

## James Kakalios

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Birthdate: December 27, 1958

### **Education:**

Ph.D. in Physics, The University of Chicago, 1985  
M.S. in Physics, The University of Chicago, 1982  
B. S., *summa cum laude*, City College of New York, 1979

### **Positions Held:**

Taylor Distinguished Professor, University of Minnesota, 2008 – present  
Professor and Director of Undergraduate Studies, University of Minnesota, 2007 - 2010  
Professor and Director of Graduate Studies, University of Minnesota, 2001 - 2004  
Associate Professor, University of Minnesota, 1993 - 2001  
Assistant Professor, University of Minnesota, 1988 - 1993  
Post-Doctoral Research Associate, Xerox-Palo Alto Research Center, 1985 - 1988  
Summer Research Assistant, Brookhaven National Laboratory, 1979, 1978

### **Honors and Awards:**

Fellow, American Physical Society, 2015  
AAAS Award for Public Engagement with Science, 2014  
Fellow, American Association for the Advancement of Science, 2013  
Taylor Distinguished Professor, 2008-present  
E. Bowers Faculty Teaching Award, 2003  
Institute of Technology Student Board –Professor of the Year, 2003  
Associate Fellow, Minnesota Supercomputer Institute 1995-1999  
National Science Foundation Presidential Young Investigator, 1990 - 1995  
McKnight Land Grant Professor, University of Minnesota, 1989 - 1992  
Marc Perry Galler Award for Student Research, The University of Chicago, 1986  
Graduate Student Award of the Materials Research Society, 1984  
AT&T Bell Labs Ph.D. Scholarship, 1983-1985

### **Research Interests:**

Synthesis and characterization of electronic properties of thin film  
amorphous semiconductors; particularly 1/f noise and metastable conductance changes; opto-  
electronic and thermoelectric properties of mixed phase amorphous/nanocrystalline silicon thin  
films, fluctuation phenomena in neurological systems.

### **Synergistic Activities:**

Past-Chair, A.P.S. Forum on Outreach and Engaging the Public (2012)

Member, A.P.S. Committee on Informing the Public (2011-2014)

Chair, A.P.S. Committee on Informing the Public (2015)

Author of popular science books: The Physics of Superheroes (Gotham Books, 2005; second edition, 2009), translated into Italian, Spanish, German, Korean and Chinese, and The Amazing Story of Quantum Mechanics (Gotham Books, 2010) which has led to over 14 public general audience presentations per year, in venues ranging from high schools to the Library of Congress, from the 92<sup>nd</sup> Street Y in New York City to FermiLab. See <http://www.kakalios.com>.

Volunteer science consultant, *Watchmen* (Warner Bros. 2009); *The Amazing Spider-Man* (2012). Video produced with the University of Minnesota (The Science of Watchmen), (<http://www.youtube.com/watch?v=zmj1rpzDRZ0>) explaining basic principles of quantum mechanics, has been viewed over 1.8 million times on youtube.com; video won an Upper Midwest Regional Emmy award (Alternative Media: Arts/Entertainment).

Volunteer science consultant, through National Academy of Science's Science and Entertainment Exchange, for *The Amazing Spider-Man* (Sony, 2012). Video produced with the University of Minnesota (Spider-Man and the Decay Rate Algorithm), (<http://www.youtube.com/watch?v=Wjft6MqTCqQ>) explaining basic principles of Gompertz equation, has been viewed over 55,000 times on youtube.com.

Guest on Neil deGrasse Tyson's *Star Talk* radio show, May and July 2011.

Featured on season three premiere episode of *Through the Wormhole with Morgan Freeman*, Science Channel, 2012.

Presented public lecture on *The Materials Science of Superheroes*, sponsored by the Div. of Materials Physics and Div. of Condensed Matter Physics, at the March meeting of the A.P.S., 2010, 2011, 2012, 2013, 2015.

### **Societies:**

American Physical Society (Fellow)

American Assoc. for the Advancement of Science (Fellow)

American Assoc. of Physics Teachers

Materials Research Society

Sigma Xi

Phi Beta Kappa

## **James Kakalios**

### Invited Talks

#### Amorphous Silicon

American Physical Society, Baltimore, MD 1985  
12th International Conference on Amorphous and Liquid Semiconductors, Prague, Czechoslovakia 1987  
American Physical Society, New Orleans, LA 1988  
Materials Research Society, Boston, MA 1989  
Iowa State University, 1991  
University of Illinois-Urbana, 1992  
Rutgers University, 1992  
NEC Research Institute, Princeton, NJ, 1992  
Workshop on Crystalline and Amorphous Silicon and its Alloys, Campinas, Brazil, 1992  
3M Research Center, 1992  
Xerox-Palo Alto Research Center, 1992  
University of Minnesota, Mathematics Dept. Seminar, 1992  
American Physical Society, Seattle, WA 1993  
Honeywell Research Center, 1993  
Indiana University, Physics Dept., Solid State Seminar, 1993  
New York Section of the American Physical Society, 1993  
Seventh Annual Complex Systems Summer School, The Santa Fe Institute, Santa Fe, NM, 1994  
University of Chicago, Hellmut Fritzsche Retirement Symposium, 1996  
City College of New York, New York, NY, 1998  
University of Minnesota, Institute of Mathematics and its Applications  
Hot Topics Workshop, 2000  
Minnesota Section of the Optical Society of America, 2000  
University of Arizona, 2005  
University of Nebraska, 2005  
New York University, 2005  
North Dakota State University, 2006  
University of Montreal, 2006  
Hahn-Meitner Institute, Berlin, Germany, 2007  
University of Wisconsin – Stevens Point, 2008  
National Renewable Energy Laboratory, Golden, CO, 2008  
Lewis and Clark College, Portland, OR, 2010  
Materials Research Society, San Francisco, CA, 2011  
University of Minnesota, Center for Nanostructure Applications, 2011  
Instrumentation Frontier Workshop, Argonne National Laboratory, 2013  
Johns Hopkins University, Baltimore, MD 2013

## **James Kakalios**

### Invited Talks

#### Granular Media

University of Minnesota, Chem. Eng. Seminar, 1993, 1994  
Seventh Annual Complex Systems Summer School, The Santa Fe Institute,  
Santa Fe, NM, 1994  
North Dakota State University, Physics Colloquium, Fargo, ND 1995  
Workshop on Dynamical Processes in Granular Materials, Chicago, IL, 1995  
Merck Inc., West Point, PA 1996  
American Physical Society, St. Louis, MO 1996  
University of Texas at Austin, Center for Dynamical Systems, Austin, TX 1997  
Hamline College, St. Paul, MN, 1998  
City College of New York, New York, NY, 1998  
Theory Workshop on Dynamics of Granular Materials, Argonne National Laboratory,  
Argonne, IL, 1998  
Workshop on Granular Materials: Statics, Excitations and Dynamics, Albuquerque, NM,  
1998  
Conference on Granular Geomorphology, Lyon, France, 1998  
Mankato State University, MN, 1999  
University of Minnesota, Geology Colloquium, 1999  
University of Minnesota, Civil Engineering Colloquium, 1999  
University of Chicago, James Franck Institute Colloquium, 2000  
American Association of Physics Teachers Annual Meeting, Hot Topics Session,  
Toronto, Canada, 2000  
Iowa State University, Geology Colloquium, Ames, IA 2000  
Minnesota Particle Society, St. Paul, MN 2003  
Perugia Science Festival, Perugia, Italy 2007

## **James Kakalios**

### Invited Talks

### Science Outreach

Bakken Library, Minneapolis, Minnesota, 2002  
Minnesota Science Teachers Association, Bloomington, Minnesota, 2002  
University of Minnesota Sigma Xi Public Lecture, 2002  
American Association of Physics Teachers, Austin, TX, 2003  
American Physical Society, Austin, TX, 2003  
Thomas Jefferson National Accelerator Facility, Newport News, VA, 2003  
Joint Meeting of Ohio Section of APS/AAPT, Cleveland, OH, 2003  
American Association for the Advancement of Science, Seattle, WA, 2004  
St. Olaf College, Northfield, MN, 2004  
Hamline University, 2004  
Fermilab National Laboratory, 2005  
University of Arizona, 2005  
CoastCon 28, Biloxi, Mississippi, 2005  
Convergence, Bloomington, MN, 2005  
Minnesota Science Museum, 2005  
FallCon, St. Paul, MN 2005  
University of Nebraska, 2005  
New York University, 2005  
Long Island Physics Teachers Annual Meeting, Keynote Speech, 2005  
New York Comic-Con, 2006  
92<sup>nd</sup> Street Y, New York City, 2006  
Minnesota Academy of Science, St. Paul, MN 2006  
Café Scientifique, Minneapolis, MN, 2006  
Augustana College, Illinois, 2006  
University of Wisconsin – Madison, 2006  
Minnesota Physics Teachers Annual Meeting, Keynote Speech, 2006  
University of Minnesota, IT Commencement Open House, 2006  
Aspen Center for Science, Colorado, 2006  
FallCon, St. Paul, MN 2006  
University of Texas – Austin, Humanities Fellow Lecture, Austin, TX, 2006  
McGill University, Montreal, Canada, 2006  
Library of Congress, Washington, DC, 2006  
Convergence, Bloomington, MN, 2006  
Prior Lake – Savage Area High School, Minnesota, 2006  
New York Academy of Sciences, New York, New York, 2006  
American Association of University Women, Minnesota, 2007  
Hahn-Meitner Institute, Berlin, Germany, 2007  
Young Scientists Roundtable, Wayzata Middle School, Minnesota, 2007  
University of Illinois – Urbana, 2007  
Massachusetts Institute of Technology, Cambridge, MA 2007  
Optical Society of America, Minneapolis, MN, 2007

National Science Bowl, Washington, DC, 2007  
Special Librarians National Meeting, Denver, CO, 2007  
Convergence, Bloomington, MN, 2007  
PUSH, Minneapolis, MN 2007  
People's University, Minneapolis Public Library, MN 2007  
Aspen Center for Science, Colorado, 2007  
Perugia Science Festival, Perugia, Italy 2007  
FallCon, St. Paul, MN 2007  
Minnesota Microscopy Society, Minneapolis, MN 2007  
Juniata College, College Park, PA 2007  
Washington University, St. Louis, MO 2007  
Light in Winter Festival, Ithaca, NY 2008  
Parthenon, Science and Art Museum, Nashville, TN 2008  
Mayo Clinic Sigma Xi Public Lecture, Rochester, MN 2008  
American Physical Society, New Orleans, LA 2008  
University of Wisconsin – Stevens Point, WI 2008  
Convergence, Bloomington, MN, 2008  
Comic-Con International, San Diego, CA, 2008  
Distinctive Voices Series, Nat. Academy of Sciences, Beckman Center, Irvine, CA, 2008  
Imageworks, Culver City, CA, 2008  
FallCon, St. Paul, MN 2008  
Mankato State University, MN, 2008  
Medronic, St. Paul, MN 2008  
ExxonMobil Research Associates, Annandale, New Jersey, 2008  
Brooklyn Park Library, MN 2008  
Friends of Anderson Library, MN 2009  
Convergence, Bloomington, MN, 2009  
Pecha Kucha, Arts and Science Festival, Minneapolis, MN, 2009  
National Academy of Sciences, Washington DC, 2009  
Case Western Reserve University, Cleveland, OH, 2009  
Lakehead University, Thunder Bay, Ontario, 2009  
Iowa State University, Ames, IA, 2009  
American Association for the Advancement of Science, San Diego, CA, 2010  
University of Minnesota Retirees Association, Minneapolis, MN, 2010  
Minnesota Physics Teachers Annual Meeting, Keynote Speech, 2010  
Lewis and Clark College, Portland, OR, 2010  
American Physical Society, Portland, OR, 2010  
WESCAN 2010, Winnipeg, Manitoba, 2010  
Worcester Polytechnic Institute, Worcester, MA, 2010  
Adler Planetarium, Chicago, IL, 2010  
Chicago Comic and Entertainment Expo, Chicago, IL, 2010  
Institute of Technology Public Lecture, Minneapolis, MN, 2010  
Convergence, Bloomington, MN, 2010  
St. Cloud State University, St. Cloud, MN, 2010  
Emory University, Atlanta, GA, 2010  
Nifty Fifty – High School Presentation, Chantilly, VA, 2010  
USA Science and Engineering Festival, Washington DC, 2010  
Microsoft, Seattle, WA, 2010

Town Hall, Seattle, WA, 2010  
Arizona State University, Tempe, AZ, 2010  
University of Minnesota, Mechanical Engineering Colloquium, 2010  
Argonne National Laboratory, Argonne, IL, 2011  
American Physical Society, Dallas, TX, 2011  
Minnesota State University Moorehead, Moorehead, MN 2011  
North Dakota State University, Fargo Theater, Fargo, ND 2011  
SpringCon, St. Paul, MN, 2011  
Convergence, Bloomington, MN, 2011  
Alpbach Technology Festival, Alpbach, Austria, 2011  
University of New Mexico, Albuquerque, New Mexico, 2011  
University of Florida, Gainesville, FL, 2011  
Minnesota Association of Materials Scientists, Plymouth, MN, 2011  
Ohio University, Kennedy Lecture Series, Athens, OH, 2012  
American Association for the Advancement of Science, Vancouver, B.C., 2012  
American Physical Society, Boston, MA, 2012  
USA Science and Engineering Festival, Washington DC, 2012  
Convergence, Bloomington, MN, 2012  
Center for Continuing Education, St. Paul, MN, 2012  
West Virginia University, Morgantown, WV, 2012  
American Physical Society, Baltimore, MD, 2013  
State Dept. – STEM Outreach, Lisbon, Portugal, 2013 (nine talks)  
Edinburgh Book Festival, Edinburgh, Scotland, 2013  
Alpbach Technology Festival, Alpbach, Austria, 2013  
DePauw University, Indianapolis, IN, 2013  
Berkeley-Carroll High School, NY, NY, 2013  
Johns Hopkins University, Baltimore, MD 2013  
FermiLab National Laboratory, Batavia, IL, 2013  
USA Science and Engineering Festival, Washington DC, 2014  
State Dept. – STEM Outreach, Azures and Madiera, Portugal, 2014 (seven talks)  
American Association of Physics Teachers, Minneapolis, MN, 2014  
Elgin University, Elgin, Illinois, 2014  
Gustavus Adolphus University, St. Peter, Minnesota, 2014  
American Physical Society, San Antonio, TX, 2015  
Academia Film Festival, Olomouc, Czech Republic, 2015  
Dallas Museum of Art, Dallas, TX, 2015  
Convergence, Bloomington, MN, 2015  
Joint Meeting of Texas sections of APS, AAPT and SPS, Waco, TX, 2015  
Minnesota Science Museum, St. Paul, MN, 2015

## James Kakalios

Publications (125 total)

### Refereed Journals

1. "Persistent Photoconductivity in Doping Modulated Amorphous Semiconductors", J. Kakalios and H. Fritzsche, Phys. Rev. Lett. **53**, 1602 (1984).
2. "Thermal Equilibrium in Doped Amorphous Silicon", R. A. Street, J. Kakalios and T. M. Hayes, Phys. Rev. B **34**, 3030 (1986).
3. "Electronic Transport in Doped Amorphous Silicon", J. Kakalios and R. A. Street, Phys. Rev. B **34**, 6014 (1986).
4. "Bias Annealing in Doped Amorphous Silicon", R. A. Street and J. Kakalios, Philos. Mag. B **54**, L21 (1986).
5. "Excitation and Temperature Dependence of the Photo-Induced Excess Conductivity in Doping Modulated Amorphous Silicon", J. Kakalios, Philos. Mag. B **54**, 199 (1986).
6. "Thermal Equilibrium Processes in Amorphous Silicon", R. A. Street, J. Kakalios, C. C. Tsai and T. M. Hayes, Phys. Rev. B **35**, 1316 (1987).
7. "The Role of Dangling Bonds in the Transport and Recombination of a-Si:Ge:H Alloys", R. A. Street, C. C. Tsai, M. Stutzmann and J. Kakalios, Philos. Mag. B **56**, 289 (1987).
8. "Stretched Exponential Relaxation Arising from Dispersive Diffusion of Hydrogen in Amorphous Silicon", J. Kakalios, R. A. Street and W. B. Jackson, Phys. Rev. Lett. **59**, 1037 (1987).
9. "Microscopic Mobility in Hydrogenated Amorphous Silicon", J. Kakalios, Philos. Mag. Lett. **55**, 129 (1987).
10. "Hydrogen Diffusion in Amorphous Silicon", R. A. Street, C. C. Tsai, J. Kakalios and W. B. Jackson, Philos. Mag. B **56**, 305 (1987).
11. Comment on "Structures and Electronic States in Disordered Systems", R. A. Street and J. Kakalios, Phys. Rev. Lett. **58**, 2504 (1987).
12. "Evidence for Hydrogen Motion in Annealing of Light Induced Metastable Defects in Hydrogenated Amorphous Silicon", W. B. Jackson and J. Kakalios, Phys. Rev. B **37**, 1020 (1988).
13. "The Electron Drift Mobility in Doped Amorphous Silicon", R. A. Street, J. Kakalios and M. Hack, Phys. Rev. B **38**, 5603 (1988).



14. "Test of the Thermal Equilibration Model for Persistent Photoconductivity in Doping Modulated Amorphous Silicon", B. Everitt and J. Kakalios, Phys. Rev. B **43**, 6820 (1991).
15. "Non-Linear 1/f Noise in Hydrogenated Amorphous Silicon", C. Parman and J. Kakalios, Phys. Rev. Lett. **67**, 2529 (1991).
16. "The Non-Radiative Efficiency in Hydrogenated Amorphous Silicon", J. Fan and J. Kakalios, Philos. Mag. Lett. **64**, 235 (1991).
17. "Random Telegraph Switching Noise in Co-Planar Current Measurements of Amorphous Silicon", C. E. Parman, N. E. Israeloff and J. Kakalios, Phys. Rev. B **44**, 8391 (1991).
18. "Conductance Noise Power Fluctuations in Hydrogenated Amorphous Silicon", C. E. Parman, N. E. Israeloff and J. Kakalios, Phys. Rev. Lett. **69**, 1097 (1992).
19. "Conductance Fluctuations in Doped Hydrogenated Amorphous Silicon", C. E. Parman, N. E. Israeloff and J. Kakalios, Phys. Rev. B **47**, 12578 (1993).
20. "Light Induced Changes in the 1/f Noise in Hydrogenated Amorphous Silicon", J. Fan and J. Kakalios, Phys. Rev. B **47**, 10903 (1993).
21. "Origin of the Spectral Dependence of the Non-Radiative Efficiency in Amorphous Silicon", J. Fan and J. Kakalios, Phys. Rev. B **47**, 9989 (1993).
22. "1/f Noise in Doped Hydrogenated Amorphous Silicon", J. Kakalios, Brazillian J. Phys. **23**, 137 (1993).
23. "Optical Absorption Spectrum of Hydrogenated Amorphous Silicon Using Photo-Pyroelectric Spectroscopy", J. Fan and K. Kakalios, J. Appl. Phys. **74**, 1799 (1993).
24. "Reversible Axial Segregation of Binary Mixtures of Granular Materials", K. M. Hill and J. Kakalios, Phys. Rev. E **49**, R3610 (1994).
25. "Computer Simulations of Conductance Noise in a Dynamical Percolation Resistor Network", Lisa M. Lust and J. Kakalios, Phys. Rev. E **50**, 3431 (1994).
26. "Light Induced Changes of the Non-Gaussian 1/f Noise Statistics in Doped Hydrogenated Amorphous Silicon", J. Fan and J. Kakalios, Philos. Mag. B **69**, 595 (1994).
27. "Dynamical Percolation Model of Conductance Fluctuations in Hydrogenated Amorphous Silicon", Lisa M. Lust and J. Kakalios, Phys. Rev. Lett. **75**, 2192 (1995).
28. "Reversible Axial Segregation of Rotating Granular Media", K. M. Hill and J. Kakalios, Phys. Rev. E **52**, 4393 (1995).
29. "Thermopower and Conductivity Activation Energies in Hydrogenated Amorphous Silicon", H. M. Dyalsingh and J. Kakalios, Phys. Rev. B **54**, 7630 (1996).

30. "Magnetic Resonance Imaging of Axial Segregation of Granular Media", K. M. Hill, J. Kakalios and A. Caprihan, *Phys. Rev. Lett.* **78**, 50 (1997).
31. "Temperature and Doping Dependence of Non-Gaussian 1/f Noise and Noise Statistics in Hydrogenated Amorphous Silicon", G. M. Khera and J. Kakalios, *Phys. Rev. B* **56**, 1918 (1997).
33. "Axial Segregation of Granular Media Rotated in a Drum Mixer: Pattern Evolution", K. M. Hill, A. Caprihan and J. Kakalios, *Phys. Rev. E* **56**, 4386 (1997).
34. "Phase Diagram for Avalanche Segregation of Granular Media", J. Koeppel, M. Enz and J. Kakalios, *Phys. Rev. E* **58**, R4104 (1998).
35. "Long-Range Disorder and its Correlation with Hydrogen Microstructure in n-type Doped Hydrogenated Amorphous Silicon", D. Quicker and J. Kakalios, *Phys. Rev. B* **60**, 2449 (1999).
36. "Long Range Disorder and the Staebler-Wronski Effect in n-type Amorphous Silicon", T. J. Belich and J. Kakalios, *Phys. Rev. B* **66**, 195212 (2002).
37. "Measuring Fundamental Frequencies in Local Field Potentials", B. Masimore, J. Kakalios and A. David Redish, *J. Neuroscience Methods* **138**, 97 (2004).
38. "Experimental Investigations into the Formation of Nanoparticles in a/nc-Si:H Thin Films", S. Thompson, C. R. Perrey, C. B. Carter, T. J. Belich, J. Kakalios and U. Kortshagen, *J. Appl. Phys.* **97**, 34,310 (2005).
39. "Transient Striatal  $\gamma$  Local Field Potentials Signal Movement Initiation in Rats", B. Masimore, N. C. Schmitzer-Torbet, J. Kakalios and A. D. Redish, *NeuroReport* **16**, 2021 (2005).
40. "Structural and Electronic Properties of Dual Plasma Co-deposited Mixed-Phase Amorphous/Nanocrystalline Thin Films," Y. Adjallah, C. Anderson, U. Kortshagen and J. Kakalios, *Journal of Applied Physics* **107**, 43704 (2010).
41. "Electronic Transport in Doped Mixed-Phase Hydrogenated Amorphous/Nanocrystalline Silicon Thin Films," L. R. Wienkes, C. Blackwell and J. Kakalios, *Appl. Phys. Lett.* **100**, 072105 (2012).
42. "Dynamical Changes in Neurons During Seizures Determines Tonic to Clonic Shift," B. Beverlin II, J. Kakalios, D. Nykamp and T. I. Netoff, *J. Computational Neuroscience* **33**, 41 (2012).
43. "Conduction Mechanisms in Doped Mixed-Phase Hydrogenated Nanocrystalline Silicon Thin Films," L. R. Wienkes, C. Blackwell, T. Hutchinson and J. Kakalios, *J. Appl. Phys.* **113**, 233707 (2013).

44. "Thermopower of Nanocrystalline Germanium/Amorphous Silicon Composite Thin Films," K. Bodurtha and J. Kakalios, *J. Appl. Phys.* **114**, 193705 (2013).
45. "Quantum Confinement of Mixed Phase Silicon Thin Films Grown by Co-Deposition Plasma Processing," J.D. Fields, S. McMurray, L.R. Wienkes, J. Trask, C. Anderson, L. Miller, B.J. Simonds, J. Kakalios, U. Kortshagen, M.T. Lusk, R.T. Collins, and P.C. Taylor, *Solar Energy Materials & Solar Cells* **129**, 7 (2014).
46. "Non-Arrhenius Anomalous Hopping Electronic Conduction in Hydrogenated Amorphous Silicon and Composite Amorphous/Nanocrystalline Thin Films," K. Bodurtha and J. Kakalios, submitted to *J. Appl. Phys.*
47. "Photo-Enhanced Conductivity in Nanocrystalline Germanium/Amorphous Silicon Composite Thin Films," J. K. Nangoi, K. Bodurtha and J. Kakalios, in preparation.

### **Refereed Papers by Students**

1. "Direct-Current Method for Differentiating Contact and Bulk Low Frequency Resistance Fluctuations", P. W. West, *Rev. Sci. Instr.* **70**, 2802 (1999).
2. "Chaotic Desynchronization as the Therapeutic Mechanism of Deep Brain Stimulation," C. J. Wilson, B. Beverlin II, Theoden Netoff. *Frontiers in Systems Neuroscience* **5**, 50 (2011).
3. "Synchronization from Second Order Network Connectivity Statistics," Liqiong Zhao, B. Beverlin II, T. Netoff and D. Q. Nykamp. *Frontiers in Comp. Neuroscience* **5**, 28 (2011).
4. "The Variance of Phase-Resetting Curves," G.Bard Ermentrout, B. Beverlin II, T. Troyer, and T. Netoff. *J. Comp. Neuroscience* **31**, 185 (2011).
5. "Dynamic Control of Modeled Tonic-Clonic Seizure States with Closed-Loop Stimulation," B. Beverlin II, T. Netoff. *Frontiers in Neural Circuits* **6**, 126 (2012).

### **Refereed Conference Proceedings**

1. "Properties of Amorphous Silicon Multilayer Films", J. Kakalios, H. Fritzsche, N. Ibaraki and S. R. Ovshinsky, *J. Non-Cryst. Solids* **66**, 339 (1984).
2. "Doping Modulated Amorphous Semiconductors", J. Kakalios, H. Fritzsche and K. L. Narasimhan, A.I.P. Conference Proceedings no. **120**, ed. by P. C. Taylor and S. R. Bishop, 425 (1984).

3. "Optical and Electrical Properties of Amorphous Semiconductor Doping Superlattices", J. Kakalios and H. Fritzsche, Proc. of the 17th Intl. Conf. on the Physics of Semiconductors, ed. by J. D. Chadi and W. A. Harrison, 503 (1984).
4. "Search for Reversible Light-Induced Changes in the Absorption Bands of a-Si:H", H. Fritzsche, J. Kakalios and D. Bernstein, A.I.P. Conference Proceedings no. **120**, ed. by P. C. Taylor and S. R. Bishop, 229 (1984).
5. "Doping Modulated Amorphous Semiconductor Multilayers", J. Kakalios and H. Fritzsche, Materials Research Society Symposia Proceedings (Materials Research Society, Pittsburgh, PA) **37**, 29 (1984).
6. "Photo-Induced Excess Conductivity in Doping Modulated Amorphous Silicon", J. Kakalios and H. Fritzsche, Materials Research Society Symposia Proceedings (Materials Research Society, Pittsburgh, PA) **49**, 127 (1985).
7. "Temperature and Excitation Dependence of the Photo-Induced Excess Conductivity in Doping Modulated Amorphous Silicon", J. Kakalios and H. Fritzsche, J. Non-Cryst. Solids **77 & 78**, 1101 (1985).
8. "Carrier Separation Effects in Doping Modulated Amorphous Silicon", J. Kakalios, C. C. Tsai and R. A. Street, Materials Research Society Symposia Proceedings (Materials Research Society, Pittsburgh, PA) **70**, 435 (1986).
9. "Thermal Equilibrium and Structural Relaxation in Amorphous silicon", R. A. Street and J. Kakalios, Proc. of the 18th Intl. Conf. on the Physics of Semiconductors, ed. by Olof Engstrom, 1045 (1986).
10. "Thermally Induced Instabilities and the Staebler-Wronski Effect in Doped Amorphous Silicon", J. Kakalios and R. A. Street, A.I.P. Conference Proceedings no. **157**, ed. by B. L. Stafford and E. Sabisky, 179 (1987).
11. "Thermal Equilibrium and Growth of Doped Amorphous Silicon", J. Kakalios, R. A. Street, C. C. Tsai and R. Weisfield, Materials Research Society Symposia Proceedings (Materials Research Society, Pittsburgh, PA) **95**, 243 (1987).
12. "Thermal Equilibrium Processes in Doped Amorphous Silicon", J. Kakalios and R. A. Street, J. Non-Cryst. Solids **97 & 98**, 767 (1988).
13. "The Doping Dependence of the Drift Mobility in N-Type a-Si:H", R. A. Street, J. Kakalios and M. Hack, Materials Research Society Symposia Proceedings (Materials Research Society, Pittsburgh, PA) **118**, 495 (1988).
14. "The Origin of Persistent Photoconductivity in Amorphous Semiconductors", J. Kakalios, J. Non-Cryst. Solids **114**, 714 (1989).

15. "A Physical Interpretation of the Hall Effect in Amorphous Silicon", J. Kakalios, *J. Non-Cryst. Solids* **114**, 372 (1989).
16. "Metastable Electronic Effects in Amorphous Semiconductor Superlattices", J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **160**, 559 (1990).
17. "Studies of Light Soaking Stability in r.f. Sputter-Deposited a-Si:H", A. Wynveen, J. Fan, J. Kakalios and J. Shinar, *A.I.P. Conference Proceedings* no. **234**, ed. by B. L. Stafford, 241 (1991).
18. "Sub-Bandgap Optical Absorption in Amorphous Silicon Using Photo-Pyroelectric Spectroscopy", J. Fan and J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **219**, 545 (1991).
19. "1/f Noise in Hydrogenated Amorphous Silicon", C. Parman and J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **219**, 235 (1991).
20. "Improved Light-Soaking Stability in r.f. Sputter-Deposited a-Si:H", A. Wynveen, J. Fan, J. Kakalios and J. Shinar, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **219**, 105 (1991).
21. "The Spectral Dependence of the Non-Radiative Efficiency in Hydrogenated Amorphous Silicon", J. Fan and J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **258**, 789 (1992).
22. "Tunneling Spectroscopy of Amorphous Semiconductors", J. Wen and J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **258**, 819 (1992).
23. "Non-Gaussian 1/f Noise and Conductance Fluctuations in Hydrogenated Amorphous Silicon", C. E. Parman, N. E. Israeloff and J. Kakalios, *Materials Research Society Symposia Proceedings* (Materials Research Society, Pittsburgh, PA) **258**, 741 (1992).
24. "1/f Noise Measurements of the Staebler-Wronski Effect in Hydrogenated Amorphous Silicon", J. Fan and J. Kakalios, *Proc. of the Third Intl. Conf. on Solid State and Integrated Circuit Technology*, ed. by R. Ellwanger, C. C. Tsai, W. Yangyuan and M. Bangxian, 534 (1992).
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### **Invited Review Articles**

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