169-174; Jan 70.
- The Josephson Effect;  
Kamper, R. A.  
IEEE Trans. Electron Devices ED-16: 840-844; Oct 69.
- Harmonic Generation and Submillimeter Wave Mixing With the Josephson  
Effect;  
McDonald, D. G.; Kose, V. E.; Evenson, K. M.; Wells, J. S.; Cupp, J. D.  
Appl. Phys. Lett. 15: 121-122; Aug 15, 69.
- Fabrication of Tunnel Junctions on Niobium Films;  
Mullen, L. O.; Sullivan, D. B.  
J. Appl. Phys. 40: 2115-2117; Apr 69.
- Cryoelectronics;  
Kamper, R. A.  
Cryogenics, 9: 20-25; Feb 69.
- Contribution of Thermal Noise to the Line-Width of Josephson Radiation from  
Superconducting Point Contacts;  
Silver, A. H.; Zimmerman, J. E.; Kamper, R. A.  
Appl. Phys. Lett. 11: 209-211; Sep 15, 67.
- Millidegree Noise Thermometry;  
Kamper, R. A.  
Proc. Symp. Physics of Superconducting Devices (ONR report);  
Charlottesville, VA; Apr 67.

## SUPERCONDUCTOR AND MAGNETIC MEASUREMENT

Break Junctions I;

Moreland, J.; Goodrich, L. F.; Ekin, J. W.; Capobianco, T. E.; Clark, A. F.  
NBSIR 88-3090; May 88.

Transverse Magnetoresistance of Oxygen-Free Copper;

Fickett, F. R.

IEEE Trans. Magn. MAG-24(2): 1156-1158; Mar 88.

Development of Standards for Superconductors, Interim Report, Jan. 1986-Dec. 1987;

Goodrich, L. F.

NBSIR 88-3088; Feb 88.

Transport Critical-Current Characteristics of  $Y_1Ba_2Cu_3O_x$ ;

Ekin, J. W.; Panson, A. J.; Braginski, A. I.; Janocko, M. A.; Hong, M.;

Kwo, J.; Liou, S. H.; Capone, D. W., II; Flandermeyer, B.; Clark, A. F.

Proc. Mater. Res. Soc. Symp. on High Temp. Superconductors, Anaheim, CA,  
Apr 23-24, 1987, EA-11: 223-226; 87.

Transport Critical Currents in Bulk Sintered  $Y_1Ba_2Cu_3O_x$  and Possibilities for its Enhancement;

Ekin, J. W.

Advanced Ceramic Materials, 2(3B): 586-591; 87.

AC Susceptibility Measurements Near the Critical Temperature of a Y-Ba-Cu-O Superconductor;

Goldfarb, R. B.; Clark, A. F.

Proc. Materials Research Society Mtg., Apr 23-24, 1987; p 261-263; 87.

Electron Tunneling Measurements in LaSrCuO and YBaCuO;

Moreland, J.; Ekin, J. W.; Goodrich, L. F.; Capobianco, T. E.; Clark, A. F.

Proc., Mater. Res. Soc. Symp. on High Temp. Superconductors, Anaheim, CA,  
Apr 23-24, 1987, EA-11: 273-275; 87.

Effect of Transverse Compressive Stress on the Critical Current and Upper Critical Field of  $Nb_3Sn$ ;

Ekin, J. W.

J. Appl. Phys., 62(12): 4829-4834; Dec 15 87.

Evidence for Weak Link Anisotropy Limitations on the Transport Critical Current in Bulk Polycrystalline  $Y_1Ba_2Cu_3O_x$ ;

Ekin, J. W.; Capone, D. W., II; Flandermeyer, B.; deLima, O. F.; Braginski,

A. I.; Panson, A. J.; Janocko, M. A.; Hong, M.; Kwo, J.; Liou, S. H.

J. Appl. Phys. 62(12): 4821-4828; Dec 15, 87.

Conductors for Advanced Energy Systems;

Fickett, F. R.; Capobianco, T. E.

INCRA Annual Report #321B, i-46; Oct 87.

Evidence for Two Superconducting Components in Oxygen-Annealed Single Phase Y-Ba-Cu-O;

Goldfarb, R. B.; Clark, A. F.; Panson, A. J.; Braginski, A. I.  
Cryogenics 27: 475-480; Sep 87.

Josephson Effect above 77 K in a YBaCuO Break Junction;

Moreland, J.; Goodrich, L. F.; Ekin, J. W.; Capobianco, T. E.; Clark, A. F.  
Appl. Phys. Lett. 51(7): 540-541; Aug 17, 87.

Electron Tunneling Measurements of High Tc Compounds Using Break Junctions;

Moreland, J.; Goodrich, L. F.; Ekin, J. W.; Capobianco, T. E.; Clark, A. F.  
Proc., LT 18 Conf., Kyoto, Japan, Aug 20-26, 1987, p 999-1000; and Jap. J. Appl. Phys. 26(26-3): 999-1000; Aug 87.

Tunneling Spectroscopy of a La-Sr-Cu-O Break Junction: Evidence for Strong-Coupling Superconductivity;

Moreland, J.; Clark, A. F.; Goodrich, L. F.; Ku, H. C.; Shelton, R. N.  
Phys. Rev. B, Rapid Communications 35(16): 8711-8713; Jun 1, 87.

Break Junction Tunneling Measurements of the High Tc Superconductor

$Y_1Ba_2Cu_3O_9-\Delta$ ;

Moreland, J.; Ekin, J. W.; Goodrich, L. F.; Capobianco, T. E.; Clark, A. F.; Kwo, J.; Hong, M.  
Phys. Rev. B, Rapid Communications 35(16): 8856-8857; Jun 1, 87.

Electron Tunneling Measurement of the Energy Gap in a La-Sr-Cu-O Superconductor;

Moreland, J.; Clark, A. F.; Ku, H. C.; Shelton, R. N.  
Cryogenics, 27: 227-228; May 87.

Development of Standards for Superconductors, Interim Report, Jan.-Dec. 1985;

Goodrich, L. F.; Bray, S. L.; Pittman, E. S.; Clark, A. F.; Dube, W. P.  
NBSIR 87-3066; Apr 87.

AC Losses in Nb-Ti Measured by Magnetization and Complex Susceptibility;

Goldfarb, R. B.; Clark, A. F.  
Advances in Cryogenic Engineering - Materials, Vol. 32, p 79; 86.

Electron Tunneling into Superconducting Filaments: Depth Profiling the Energy Gap of NbTi Filaments in High-Field Magnet Wires;

Moreland, John; Ekin, J. W.; Goodrich L. F.  
Advances in Cryogenic Engineering - Materials, Vol. 32, p 1101-1108; 86.

Ferromagnetic Resonance at 9.55 and 23.9 GHz in the Weak Ferromagnet  $Ni_3Al$ ;

Goldfarb, R. B.; Heinrich, B.; Cochran, J. F.; Myrtle, K.; Lonzarich, G.  
J. Magnetism and Magnetic Materials 54-57: 1011-1012; 86.

Flaw Detection with a Magnetic Field Gradiometer;

Capobianco, T. E.; Moulder, J.; Fickett, F. R.  
Proc. NTIAC 15th Symp. on Nondestructive Evaluation; Apr 22-22, 1985; San Antonio, TX; 15-20; 86.

- Losses in a Nb-Ti Superconductor as Functions of AC Field Amplitude and DC Transport Current;  
Ekin, J. W.; Minervini, R.; Dragomirecky, M.; Goldfarb, R. B.; Clark, A. F.  
Proc., 11th International Cryogenic Engineering Conference; Berlin, W. Germany; Apr 22-25, 1986; p 746-750; 86.
- Mapping Eddy Current Probe Fields;  
Capobianco, T. E.; Fickett, F. R.; Moulder, J. C.  
Proc., Review of Progress in Quantitative Nondestructive Evaluation 5A, chap 3, sec A, p 705-711; 86.
- New Magnetic Phase Diagram of the Amorphous Pd-Fe-Si Ferroglass Alloy System;  
Goldfarb, R. B.; Rao, R. V.; Chen, H. S.  
J. Magnetism and Magnetic Materials 54-57: 111-112; 86.
- Relationships Between Mechanical and Magnetolectric Properties of Oxygen-free Copper at 4K;  
Fickett, F. R.; Capobianco, T. E.  
Advances in Cryogenic Engineering - Materials, Vol. 32, p 421; 86.
- The Effect of Aspect Ratio on Critical Current in Multifilamentary Superconductors;  
Goodrich, L. F.; Dube, W. E.; Pittman, E. S.  
Advances in Cryogenic Engineering - Materials, Vol. 32, p 833; 86.
- Electro-mechanical Properties of Superconductors for High Energy Physics Applications;  
Ekin, J. W.; Goodrich, L. F.; Moreland, J.; Pittman, E. S.; Clark, A. F.  
NBSIR 86-3061; Dec 86.
- Hysteresis Losses in Fine-Filament Internal-Tin Superconductors;  
Goldfarb, R. B.; Ekin, J. W.  
Cryogenics 26: 478-481; Aug/Sep 86.
- Internal Fields in Magnetic Materials and Superconductors;  
Goldfarb, R. B.  
Cryogenics 26: 621-622; Aug/Sep 86.
- Quench Circuit for Electronic Instruments Used with Superconducting Magnets;  
Benson, R.; Goldfarb, R. B.; Pittman, E.  
Cryogenics 26: 482-483; Aug/Sep 86.
- Electromechanical Properties of Superconductors for DoE Fusion Applications;  
Ekin, J. W.; Moreland, John; Baruch, J. C.  
NBSIR 86-3044; Jun 86.
- Flux Limit of Cosmic-Ray Magnetic Monopole from a Multiply Discriminating Superconductive Detector;  
Cromar, M.; Clark, A. F.; Fickett, F. R.  
Phys. Rev. Lett. 56(24): 2561-2563; Jun 86.
- Transient Losses in Superconductors;  
Goldfarb, R. B.  
NBSIR 86-3053; Jun 86.

- Problems with Cryogenic Operation of Piezoelectric Bending Elements;  
Duffield, C.; Moreland, John; Fickett, F. R.  
Rev. Sci. Instrum. 57(8): 990-992; May 86.
- A Quench Detector Design for Superconductor Testing;  
Dube, W. E.; Goodrich, L. F.  
Rev. Sci. Instrum. 57: 680-682; Apr 86.
- Differences Between Spin Glasses and Ferroglasses: Pd-Fe-Si;  
Goldfarb, R. B.; Rao, K. V.; Chen, H. S.  
Solid State Commun. 54(9): 799-801; 85.
- High-Field Flux Pinning and the Strain Scaling Law;  
Ekin, J. W.  
Proc. Intl. Symp. on Flux Pinning and Electromagnetic Properties in  
Superconductors; Nov 11-15, 1985; Fukuoka, Japan; p 267-271; 85.
- Investigation of a Practical Superconductor with a Copper Matrix;  
Fickett, F. R.  
Ann. Rpt. and Final Summary of Project 255, Intl. Copper Research Assoc.,  
Inc., 708 Third Avenue, New York, NY 10017; 85.
- Magnetic Field Mapping with a SQUID Device;  
Fickett, F. R.; Capobianco, T.  
Proc. Review of Progress in "Quantitative NDE" Conf.; Jul 8-13, 1984; San  
Diego, CA; 4A: 401-410, New York, NY: Plenum Press; 85.
- Precision Measurement of Eddy Current Coil Parameters;  
Capobianco, T.; Fickett, F. R.  
Proc. Review of Progress in Quantitative NDE Conf.; Jul 9-13, 1984; Univ.  
of Calif., San Diego, CA; New York, NY: Plenum Press; 85.
- Electron Tunneling Experiments Using Nb-Sn "Break" Junctions;  
Moreland, J.; Ekin, J. W.  
J. Appl. Phys. 58(10): 3888-3894; 15 Nov 85.
- Electron Tunneling Experiments into Superconducting Filaments Using  
Mechanically Adjustable Barriers;  
Moreland, J.; Ekin, J. W.  
Appl. Phys. Lett. 47(2): 175-177; Jul 85.
- Hysteretic Losses in NbTi Superconductors;  
Goldfarb, R.; Clark, A. F.  
J. Appl. Phys. 57(1): 3809-3811; 15 Apr 85.
- Tenth International Cryogenic Engineering Conference - A Report  
Clark, A. F.; Heinz, W.; Rizzoto, C.; Fast, R. W.; Klipping, G.  
10th Intl. Cryogenic Eng. Conf.; 31 Jul-3 Aug, 1985; Otaniemi, Finland;  
Cryogenics 25: 222-223; Apr 85.
- Standards for Measurement of the Critical Fields of Superconductors;  
Fickett, F. R.  
NBS JRes 90(2): 95-113; Mar-Apr 85.

Effect of Uniaxial Strain on the Critical Current and Critical Field of Chevrel Phase  $\text{PbMo}_3\text{S}_8$  Superconductors;

Ekin, J. W.

Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 474-477; Mar 85.

Further Investigations of the Solid-Liquid Reaction & High-Field Critical Current Density in Liquid-Infiltrated Nb-Sn Conductors;

Hong, M.; Maher, D. M.; Ellington, M. B.; Hellman, F.; Geballe, T. H.;  
Ekin, J. W.; Holthuis, J. T.

Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 332-335; Mar 85.

Magnetic Hysteresis and Complex Susceptibility as Measures of AC Losses in a Multifilamentary NbTi Superconductor;

Goldfarb, R.; Clark, A. F.

Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 332-335; Mar 85.

The NBS Magnetic Monopole Detector

Cromar, M.; Fickett, F. F.; Clark, A. F.

Proc. Applied Superconductivity Conf.; Sep 10-13, 1984; San Diego, CA;  
IEEE Trans. Magn. MAG-21(2): 418-420; Mar 85.

Units for Magnetic Properties;

Goldfarb, R.; Fickett, F. R.

NBS SP 696; Mar 85.

Editorial;

Clark, A. F.; Heinz, W.; Nagano, H.; Gardner, J. B.

Cryogenics 25: 59; Feb 85.

Development of Standards for Superconductors;

Goodrich, L. F.; Minervini, J. V.; Clark, A. F.; Fickett, F. R.;

Ekin, J. W.; Pittman, E. S.

Interim Report Jan 1982-Dec 1983; NBSIR 85-3027; Jan 85.

Characterization of a Standard Reference Superconductor for Critical Current and a Summary of Other Standard Research at NBS;

Clark, A. F.; Goodrich, L. F.

Proc. Intl. Cryogenic Engineering Conf.-10; Jul 31-Aug 3, 1984;  
Helsinki, Butterworth, p 433-437; 84.

Critical Parameters and Strain Effects in Liquid-Infiltrated Nb-Ta/Sn Multifilamentary Superconductor;

Ekin, J. W.; Hong, M.

J. Appl. Phys. Lett. 45: 297; 84.

Design of the NBS Magnetic Monopole Detectors;

Clark, A. F.; Cromar, M. W.; Fickett, F. R.

Proc. Intl. Cryogenic Engineering Conf.-10; Jul 31-Aug 3, 1984; Helsinki,  
Butterworth, p 365-368; 84.

- Monopole Detector Studies at NBS;  
Fickett, F. R.; Cromar, M.; Clark, A. F.  
In Monopole '83, J. L. Stone, ed.; New York: Plenum Press, p 477-480; 84.
- Magnetic Measurements, Calibrations, and Standards: Report on a Survey;  
Fickett, F. R.  
NBSIR 84-3018, 20 p; Oct 84.
- Critical Current Measurements on a NbTi Superconducting Wire Standard  
Reference Material;  
Goodrich, L. F.; Vecchia, D. F.; Pittman, E. S.; Clark, A. F.  
NBS SP 260-291; Sep 84.
- Electromechanical and Metallurgical Properties of Liquid-Infiltration Nb-Ta/Sn  
Multifilamentary Superconductor;  
Ekin, J. W.; Hong, M.  
Appl. Phys. Lett. 45(3): 297-299; Aug 84.
- Critical Current Measurements on a NbTi Superconducting Wire Standard  
Reference Material;  
Goodrich, L. F.; Vecchia, D. F.; Pittman, E. S.; Clark, A. F.  
Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and  
R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17,  
1983; Colorado Springs, CO; New York, NY: Plenum Press, p 952-960; Jul 84.
- Development of Nb<sub>3</sub>Sn Cabled Conductor by External Diffusion Process and Effect  
of Strain on the Critical Current;  
Pasztor, G.; Ekin, J. W.  
Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and  
R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17,  
1983; Colorado Springs, CO; New York, NY: Plenum Press, p 787-795; Jul 84.
- Magnetic Susceptibility and Strain-Induced Martensite Formation at 4 K in Type  
304 Stainless Steel;  
Goldfarb, R. B.; Reed, R. P.; Ekin, J. W.; Arvidson, J. M.  
Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and  
R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17,  
1983; Colorado Springs, CO; New York, NY: Plenum Press, p 475-482; Jul 84.
- Research Opportunities in Superconductivity;  
Tinkham, M.; Beasley, M. R.; Larbalestier, D. C.; Clark, A. F.;  
Finnemore, D. K.  
Cryogenics 24(7): 378-388; Jul 84.
- Strain Effects in Superconducting Compounds--An Overview and Synthesis;  
Ekin, J. W.  
Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and  
R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17,  
1983; Colorado Springs, CO; New York, NY: Plenum Press, p 823-836; Jul 84.

The Effect of Mill Temper on the Mechanical and Magneto-resistive Properties of Oxygen-free Copper in Liquid Helium;

Fickett, F. R.

Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17, 1983; Colorado Springs, CO; New York, NY: Plenum Press, p 453-460; Jul 84.

Training Studies of Epoxy-Impregnated Superconductor Windings, Part III: Epoxies, Conductor Insulations, and Copper Ratio;

Ekin, J. W.; Pittman, E. S.; Goldfarb, R. B.; Superczynski, M. J.; Waltman, D. J.

Advances in Cryogenic Engineering--Materials, Vol. 30, A. F. Clark and R. P. Reed, eds.; Proc. 5th Intl. Cryogenic Materials Conf.; Aug 15-17, 1983; Colorado Springs, CO; New York, NY: Plenum Press, p 977-984; Jul 84.

Calibration of ac Susceptometer for Cylindrical Specimens;

Goldfarb, R. B.; Minervini, J. V.

Rev. Sci. Instrum. 55(5): 761-764; May 84.

Copper-TFE Friction at Cryogenic Temperatures;

Bell, R.; Jones, K.; Fickett, F. R.

Cryogenics 24: 31-35; Jan 84.

Experience in Standardizing Superconductor Measurements;

Clark, A. F.; Goodrich, L. F.; Fickett, F. R.

J. Physique, Colloque C1, supplement au 1(45): C1-379-382; Jan 84.

Magnetic Field Effects on Tensile Behavior of Alloys 304 and 310 at 4 K;

Reed, R. P.; Arvidson, J. M.; Ekin, J. W.; Schoon, R. H.

Proc. Intl. Cryogenic Materials Conf.; May 11-14, 1982; Kobe, Japan; p 33-36; 83.

Conductors for Advanced Energy Systems Annual Report 1982;

Fickett, F. R.

INCRA Research Report, Paper #321A; Intl. Copper Research Assoc., 708 3rd Ave., NY 10017; p 1-97; Aug 83.

Electrical Properties;

Fickett, F. R.

Chapt. 5 in Materials at Low Temperatures, R. Reed; A. F. Clark, eds., American Society for Metals, Metals Park, OH 44073; p 163-201; Jun 83.

Magnetic Properties;

Fickett, F. R.; Goldfarb, R. B.

Chap. 6 in Materials at Low Temperatures, R. Reed; A. F. Clark, eds., American Society of Metals, Metals Park, OH 44073; p 203-235; Jun 83.

Superconductors;

Ekin, J. W.

Chapt. 13 in Materials at Low Temperatures, R. Reed; A. F. Clark, eds., American Society of Metals, Metals Park, OH 44073, p 465-513; Jun 83.



Thermal Expansion;

Clark, A. F.

Chapt. 3 in Materials at Low Temperatures, R. Reed; A. F. Clark, eds.,  
American Society for Metals, Metals Park, OH 44073, p 75-132; Jun 83.

Effect of Stainless Steel Reinforcement on the Critical Current Versus Strain  
Characteristic of Multifilamentary Nb<sub>3</sub>Sn Superconductors;

Ekin, J. W.

J. Appl. Phys. 54(5): 2869-2871; May 83.

J-B-T- $\epsilon$  Interaction in A15, B1, and C15 Crystal Structure Superconductors;

Ekin, J. W.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19: 900-902;  
May 83.

Multifilamentary Nb-Nb<sub>3</sub> Composite by Liquid Infiltration Method:  
Superconducting, Metallurgical, and Mechanical Properties;

Hong, M.; Hull, G. W., Jr.; Holthuis, J. T.; Hazzenzahl, W. V.; Ekin, J. W.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 912-  
916; May 83.

Oxygen-Free Copper at 4 K;

Fickett, F. R.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19: 228-231;  
May 83.

Properties of NbN Films Crystallized from the Amorphous State;

Gavaler, J. R.; Greggi, J.; Wilmer, R.; Ekin, J. W.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 418-  
421; May 83.

The Effect of Field Orientation on Current Transfer in Multifilamentary  
Superconductors;

Goodrich, L. F.

Proc. Applied Superconductivity Conf., IEEE Trans. Magn. MAG-19(3): 244-  
247; May 83.

Four-Dimensional J-B-T- $\epsilon$  Critical Surface for Superconductivity;

Ekin, J. W.

J. Appl. Phys. 54(1): 303-306; Jan 83.

Proceedings, International Cryogenic Materials Conference;

Clark, A. F.; Tachikawa, K., eds.

May 11-14, 1982; Kobe, Japan: Butterworth; Jan 83.

Effect of Strain on the Critical Current and Critical Field of B1 Structure  
NbN Superconductors;

Ekin, J. W.

Appl. Phys. Lett. 41(10): 996; Nov 82.

Effect of Strain on the Critical Current of Sputtered NbN Films;

Ekin, J. W.; Gavaler, J. R.; Greggi, J.

Bull. Am. Phys. Soc. p 8-12; Mar 82 and Appl. Phys. Lett. 41(10): 996-998;  
Nov 82.

Spin-Freezing below the Ferromagnetic Transition Determined by the Imaginary Component of ac Magnetic Susceptibility

Goldfarb, R. B.; Fickett, F. R.; Rao, K. V.; Chen, H. S.

J. Appl. Phys. 53(11): 7687; Nov 82.

Development of Standards for Superconductors;

Clark, A. F.

NBSIR 82-1678; Jul 82.

Effect of Twist Pitch on Short-Sample V-I Characteristics of Multifilamentary Superconductors;

Goodrich, L. F.; Ekin, J. W.; Fickett, F. R.

Adv. Cryo. Eng. 28: 571-580; New York: Plenum Press; Jul 82.

Low Temperature Material Perspective;

Fickett, F. R.

Adv. Cryo. Eng. 28: 1-16; Jul 82.

Training Studies of Epoxy-Impregnated Superconductor Windings;

Ekin, J. W.; Pittman, E. S.; Supercynski, M. J.; Waltman, D. J.

Adv. Cryo. Eng. 28: 719-728, New York: Plenum Press; Jul 82.

Critical Current Measurement: A Compendium of Experimental Effects;

Goodrich, L. F.; Fickett, F. R.

Cryogenics, p 225-242; May 82.

Effect of Strain on the Critical Parameters of  $V_2(\text{Hf,Zr})$  Laves Phase Composite Superconductors;

Ekin, J. W.

Appl. Phys. Lett. 40(9): 844-846; May 82.

Electrical Properties of Materials and Their Measurement at Low Temperatures;

Fickett, F. R.

NBS TN 1053; Mar 82.

Electric and Magnetic Properties of CuSn and CuNi Alloys at 4 K;

Fickett, F. R.

Cryogenics 22: 135; Mar 82.

Further Evidence for a Spin-Glass Phase Transition in Amorphous Fe-Mn-P-B-Al Alloys;

Goldfarb, R. B.; Rao, K. V.; Chen, H. S.; Patton, C. E.

J. Appl. Phys. 53: 2217; Mar 82.

Electrical and Magnetic Properties of Internally Oxidized Copper and Dilute Copper-Iron Alloys;

Fickett, F. R.

J. Phys. F: Met. Phys. 12: 1953-1969; Jan 82.

Effect of Strain on the Critical Current of Nb-Hf/Cu-Sn-Ga Multifilamentary Superconductors;

Ekin, J. W.; Sekine, H.; Tachikawa, K.

J. Appl. Phys. 52: 6252; 81.

- Lap Joint Resistance and Intrinsic Critical Current Measurements on a NbTi Superconducting Wire;  
Goodrich, L. F.; Ekin, J. W.  
IEEE Trans. Magn. MAG-17: 69; 81.
- Magnetic Susceptibility Studies of Amorphous Ni-Mn-P-B-Al Alloys;  
Goldfarb, R. B.; Rao, K. V.; Fickett, F. R.; Chen, H. S.  
J. Appl. Phys. 52: 1744; 81.
- Mechanical Properties and Strain Effects in Superconductors;  
Ekin, J. W.  
Chap. 7 in Superconducting Materials Science, S. Foner and B. Schwartz, eds.; New York: Plenum Press, p 455-509; 81.
- Miniature Multipin Electrical Feedthrough for Vacuum Use;  
Goldfarb, R. B.  
Cryogenics 21: 746; 81.
- Strain Scaling Law for Flux Pining in NbTi, Nb<sub>3</sub>Sn, Nb-Hf/Cu-Sn-Ga, V<sub>3</sub>Ga, and Nb<sub>3</sub>Ge;  
Ekin, J. W.  
IEEE Trans. Magn. MAG-17: 658; 81.
- Structural Materials for Large Superconducting Magnets;  
Fickett, F. R.; McHenry, H. I.  
IEEE Trans. Magn. MAG-17: 2297; 81.
- Superparamagnetism and Spin-Glass Freezing in Nickel-Manganese Alloys;  
Goldfarb, R. B.; Patton, C. E.  
Phys. Rev. B 24: 1360; 81.
- NBS Superconductor Standardization Program;  
Fickett, F. R.; Goodrich, L. F.  
Proc. 1980 Superconducting MHD Magnet Design Conf. (Francis Bitter National Magnet Laboratory, MIT); Oct 81.
- Thermal Expansion of Multifilamentary Nb<sub>3</sub>Sn and V<sub>3</sub>Ga Superconductive Cables and Fiberglass-Epoxy and Cotton-Phenolic Composite Materials;  
Fujii, G.; Ranney, M. A.; Clark, A. F.  
Jap. J. Appl. Phys. 20, p L267-L270; Apr 81.
- Thermal Expansion of Several Materials for Superconducting Magnets;  
Clark, A. F.; Fujii, G.; Ranney, M. A.  
Proc. 7th Magnet Technology Conf., Karlsruhe, Germany, IEEE Trans. Magn. MAG-17: 2316; Apr 81.
- Advances in Cryogenic Engineering - Materials, Vol. 26;  
Clark, A. F.; Reed, R. P., eds.  
Proc. 3rd Intl. Cryogenic Mater. Conf., Aug 1979; Madison, WI, New York: Plenum Press; 80.
- Definitions of Terms for Practical Superconductors, 4. Josephson Phenomena:  
Fickett, F. R.; Kaplan, S. B.; Powell, R. L.; Radebaugh, R.; Clark, A. F.  
Cryogenics 20: 319-325; 80.

- Development of Standards for Superconductors;  
Fickett, F. R.; Clark, A. F.  
Proc. 8th Intl. Cryogenic Eng. Conf., Jun 1980; Genova; IPC Science and  
Technology Press, Guildford, England, p 494-498; 80.
- Filamentary Al5 Superconductors;  
Suenaga, M.; Clark, A. F., eds.  
New York: Plenum Press; 80.
- Processing Limits for Ultrafine Multifilament Nb<sub>3</sub>Sn;  
Ho, J. C.; Oberly, C. E.; Garrett, H. J.; Walker, M. S.; Zeitlin, B. A.;  
Ekin, J. W.  
Proc. Intl. Cryo. Mater. Cong., 1979; Madison, WI, Adv. Cryogenic. Eng.  
26: 358; 80.
- Strain Scaling Law and the Prediction of Uniaxial and Bending Strain Effects;  
Ekin, J. W.  
Filamentary Al5 Superconductors, M. Suenaga and A. F. Clark, eds.,  
New York: Plenum Press; p 455-509; 80.
- Strain Scaling Law for Flux Pinning in Practical Superconductors. Part I:  
Basic Relationship and Application to Nb<sub>3</sub>Sn Conductors;  
Ekin, J. W.  
Cryogenics 20: 611; 80.
- Tensile, Fracture Toughness and Magnetization Testing in Cast 316-L Stainless  
Steel and Its Weldment;  
Genens, L.; Kim, S. H.; Wang, S. T.; Reed, R. P., Fickett, F. R.  
Proc. 8th Intl. Cryo. Eng. Conf. (IPC Science and Technology Press, paper  
3E) 20 p; 80.
- Thermal Expansion of Cryogenic-Grade Glass-Epoxy Laminates; Materials Studies  
of Magnetic Fusion Energy Applications at Low Temperatures - III;  
Ranney, M. A.; Clark, A. F.  
NBSIR 80-1627: 405 p; 80.
- Training of Epoxy-Impregnated Superconductor Windings;  
Ekin, J. W.; Schramm, R. E.; Superczynski, M. J.  
Proc. 3rd Intl. Cryogenic Mater. Conf., Aug 1979; Madison, WI; Adv. Cryo.  
Eng. 26: 677; 80.
- Development of Standards for Superconductors;  
Fickett, F. R.; Goodrich, L. F.; Clark, A. F.  
NBSIR 80-1642; Dec 80.
- Effect of Thermal Contraction of Sample Holder Material on Critical  
Current Measurement;  
Fujii, G.; Ekin, J. W.; Radebaugh, R.; Clark, A. F.  
Advances in Cryogenic Engineering - Materials, Vol. 26, New York: Plenum  
Press; p 589-598; 80. Also published as Technical Report A-1074,  
Institute of Solid State Physics, Univ. of Tokyo; Aug 80.

- Development of Standards for Practical Superconductors;  
Clark, A. F.  
Proc. Superconductivity Technical Exchange, PIC-E:E-SC 209/1, Naval  
Research Laboratory, Washington, DC; p 103-114; Apr 80.
- A Convenient Standard for Low-Field Susceptibility Calibration;  
Rosenblum, J.; Larson, E.; Hoblitt, R.; Fickett, F. R.  
Rev. Sci. Instrum. 50: 1027; 79.
- Effect of Strain on Critical Current of Nb<sub>3</sub>Ge;  
Ekin, J. W.; Braginski, A. I.  
IEEE Trans. Magn. MAG-15: 509; 79.
- Effect of Strain on Epoxy-Impregnated Superconducting Composites;  
Ekin, J. W.; Schramm, R. E.; Clark, A. F.  
Nonmetallic Materials and Composites at Low Temperatures; A. F. Clark;  
R. P. Reed; G. Hartwig, eds.; New York: Plenum Press, p 301-308; 79.
- Materials for Superconducting Magnet Systems;  
Fickett, F. R.; Reed, R. P., eds.  
Traverse City, MI: Belfour-Stulen, Inc.; 79.
- Nonmetallic Materials and Composites at Low Temperatures;  
Clark, A. F.; Reed, R. P.; Hartwig, G., eds.  
Proc. ICMC Symposium, Jul 1978; Munich, Germany, New York: Plenum Press;  
79.
- Space Applications of Superconductivity: High Field Magnets;  
Fickett, F. R.  
Cryogenics 19: 691-701; 79.
- Standards for Superconductors;  
Fickett, F. R.; Clark, A. F.,  
DoE Conf. 79-0854, Proc. Mechanical and Magnetic Energy Storage, U.S.  
Dept. of Energy, Washington, DC, p 3-8; 79.
- Strain Dependence of the Critical Current and Critical Field in  
Multifilamentary Nb<sub>3</sub>Sn Composites;  
Ekin, J. W.  
IEEE Trans. Magn. MAG-15: 197; 79.
- Structures, Insulators, and Conductors for Large Superconducting Magnets;  
Fickett, F. R.; Reed, R. P.; Dalder, E. N. C.  
J. Nucl. Mat. 85 and 86: 353-360; 79.
- The Development of Standards for Practical Superconductors  
Clark, A. F.; Ekin, J. W.; Radebaugh, R.; Read, D. T.  
IEEE Trans. Magn. MAG-15: 224-227; 79.
- Development of Standards for Superconductors;  
Fickett, F. R.; Clark, A. F.  
NBSIR 80-1629; Dec 79.

- Material Studies for Superconducting Machinery Coil Composites;  
Ekin, J. W.; Kasen, M. B.; Read, D. T.; Schramm, R. E.; Tobler, R. L.;  
Clark, A. F.  
NBSIR 80-1633; Nov 79.
- A Standards Program for AC Losses in Superconductors;  
Radebaugh, R.; Fujii, G.; Read, D. T.; Clark, A. F.  
Intl. Congress of Refrigeration, IIR A1/2-10: 1-4; Sep 79.
- Definitions of Terms for Practical Superconductors.  
3. Fabrication, Stabilization, and Transient Losses;  
Read, D. T.; Ekin, J. W.; Powell, R. L.; Clark, A. F.  
Cryogenics 19(6): 327-332; Jun 79.
- Magnetic Properties of the 'Nonmagnetic' Stainless Steels;  
Fickett, F. R.  
NBSIR 79-1609; Jun 79.
- Materials for Superconducting Magnets for MHD Power Systems, a Usage Survey  
and a Proposed Research Program;  
Reed, R. P.; McHenry, H. I.; Kasen, M. B.; Fickett, F. R.; Dalder, E. N. C.  
MIT Program Report on MHD; Jun 79.
- Materials Studies for Magnetic Fusion Energy Applications at Low  
Temperatures - II;  
Fickett, F. R., ed.  
NBSIR 79-1609; Jun 79.
- Review of the 1978 NBS/DoE Workshop on Materials at Low Temperatures;  
Fickett, F. R.; Reed, R. P.  
Proc. 1st Topical Meeting on Fusion Reactor Materials; Miami Beach, FL,  
p 352; Jan 79.
- Advances in Cryogenic Engineering, Vol. 24;  
Timmerhaus, K. D.; Reed, R. P.; Clark, A. F., eds.  
Proc. 2nd Intl. Cryogenic Mater. Conf., Aug 1977; Boulder, CO; New York:  
Plenum Press; 78.
- Current Transfer in Multifilamentary Superconductors. I. Theory;  
Ekin, J. W.  
J. Appl. Phys. 49(6): 3406-3411; 78.
- Effects of Stress on Practical Superconductors;  
Clark, A. F.  
MT-6, Proc. Intl. Conf. on Magn. Tech.; Alpha, Bratislava, Czechoslovakia,  
p 612-618; 78.
- Fatigue and Stress Effects in NbTi and Nb<sub>3</sub>Sn Multifilamentary Superconductors;  
Ekin, J. W.  
Proc. 2nd Intl. Cryogenic Mater. Conf., Aug 1977; Boulder, CO; Adv. Cryo.  
Eng. 24: 306; 78.

Low Temperature Specific Heat of Two Stainless Steels;

Ho, J. C.; King, G. B.; Fickett, F. R.

Cryogenics 18: 296; 78.

Properties of a Superconducting Coil Composite and Its Components;

Clark, A. F.; Arp, V. D.; Ekin, J. W.

MT-6, Proc. Intl. Conf. on Magn. Tech.; Alpha, Bratislava, Czechoslovakia,  
p 673-679; 78.

Special Purpose Materials: An Assessment of Needs and the Role of these  
Materials in the National Program;

Gold, R. E.; Fickett, F. R.; et al.

Proc. 3rd Topical Meeting on the Technology of Controlled Nuclear Fusion,  
DoE Conf-780508; 78.

Magnet Materials for Fusion Energy;

Fickett, F. R.

Section of the Fusion Reactor Materials Program Plan, sect. IV, Special  
Purpose Materials; U.S. DoE Report DoE/ET-0032/4; Jul 78.

Current Transfer in Multifilamentary Superconductors, II. Experimental  
Results;

Ekin, J. W.; Clark, A. F.; Ho, J. C.

J. Appl. Phys. 49(6): 3410-3411; Jun 78.

High Field Magnets;

Fickett, F. R.

Chap. 2 in the Role of Superconductivity in the Space Program: An  
Assessment of Present Capabilities and Future Potential, NBSIR 78-885;  
May 78.

Materials Studies for Magnetic Fusion Energy Applications at Low  
Temperatures - I;

Fickett, F. R.; Reed, R. P.

NBSIR 78-884; Apr 78.

Definitions of Terms for Practical Superconductors, 2. Critical Parameters;

Powell, R. L.; Clark, A. F.

Cryogenics 18(3): 137-141; Mar 78.

Investigation of a Practical Superconductor with a Copper Matrix;

Fickett, F. R.

INCRA Annual Report, Project No. 255; Jan 78.

A Low Temperature Materials Research Program for Magnetic Fusion Energy;

Fickett, F. R.; Kasen, M. B.; McHenry, H. I.; Reed, R. P.

Adv. Cryogenic Eng. 24: 52; 77.

A Review of the NBS-ERDA Workshop on Materials at Low Temperatures;

Fickett, F. R.; Reed, R. P.

Proc. 7th Symposium on Engineering Problems of Fusion Research, IEEE Pub.  
No. 77CH1267-4-NPS: 1506-1509; 77.

A Simple Method for Producing High Conductivity Copper for Low Temperature Applications;

Rosenblum, S.; Steyert, W. A.; Fickett, F. R.

Cryogenics 17: 645; 77.

Mechanisms for Critical-Current Degradation in NbTi and Nb<sub>3</sub>Sn and NbTi Multifilamentary Wires;

Ekin, J. W.

Proc. 1976 Applied Superconductivity Conf., IEEE Trans. Magn. MAG-13: 127; 77.

Studies of Superconducting Wires from Niobium Precipitated in Copper-Tin-Niobium Alloys;

Fickett, F. R.; Sparks, L. L.; Kasen, M. G.

Manufacture of Superconducting Materials, R. W. Meyerhoff, ed., American Society for Metals, Metals Park, OH, p 164; 77.

The Low Temperature Tensile Behavior of Copper-Stabilized Niobium-Titanium Superconducting Wire;

Reed, R. P.; Mikesell, R. P.; Clark, A. F.

Advances in Cryogenic Engineering, Vol. 22, New York: Plenum Press, p 463-471; 77.

Definition of Terms for Practical Superconductors, 1. Fundamental States and Flux Phenomena;

Powell, R. L.; Clark, A. F.

Cryogenics 17(12): 697-701; Dec 77.

Magnetic Fusion Energy Low Temperature Materials Program - A Survey;

Reed, R. P.; Fickett, F. R.; Kasen, M. B.; McHenry, H. I.

Report to ERDA Division of Magnetic Fusion Energy; Mar 77.

Defining Critical Current;

Clark, A. F.; Ekin, J. W.

IEEE Trans. Magn. MAG-13(1): 38-40; Jan 77.

Advances in Cryogenic Engineering - Vol. 22;

Timmerhaus, K. D.; Reed, R. P.; Clark, A. F., eds.

Proc. 1st Intl. Cryogenic Mater. Conf., Aug 1975; Kingston, Ontario; New York: Plenum Press; 76.

A Research Program on the Properties of Structural Materials at 4 K;

Reed, R. P.; Clark, A. F.; van Reuth, E. C.

Adv. Cryo. Eng., New York: Plenum Press, 22: 1-8; 76.

Effect of Strain on the Critical Current of Nb<sub>3</sub>Sn and NbTi Multifilamentary Composite Wires;

Ekin, J. W.; Clark, A. F.

AIP Conf. Proc., No. 34, New York: Amer. Inst. Phys., p 81-83; 76.

Effect of Stress on the Critical Current of Nb<sub>3</sub>Sn Multifilamentary Composite Wire;

Ekin, J. W.

Appl. Phys. Lett. 29: 216; 76.



Effect of Stress on the Critical Current of NbTi Multifilamentary Composite Wire;

Ekin, J. W.; Fickett, F. R.; Clark, A. F.  
Adv. Cryo. Eng.; New York: Plenum Press, 22: 449-452; 76.

Effect of Stress on the Critical Current of NbTi Multifilamentary Composite Wire;

Ekin, J. W.; Fickett, F. R.; Clark, A. F.  
Proc. Intl. Cryogenic Mater. Conf., 1975; Kingston, Ontario; Adv. Cryo. Eng.; New York: Plenum Press 22: 449; 76.

Magnetic and Electrical Properties of Internally Oxidized FeCu Alloys;

Fickett, F. R.  
Amer. Inst. Phys. Conf. Proc. 34: 25; 76.

On Lysozyme as a Possible High-Temperature Superconductor;

Sorenson, C. M.; Fickett, F. R.; Mockler, R. C.; O'Sullivan, W. J.;  
Scott, J. F.  
J. Phys. C: Solid State Phys. 9: L251; 76.

Properties of Nonsuperconducting Technical Solids at Low Temperatures - An Update;

Fickett, F. R.  
Proc. 5th Intl. Conf. on Magn. Tech. (MT-5), Rome, Laboratori Nazionali del CNEN, Frascati, Italy, p 659; 76.

Structural Materials for Cryogenic Applications;

Fickett, F. R.  
Proc. 6th Intl. Cryogenic Eng. Conf., May 11-14, 1976; Grenoble, France; IPC Science and Technology Press, p 20; 76.

Stress Effects in Superconductors;

Clark, A. F.  
Cryogenics 16(10): 632-633; Oct 76.

Controlled Thermonuclear Reactors: A Prospective Large-Scale Use of Pure Copper;

Fickett, F. R.  
INCRA Research Report; Aug 76.

Characterization of a Superconducting Coil Composite and Its Components;

Clark, A. F.; Weston, W. F.; Arp, V. D.; Hust, J. G.; Trapani, R. J.  
NBSIR 76-837; Jul 76.

Low Temperature Thermal Expansion of Barium Ferrite;

Clark, A. F.; Haynes, W. M.; Deason, V. A.; Trapani, R. J.  
Cryogenics 16(3): 267-270; May 76.

A Preliminary Investigation of the Behavior of High Purity Copper in High Magnetic Fields and a Final Summary of Project 186;

Fickett, F. R.  
INCRA Annual Report, Project No. 186C; Mar 76.

- A Technique for Preparing Homogeneous Bulk Samples of Concentrated Alloys;  
Ekin, J. W.; Deason, V. A.  
Rev. Sci. Instr. 46: 327; 75.
- Critical Currents in Granular Superconductors;  
Ekin, J. W.  
Phys. Rev. B 12: 2676; 75.
- The Magnetic Coupling Force of the Superconducting dc Transformer;  
Ekin, J. W.; Clem, J. R.  
Phys. Rev. B 12: 1753; 75.
- Materials Research for Superconducting Machinery - IV;  
Reed, R. P.; Clark, A. F.; vanReuth, E. C., eds.  
Semi-Annual Tech. Rept., Mar-Sep 1975; Advanced Research Projects Agency,  
Arlington, VA ADA019230; Oct 75.
- Materials Research for Superconducting Machinery - III;  
Reed, R. P.; Clark, A. F.; van Reuth, E. C., eds.  
Semi-Annual Tech. Rept., Sep. 74-Mar 75; Advanced Research Projects  
Agency, Arlington, VA, ADA012365; Apr 75.
- Magnetic Properties of Internally Oxidized Copper;  
Fickett, F. R., Sullivan, D. B.  
AIP Conf. Proc. 18: 740; 74.
- Magnetic Studies of Oxidized Impurities in Pure Copper Using a SQUID System;  
Fickett, F. R.; Sullivan, D. B.  
J. Phys. F 4: 900; 74.
- Magnetothermal Conductivity;  
Fickett, F. R.; Sparks, L. L.  
NBSIR 74-393; 74.
- Magnetothermal Conductivity;  
Sparks, L. L; Fickett, F.R.  
NBSIR 74-359; 74.
- Oxygen Annealing of Copper: A Review;  
Fickett, F. R.  
Mat. Sci. and Eng. 14: 199; 74.
- U. S. Programs on Large Scale Applications of Superconductivity;  
Powell, R. L.; Fickett, F. R.; Birmingham, B. W.  
Chap. 17 in Superconducting Machines and Devices--Large Systems  
Applications; Proc. NATO Advanced Study Inst., Sep 5-14, 1973; Entreves,  
Italy; S. Foner and B. B. Schwartz, eds., New York: Plenum Press, p 651-  
675; 74.
- Materials Research for Superconducting Machinery - II;  
Clark, A. F.; Reed, R. P.; van Reuth, E. C., eds.  
Semi-Annual Tech. Rept., Mar-Sep 74; Advanced Research Projects Agency,  
Arlington, VA, ADA004586; Oct 74.

A Preliminary Investigation of the Behavior of High Purity Copper in High Magnetic Fields;

Fickett, F. R.

INCRA Annual Report, Project No. 186B; Aug 74.

Materials Research for Superconducting Machinery;

Clark, A. F.; Reed, R. P.; van Reuth, E. C., eds.

Semi-Annual Tech. Rept., Sep 1973-Mar 1974; Advanced Research Projects Agency, Arlington, VA, AD780596; Mar 74.

Characterization of a Superconducting Coil Composite;

Fowlkes, C. W.; Angerhofer, P. E.; Newton, R. N.; Clark, A. F.

NBSIR 73-349; Dec 73.

Superconducting Levitation of High Speed Vehicles;

Arp, V. D.; Clark, A. F.; Flynn, T. M.

Transport. Eng. J., ASCE 99: 873-885; Nov 73.

A Compilation and Evaluation of Mechanical, Thermal and Electrical Properties of Selected Polymers;

Schramm, R. E.; Clark, A. F.; Reed, R. P.

NBS MN 132; Sep 73.

A Preliminary Investigation of the Behavior of High Purity Copper in High Magnetic Fields;

Fickett, F. R.

INCRA Annual Report, Project No. 186A; Aug 73.

Mechanical, Thermal, and Electrical Properties of Selected Polymers;

Reed, R. P.; Schramm, R.; Clark, A. F.

Cryogenics 13: 67-82; Feb 73.

Some Applications of Cryogenics to High Speed Ground Transportation;

Arp, V. D.; Clark, A. F.; Flynn, T. M.

NBS TN 635; Feb 73.

Characterization of High Purity Metals by the Eddy Current Decay Method;

Clark, A. F.; Deason, V. A.; Powell, R. L.

Cryogenics 12: 35; 72.

Magnetoresistivity of Copper and Aluminum at Cryogenic Temperatures;

Fickett, F. R.

Proc. 4th Intl. Conf. on Magnet Technology, Sep 72, AEC CONF-720908: p 498; 72.

Material Variability as Measured by Low Temperature Electrical Resistivity;

Clark, A. F.; Tryon, P. V.

Cryogenics 12: 451-461; Dec 72.

Properties of Nonsuperconducting Technical Solids at Low Temperatures;

Fickett, F. R.

Proc. 4th Intl. Conf. on Magnet Technology, AEC CONF-720903: 539; Sep 72.

Combination of a Power Transmission Line and an Active Track for a Magnetically Suspended, High Speed Train;

Clark, A. F.

J. Appl. Phys. 43(8): 3598; Aug 72.

A Preliminary Investigation of the Behavior of High Purity Copper in High Magnetic Fields;

Fickett, F. R.

INCRA Annual Report, INCRA Project No. 186; Jun 72.

Standard Reference Materials: The Eddy Current Decay Method for Resistivity Characterization of High Purity Metals;

Clark, A. F.; Deason, V. A.; Hust, J. G.; Powell, R. L.

NBS SP 260-39; May 72.

Defect Annealing (4 to 295 K) After Martensitic Phase Transformation in an Fe-29 Ni Alloy;

Reed, R. P.; Clark, A. F.; Schramm, R. E.

Scripta Met. 5: 485; 71.

Longitudinal Magnetoresistance Anomalies;

Fickett, F. R.; Clark, A. F.

J. Appl. Pys. 42: 217; 71.

Magnetoresistance of Very Pure Polycrystalline Aluminum;

Fickett, F. R.

Phys. Rev. B 3: 1941; 71.

Martensitic Transformation Detection in Cryogenic Steels (Magnetometer Development);

Fickett, F. R.

NBS TN 613; 71.

Characterization of High Purity Metals by the Eddy Current Decay Method;

Clark, A. F.; Deason, V. A.; Powell, R. L.

Mater. Res. Stand. 11(8): 25-28; Aug 71.

Lorenz Ratio as a Tool for Predicting Thermal Conductivity of Metals and Alloys;

Hust, J. G.; Clark, A. F.

Mater. Res. Stand. 11(8): 22-24; Aug 71.

Low Temperature Electrical Resistivity of Some Engineering Alloys;

Clark, A. F.; Childs, G. E.; Wallace, G. H.

Adv. Cryo. Eng., New York: Plenum Press, 15: 85-90; 70.

Low Temperature Specific Heat and Thermal Expansion of Alloys;

Clark, A. F.; Kropschot, R. H.

Intl. Inst. of Refrigeration, Commission I, Sep 70, Tokyo, Bulletin de l'Institut Internationale du Froid, Annexe 1970-2: 249; 70.

Resistivity of Polycrystalline Aluminum and Copper in High Magnetic Fields:  
The Effect of Temperature and Purity;

Fickett, F. R.

Appl. Phys. Lett. 17(12): 525-527; 70.

Low Temperature Electrical Resistivity of Some Engineering Alloys;

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Cryogenics 10: 295-305; Aug 70.

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U.S. DEPT. OF COMM. <b>BIBLIOGRAPHIC DATA SHEET</b> (See instructions)	<b>1. PUBLICATION OR REPORT NO.</b> NBSIR 88-3097	<b>2. Performing Organ. Report No.</b> B88-0227	<b>3. Publication Date</b> August 1988
<b>4. TITLE AND SUBTITLE</b> Metrology for Electromagnetic Technology: A Bibliography of NBS Publications			
<b>5. AUTHOR(S)</b> Mary E. DeWeese, Editor			
<b>6. PERFORMING ORGANIZATION</b> (If joint or other than NBS, see instructions)  NATIONAL BUREAU OF STANDARDS DEPARTMENT OF COMMERCE WASHINGTON, D.C. 20234		<b>7. Contract/Grant No.</b>	<b>8. Type of Report &amp; Period Covered</b>
<b>9. SPONSORING ORGANIZATION NAME AND COMPLETE ADDRESS</b> (Street, City, State, ZIP)			
<b>10. SUPPLEMENTARY NOTES</b>  Supersedes NBSIR 87-3074  <input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached.			
<b>11. ABSTRACT</b> (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)  This bibliography lists the publications of the personnel of the Electromagnetic Technology Division of NBS in the period from January 1970 through publication of this report. A few earlier references that are directly related to the present work of the Division are also included.			
<b>12. KEY WORDS</b> (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons) cryoelectronics; electromagnetic metrology; lasers; optical fibers; superconducting materials			
<b>13. AVAILABILITY</b>  <input checked="" type="checkbox"/> Unlimited <input type="checkbox"/> For Official Distribution. Do Not Release to NTIS <input type="checkbox"/> Order From Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.  <input checked="" type="checkbox"/> Order From National Technical Information Service (NTIS), Springfield, VA. 22161		<b>14. NO. OF PRINTED PAGES</b>  64	<b>15. Price</b>





