

**X-RAY SCATTERING AND MICROSCOPY GROUP**  
**Gene Ice Publications (Revised 9/12/2007)**

**Journal Publications**

B. C. Larson, A. El-Azab, W. Yang, J. Z. Tischler, W. Liu, and G. E. Ice, "Experimental Characterization of The Mesoscale Dislocation Density Tensor," *Philosophical Magazine* **87**(8-9), pp. 1327-1347 (2007).

R. E. Stoller, F. J. Walker, E. D. Specht, D. M. Nicholson, R. I. Barabash, P. Zschack, and G. E. Ice, "Diffuse X-Ray Scattering Measurements of Point Defects and Clusters in Iron," *Journal of Nuclear Materials* **367-370**, 269-275 (2007).

E. Miura, G. E. Ice, E. D. Specht, J.W.L. Pang, H. Kato, K. Hisatsune, and I. Inoue, "X-ray Study of  $Pd_{40}Cu_{30}Ni_{10}P_{20}$  Bulk Metallic Glass Brazing Filler for Ti-6Al-7Nb Alloy," *Materials Science Forum*, Vols. 539-543, pp. 1983-1987, Trans Tech Publications, Switzerland (2007).

R. I. Barabash, G. E. Ice, C. Roder, J. Budai, W. Liu, S. Figge, S. Einfeldt, D. Hommel, and R. F. Davis, "Characterization of Growth Defects in Thin GaN Layers with X-ray Microbeam," *Phys. Status Solidi B* **244**(5), 1735-1742 (2007).

Y. Sun, R. Barabash, H. Choo, P. K. Liaw, Y. Lu, D. W. Brown, and G. E. Ice, "Multiscale Plastic Deformation near a Fatigue Crack from Diffraction," *Solid State Phenomena* **129**, 151-156, Trans Tech Publications, Switzerland (2007).

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G. E. Ice and C. J. Sparks, "Bend Magnet Microprobe," *Proceedings of the Advanced Light Source Annual Users Meeting*, Berkeley, CA (1992).

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## **Other Technical Reports**

Polychromatic Microdiffraction: Back to the Future APS Highlights 2001.

Final Design Report for the Unicat Bend Magnet Beamline, submitted to the Advanced Photon Source, Argonne National Laboratory, October 1977.

Preliminary Design Report for the Unicat Bend Magnet Beamline, submitted to the Advanced Photon Source, Argonne National Laboratory , January 1977.

Preliminary Design Report for the MHATT-Cat Beamlines, submitted to the Advanced Photon Source, Argonne National Laboratory, February 1996.

Final Design Report for the Unicat Insertion Device Beamline, submitted to the Advanced Photon Source, Argonne National Laboratory, March 1995.

Preliminary Design Report for the Unicat Insertion Device Beamline, submitted to the Advanced Photon Source, Argonne National Laboratory , September 1994.

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G. E. Ice and C.,J. Sparks, *Conical Geometry for Sagittal Focusing as Applied to X-rays from Synchrotrons*, ORNL/TM-12327, June 1993.

Scientific Program for the MICROCAT Beamline, submitted to the Advanced Photon Source, Argonne National Laboratory, February 1992.

## **Other Publications – External Technical Recognition**

APS Annual Report for 2004, p. 21-22 placed a highly positive review called “Characterizing Local Crystallographic Microstructure Evolution in Three Dimensions” based on the above paper: G. E. Ice and R. I. Barabash, “Polychromatic X-ray Microdiffraction Characterization of Local Crystallographic Microstructure Evolution in 3D,” pp. 351-356 in *Proceedings of the 25<sup>th</sup> RisØ International Symposium on Materials Science: Evolution of Deformation Microstructures in 3D* (2004).

APS Annual Report for 2004, p. 39-40 placed a highly positive review “Dislocation Formation in Nickel Single-Crystal Alloy Welds,” based on the paper O. M. Barabash, J. A. Horton, S. S. Babu, J. M. Vitek, S. A. David, J. W. Park, G. E. Ice, and R. I. Barabash, “Evolution of Dislocation Structure in the Heat Affected Zone of a Nickel-Based Single Crystal,” *J. Appl. Physics* **96**(7), 3673-3679 (2004).

## **Invited Talks since 1991**

G. E. Ice, Invitation to give presentation on “3d  $\mu$ -resolution Laue Diffraction,” at the Photon and Neutron Research on Advanced Engineering Materials (PNAM) Autumn School: Application of Neutrons and Synchrotron Radiation in Engineering Materials Science, Hamburg, Germany, September 17-19, 2007.

G. E. Ice, Invited speaker G. E. Ice, Speaker at the National School on Neutron and X-ray Scattering, Argonne National Laboratory, Argonne, Illinois, August 21, 2007.

G. E. Ice, Invited speaker at the NSLS II User Workshop on “Broad Bandpass Optics for Nanodiffraction and Nanospectroscopy,” Brookhaven National Laboratory, Upton, New York, July 17-18, 2007.

G. E. Ice, Invited talk on “Reflective Optics for Microdiffraction,” at Synchrotron Radiation Instrumentation (SRI 2007) Conference, Baton Rouge, Louisiana, April 25-27, 2007.

G. E. Ice, Seminar speaker at Oak Ridge Chapter of ASM International Monthly Technical Meeting, Knoxville, Tennessee, March 15, 2007.

G. E. Ice, Invited talk on “Kirkpatrick-Baez Supermirrors for Intense Focused Neutron Beams,” at Australian Nuclear Science and Technology Organization (ANSTO), Sydney, Australia, December 4, 2006.

G. E. Ice, Invited keynote speaker on “Fundamental Physics of Materials Investigated by Polychromatic Micro- and Nanodiffraction,” at 2006 Australian Synchrotron Research Program (ASRP)/Australian Synchrotron Users’ Workshop, Melbourne, Australia, November 29-December 1, 2006.

G. E. Ice, Invited talk on “Polychromatic Microdiffraction Studies of Materials,” Shanghai Synchrotron Radiation Facility (SSRF), Shanghai, China, October 9-10, 2006.

G. E. Ice, Invited talk at National Synchrotron Radiation Research Center (NSRRC) 12 User’s Meeting and Workshops, Hsinchu, Taiwan, October 3-4, 2006.

G. E. Ice, Invited speaker at the 21<sup>st</sup> Century Center of Excellence (COE) colloquium, Osaka University, September 30, 2006.

G. E. Ice, speaker at National School on Neutron and X-ray Scattering, Argonne, Illinois, August 22, 2006.

G. E. Ice, Invited speaker at Microscopy and Microanalysis 2006 Conference, Chicago, Illinois, August 1, 2006.

G. E. Ice, Invited talk at Cornell University for an ERL Workshop on New Science Opportunities with Nanometer-Sized Beam, Ithaca, New York, June 23-24, 2006.

G. E. Ice, Invited talk at the Ninth International Conference on Synchrotron Radiation Instrumentation (SRI 2006), Daegu, Korea, May 28-30, 2006.

G. E. Ice, Invited talk and serve as external consultant at HASYLAB Workshop on “Diffraction Experiments at the new brilliant Synchrotron Source PETRA III,” Hamburg, Germany, April 26, 2006.

G. E. Ice, Keynote lecture at West Virginia Science Teachers Conference, Daniels, WV, November 10-12, 2005.

G. E. Ice, Invited speaker at the 2005 Advanced Light Source (ALS) Users’ Meeting for the workshop “Frontiers of Synchrotron-based X-ray Microdiffraction,” Berkeley, CA, October 20-22, 2005.

G. E. Ice, Invited international lecturer at the first “Autumn School on Application of Neutrons and Synchrotron Radiation in Engineering Materials Science,” Hamburg, Germany, October 10-12, 2005.

G. E. Ice, “Spatially Resolved 3D Polychromatic X-ray Microdiffraction,” XX Congress of the International Union of Crystallography,” Florence, Italy, August 25-28, 2005.

G. E. Ice, “How Spatially Resolved Three-Dimensional X-ray Microdiffraction and Fluorescence Provide a Fundamentally New Understanding of Mesoscale Dynamics in Materials,” Maslen Fellow at the Crystal 24 – Marysville 2005, 24<sup>th</sup> Biennial Conference of Society of Crystallographers in Australia and New Zealand, Marysville in Victoria, Australia, March 29-Apr. 1, 2005.

G. E. Ice, “Neutron Diffraction Characterization of Mechanical Behavior,” TMS 2005 Annual Meeting, San Francisco, California, February 13-17, 2005.

R. I. Barabash and G. E. Ice, “White Beam Analysis of Dislocations Structure Evolution in GaN Layers Grown by Maskless Pendoepitaxy,” Eleventh International Symposium on Plasticity and its Current Applications, PLASTICITY ’05, January 3-7, 2005.

J. W. L. Pang, R. I. Barabash, W. Liu, and G. E. Ice “Deformation Inhomogeneity on Mesoscale in Polycrystalline Ni,” Eleventh International Symposium on Plasticity and its Current Applications, PLASTICITY ’05, January 3-7, 2005.

G. E. Ice, “Focusing Short-Wavelength X-rays and Neutrons with Advanced Kirkpatrick-Baez Optics,” 2004 Frontiers in Optics Conference, Rochester, New York, October 12-13, 2004.

G. E. Ice, “Polychromatic Microdiffraction,” The University of Western Ontario, London, Ontario, Canada, October 6-8, 2004.

G. E. Ice, “3D Polychromatic Microdiffraction: A New/Old Tool for Single Crystal Studies of Polycrystalline Materials,” University of Houston, Symposium in Honor of Simon Moss, Houston, Texas, October 1-3, 2004.

G. E. Ice, “Diffuse X-Ray Scattering,” X-Ray and Neutron Summer School, Argonne, Illinois, August 27, 2004.

G. E. Ice, “DOE Synchrotron Sources: Crown Jewels of X-Ray Science,” X-Ray and Neutron Summer School, Argonne, Illinois, August 27, 2004.

G. E. Ice, "The Polychromatic 3D X-Ray Microscope: A New Tool for Materials Characterization," 4th International Conference on Synchrotron Radiation in Materials Science, Grenoble, France, August 24, 2004.

G. E. Ice, "Toward a New Understanding of Mesoscale Dynamics: The Role of Polychromatic X-Ray Microdiffraction," RISO National Laboratory, Roskilde, Denmark, August 19, 2004.

R. Barabash and G. Ice, "Understanding of Local Dislocation Structure in Deformed Materials Based on Microdiffraction," Workshop on Science with High energy X-Rays, Argonne, Illinois, August 9-10, 2004.

G. E. Ice, "The Polychromatic 3D X-Ray Microscope: A New Tool for Materials Characterization," Int. Conf. On Microscopy and Microanalysis, Savannah, Georgia, August 2, 2004.

R. Barabash and G. Ice, "Application of Krivoglaz Theory in the 21<sup>st</sup> Century," International Workshop Devoted to 75<sup>th</sup> Anniversary of M. Krivoglaz, Kiev, Ukraine, June 2004.

G. E. Ice, "As Good as it Gets? Why Kirkpatrick-Baez Optics Outperform Other Neutron Optics for Small Samples," SNS Seminar, May 27, 2004.

G. E. Ice, "KB Mirrors, Nanoprobes and Differential Coating Technology," NSLS Workshop, May 19, 2004.

G. E. Ice, "Toward a New Understanding of Mesoscale Dynamics," Canadian Light Source, May 13, 2004.

G. E. Ice, "The Scientific Legacy of Cullie Sparks: Contributions to Materials Science, Atomic Physics, X-Ray Optics and Synchrotron Radiation Research," APS Users Meeting, May 5, 2004.

G. E. Ice, "Neutron Focusing Optics For Subgrain Microdiffraction," Chalk River, Canada, February 12, 2004.

G. E. Ice, E. D. Specht, J. Z. Tischler, A. M. Khounsary, L. Assoufid, and C. Liu, "At the Limit of Nondispersive Micro and Non Focusing Mirror Optics," SPIE, January 28, 2004.

G. E. Ice, Organizer, "Frontiers of X-Ray Micro and NanoBeam Diffraction," 2003 TMS Symposium / Materials Science and Technology Conference, Chicago, Illinois, October 17, 2003.

G. E. Ice, "Neutron Microfocusing Optics of Subgrain Microdiffraction," LANSCE seminar, Sandia National Laboratory, September 24, 2003.

G. E. Ice, "Below the Grain Size of Most Materials," Plenary Talk, International Synchrotron Radiation Instrumentation Conference, San Francisco, California, August 25, 2003.

G. E. Ice, "Diffuse X-Ray Scattering," X-Ray and Neutron Summer School, Argonne, Illinois, August 22, 2003.

G. E. Ice, "DOE Synchrotron Sources," X-Ray and Neutron Summer School, Argonne, Illinois, August 22, 2003.

G. E. Ice, "X-Ray Microanalysis of Materials for the 21<sup>st</sup> Century," XII International Materials Research Congress, Cancun, Mexico, August 20, 2003.

G. E. Ice, "Sumicron and Nanoscale X-Ray Measurement of 3D Strain Tensor Distributions," SEM, Charlotte, North Carolina, June 4, 2003.

G. E. Ice, "3D X-Ray Crystal Microscope," TMS, San Diego, California, March 5, 2003.

G. Ice and R. Barabash, "Multiscale Dislocation Ensembles from Microdiffraction," Proceedings of the Tenth International Symposium on Plasticity (2003).

C. J. Sparks, G. E. Ice, L. Robertson, and J. Bai, "Magnetic Annealing of Fe-Ni Alloys: Effects on Local Atomic Arrangements and Magnetic Properties," TMS San Diego, California, March 3, 2002.

G. E. Ice, "Faster than Moore's Law: The Continuing Revolution in X-Ray Science Driven by Advanced Synchrotron Sources and X-Ray Optics," ORNL Physics Division Seminar, October 17, 2002.

G. E. Ice, "The 3D X-Ray Crystal Microscope: A New Tool for Materials Characterization," TMS, Columbus, Ohio, October 9, 2002.

G. E. Ice, "Characterization of Welds with the 3-D X-Ray Crystal Microscope," MRS, Columbus, Ohio, October 8, 2002.

G. E. Ice, "The 3D X-Ray Crystal Microscope: A New Tool for Materials Characterization," Idaho, 2002.

G. E. Ice, "3D-X-Ray Crystal Microscope," ACS Annual Meeting, Boston , Massachusetts, 2002.

G. E. Ice, "Diffuse X-Ray Scattering," X-Ray and Neutron Summer School, August 19, 2002.

G. E. Ice, "DOE Synchrotron Sources," X-Ray and Neutron Summer School , August 19, 2002.

G. E. Ice, "It's all about People; Samples; Results," APS Retreat, May 15, 2002.

G. E. Ice, "Quantitative Three-Dimensional X-Ray Microprobe Measurements of Plastic and Elastic Deformation in Welds," ASM Weld Conference, Pine Mountain, Georgia, April 15, 2002.

G. E. Ice, "The 3D X-Ray Crystal Microscope: Quantitative Mesoscale Characterization of Polycrystalline and Plastically Deformed Materials," University of Western Ontario, London, Ontario, Canada, February 28, 2002.

G. E. Ice, "Computational Challenges of the 3D X-Ray Crystal Microscope," University of Tennessee Computational Sciences Seminar, Knoxville, Tennessee, January 25, 2002.

G. E. Ice, "The 3-D X-Ray Crystal Microscope: Quantitative Phase, Strain, Orientation and Deformation in Materials," DOE Workshop: New Directions in In-Situ Microscopy, Half Moon Bay, California, January 17, 2002.

G. E. Ice, "3D X-Ray Crystal Microscope: Fundamental Issues in Materials Science," Seminar, Lawrence Livermore National Laboratory, Livermore, California, January 15, 2002.

G. E. Ice, "3D X-Ray Crystal Microscope: Addressing Fundamental Issues in Materials Science," Seminar, Lawrence Berkeley National Laboratory, Berkeley, California, January 14, 2002.

G. E. Ice, "3D X-Ray and Neutron Crystal Micro/Nanoscopes: Fundamental Issues in Materials Science," Materials Science Seminar, University of Tennessee, Knoxville, Tennessee, December 6, 2001.

G. E. Ice, "Polychromatic X-Ray Microdiffraction: Fundamental Issues in Materials Science," BES Review of APS Science, Argonne, Illinois, October 2001.

G. E. Ice, "3-D X-Ray and Neutron Crystal Probes," SNS Seminar Series, September 18, 2001.

G. E. Ice, "Diffuse Scattering," DOE National School on Neutron and X-Ray Scattering, August 2001.

G. E. Ice, "DOE Synchrotron Sources: Crown Jewels of X-Ray Science," DOE National School on Neutron and X-Ray Scattering, August 2001.

G. E. Ice "Polychromatic X-Ray Microdiffraction and the Investigation of Mesoscale Dynamics in Materials," Swiss Light Source, Brugg, Switzerland, July 5, 2001.

G. E. Ice, "The 3-D X-Ray Crystal Microscope: A New Tool for Quantitative Determination of Local Chemistry, Phase, Strain and Deformation in Materials," International Conference on X-Ray Optics and Microanalysis, Vienna, Austria, July 3, 2001.

G. E. Ice, "Microdiffraction Optics," X-Ray Conference, Denver, Colorado, July 2001.

G. E. Ice, "3-D X-Ray Crystal Microscope," Pohang Accelerator Laboratory, Pohang, Korea, June 5, 2001.

G. E. Ice, "Sagittal Crystal Focusing: History and Applications," Pohang Accelerator Laboratory, Pohang, Korea, June 4, 2001.

G. E. Ice, "Frontiers of X-Ray Microdiffraction," Nanoscale Workshop, Argonne, Illinois, December 14-15, 2000.

G. E. Ice, "Frontiers of X-Ray Microdiffraction," Energy Recovery Linac Workshop, Cornell University, December 2-3, 2000.

G. E. Ice, B. Larson, J. S. Chung, J. Budai, and H. Chen, "X-Ray Microdiffraction Below the Size of Grains in Most Materials," Invited Lecture, Cohen Memorial Symposium, ASM, October 10, 2000.

G. E. Ice, "Synchrotron Radiation Sources," DOE Workshop on Neutron and X-Ray Sources Argonne National Laboratory, Argonne, Illinois, August 18, 2000.

G. E. Ice, "X-Ray Microdiffraction Below the Size of Grains in Most Materials," Invited Tutorial, X-Ray Conference, Denver, Colorado, August 1-4, 2000.

G. E. Ice, "3-D X-Ray Crystal Microscope," University of Illinois Seminar, Chicago, Illinois, May 31, 2000.

G. E. Ice, "X-Ray Microbeam 3-D Residual Stress Measurements with Subgrain Resolution," Invited Talk, American Ceramic Society, May 1, 2000.

G. E. Ice, "How Synchrotron Radiation is Driving a Revolution in X-Ray Optics," HEOS, Huntsville, Alabama, January 20, 2000.

G. E. Ice, J. S. Chung, B. Larson, J. Budai, J. Tischler, N. Tamura, and W. Lowe, "Microbeam Techniques for Stress Measurements," Invited Talk, National Synchrotron Radiation Instrumentation Conference, Stanford, California, October 13, 1999.

G. E. Ice, "Your Tax \$ at Work: How Fundamental Materials Science has Generated Important Opportunities for the Semiconductor Industry," Invited Talk, Sun Microsystems Seminar, Palo Alto, California, October 12, 1999.

B. C. Larson, M. Yoon, J. Z. Tischler, T. E. Haynes, G. E. Ice, and P. Zschack, "Microbeam X-Ray Diffuse Scattering Study of Ion-Implantation Induced Defects in Silicon," Krivoglaz Memorial Symposium, Alushta, Crimea, Ukraine, September 8, 1999.

G. E. Ice, "Anomalous (Resonant) Diffuse X-Ray Scattering Measurements of Local Correlations in Solid-Solution Alloys," Krivoglaz Memorial Symposium, Alushta, Crimea, Ukraine, September 8, 1999.

G. E. Ice, "X-Ray Microdiffraction Below the Size of Most Polycrystalline Grains," Krivoglaz Memorial Symposium, Alushta, Crimea, Ukraine, September 8, 1999.

G. E. Ice, "X-Ray Microdiffraction Below the Size of Most Polycrystalline Grains," ESRF Seminar, Grenoble, France, September 1, 1999.

G. E. Ice, "X-Ray Microdiffraction Below the Size of Most Polycrystalline Grains," Materials Science Seminar, Georgia Institute of Technology, Atlanta, Georgia, August 24, 1999.

G. E. Ice, "X-Ray Microdiffraction," Millibeam Workshop, NSLS Users Meeting, Upton, New York, May 29, 1999.

G. E. Ice, "Emerging X-Ray Microbeam Experiments and Instrumentation," TWIG Working Group, Advanced Photon Source, Argonne, IL, April 15, 1999.

G. E. Ice, "X-Ray Microdiffraction: A Revolutionary New Window on the Synthesis and Evolution of Materials," Materials Science and Engineering Seminar, University of Illinois Urbana/Champaign, IL, March 29, 1999.

G. E. Ice, "X-Ray Microbeams: The Next step in Materials Characterization," UOP Seminar, Corporate Headquarters, Des Plaines, Illinois, December 16, 1998.

G. E. Ice, "The Ongoing Revolution in X-Ray Microbeam Optics," Advanced Photon Source Workshop, Microbeams: Techniques and Applications, Ninth Users Meeting for the Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois, October 14, 1998.

M. Naghedolfeizi, J. S. Chung, G. E. Ice, W. B. Yun, Z. Cai, and B. Lai, "X-Ray Fluorescence Microtomography on a SiC Nuclear Fuel Shell," Marcon Reliability Conference 98, Knoxville, Tennessee, May 12-14, 1998.

J. S. Chung and G. E. Ice, "Automated Indexing of Laue Images from Polycrystalline Materials," MRS 1998 Spring Meeting, Symposium V: Application of Synchrotron Radiation to Materials Science, San Francisco, California, April 13-17, 1998.

G. E. Ice, "Advanced X-Ray Characterization of Materials," Institute of Metal Physics Seminar, Kiev, Ukraine, February 23, 1998.

G. E. Ice, C. J. Sparks, X. Jiang, E. Epperson, and J. L. Robertson, "Measurement and Modeling of Short-Range Correlations in Metal Alloys," ASM Technical Symposium: Alloy Modeling and Design II: Short-Range Order and Phase-Stability in Alloys, Indianapolis, IN, September 15, 1997.

G. E. Ice, J. S. Chung, and M. Naghedolfeizi, "X-Ray Fluorescence Microtomography of SiC Shells," Advanced Photon Source Workshop: Making and Using Small X-Ray Beams, Eighth Users Meeting for the Advanced Photon Source, Argonne National Laboratory, Argonne, IL, April 15-17, 1997.

G. E. Ice, "X-Ray Microprobe: The Next Step in Microcharacterization," Advanced Photon Source Workshop: Making and Using Small X-Ray Beams, Eighth Users Meeting for the Advanced Photon Source, Argonne National Laboratory, Argonne, IL, April 15-17, 1997.

G. E. Ice, "Bend-Magnet Preliminary Design Report," UNI-Cat Workshop, Argonne, IL, October 17-18, 1996.

G. E. Ice, "X-Ray Microprobe: The Next Step in Microcharacterization," Joint Materials/Polymer Seminar, University of Tennessee, Knoxville, Tennessee, October 15, 1996.

G. E. Ice, "X-Ray Measurement of Strain with Micron Resolution," DOE Discussion Meeting on Neutron Residual Stress Analysis, Santa Fe, New Mexico, October 1996.

G. E. Ice, "Modeling of X-Ray Beamlines and Devices," DOE Workshop on Neutron Scattering Instrument Design," Berkeley, California, September 23-25, 1996.

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## **Honors**

Associate Editor: J. Synch. Radiation  
Member: APS Users Executive Committee