

## Eric A. Schiff, Ph.D.

Professor, Department of Physics, Syracuse University, Syracuse, New York 13244-1130  
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### Education

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|---|---|
| University of Chicago, James Franck Institute   | Research Associate, 1978-1981               |
| Amorphous semiconductor research with Hellmut Fritzsche; scanning transmission electron microscopy research with Albert Crewe and Stuart Solin. |   |
| Cornell University  | Ph.D. in experimental physics, 1979         |
| Thesis research with Albert J. Sievers: far-infrared spectroscopy of semiconductors.  |   |
| California Institute of Technology  | B.S. with honors, physics and English, 1971 |

### Professional Experience

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|---------------------|------------------------------------|
| Syracuse University | Professor of Physics, 1981-present |
|---------------------|------------------------------------|
- Interdisciplinary research group leader. Our research has typically involved collaborators from other laboratories (United Solar Ovonic LLC, First Solar, Antek, BP Solar, National Renewable Energy Laboratory, Forschungszentrum Juelich, Iowa State University, University of Delaware,) and disciplines (engineering, chemistry, and biophysics).
  - Thesis advisor to about 20 graduate students who now work in industry (IBM Research, DuPont, Sycamore Networks, etc.), government labs (NREL), and universities (Seton Hall, Chonbuk National).
  - Principal investigator for externally funded research projects from government agencies (Department of Energy, National Science Foundation, and the Empire State Development Corp.) and corporations (United Solar Ovonic LLC, First Solar, Inc., and SRC, Inc.).
  - Created and taught “Space and time in elementary physics”, a course for undergraduates who are underprepared for calculus-based introductory physics.
  - Created and taught “Solar Energy Science and Architectures”, an innovative and popular course for undergraduate engineering and science students.
  - Research accomplishments include development of low-mobility solar cell device physics (for thin film silicon, CIGS, and CdTe), discovery of ambipolar diffusion in dye-sensitized solar cells, thermodynamic limits to light trapping in solar cells, hydrogen pairing effects for defect metastability in hydrogenated amorphous silicon, and experimental confirmation of the Einstein transport relation in dispersive transport materials. Co-author of more than 100 refereed research publications with more than 1600 citations. Co-inventor on two patent applications (pending).
  - Co-organizer of eight Materials Research Society Symposia and of two large international conferences (ICANS). Program committee member for about six additional conferences.

Syracuse University

Associate Dean for Science, 2003-2008

- Project management for the \$110 M Life Sciences Complex. This work included a major revision of the conceptual design that which was essential to project authorization by the Board of Trustees. I participated in all phases from architect selection to construction. The handsome and highly functional Complex was completed within its budget.
- Chaired a committee that oversaw conversion of the university to a responsibility center management (RCM) budgeting system.
- Management responsibility for eight academic departments with about 150 professors, 1500 undergraduate students and 500 graduate students.
- Developed and shepherded a new undergraduate biophysics major through departmental, university, and New York state approvals.

Innovalight, Inc.

Visiting Engineer and Consultant, 2007

- Research on silicon ink technology for emitters on silicon solar cells. This technology ultimately received an R&D 100 award in 2011, and Innovalight was purchased by DuPont in the same year. With Homer Antoniadis, Conrad Burke, and Francesco Lemmi.
- Co-inventor on 2 patents

Syracuse University

Physics Department Chair, 1997-2003

- Management and budgeting responsibility for a department with 25 professors, 50 graduate assistants, and 20 professional and clerical staff members (about \$6M/annum in direct costs).
- Led initiative that more than tripled the number of undergraduates majoring in physics. This initiative involved new courses and curricula and realignment of faculty teaching responsibilities. The emphases were on diversifying the major beyond those with professional interests in becoming doctoral physicists, and on developing multiple gateway courses for the major.
- Expansion in sponsored research: Department faculty obtained new sponsorship for research projects in biophysics (NIH, Research Corporation), public science (NSF), information technology (NSF), cosmology (NSF), and solar cells (NREL). The BTeV collaboration for particle physics was founded, acquiring nearly 30 institutional collaborators before cancellation by then President Bush.
- Supervised national searches for five new professors.

Xerox Palo Alto Research Center

Visiting Scientist and Consultant, 1995

- Research on thin film sensor arrays for digital radiography (with Robert Street and Richard Weisfield). dPix, Inc., was spun off to commercialize related technologies.

Brown University

Visiting Associate Professor, 1988-1989

- Sub-picosecond techniques for measuring photocarrier transport in semiconductor devices (with Jan Tauc).

Syracuse University

Assistant/Associate Professor, 1981-1995

- Led faculty recruitment efforts for the physics department that revitalized experimental and theoretical condensed matter physics. In 1981, there was no external research funding in the field, despite a proud research history. By 1992, with 5 new professors, the field had again become highly productive, and was the best-funded within the department.

Fisher Scientific Co.

Engineer, 1972-73

- Development of the Model 850, a very early computer-interfaced atomic absorption spectrophotometer (Jarrell-Ash Division, Waltham, MA).

## **Honors**

- Fellow of the American Physical Society (nominated by the Forum on Industrial and Applied Physics)
- Syracuse University Chancellor's Citation
- Invited speaker and tutorial instructor at national and international conferences
- Invited seminar and colloquium speaker at universities, government laboratories, and companies
- Departmental teaching awards

## **E. A. Schiff: Sponsored Research Projects**

*National Science Foundation* (8/1/13-7/31/16). "Fundamental Research on Physics of Instability of Organic Solar Cells" (Collaborative Research with Iowa State). \$163k (at Syracuse).

*First Solar, Inc.* (4/1/12 – 12/31/13). "Optoelectronic Characterization of CdTe Solar Cells." \$120k.

*SRC, Inc.* (4/1/11-3/31/12). "Electromagnetics for Solar Cells and Optoelectronics." \$50k.

*Department of Energy Solar America Initiative* (8/1/07 – 4/30/11). "Collaborative research with United Solar Ovonic LLC on amorphous and nanocrystalline silicon solar cells." \$600k (includes 50% cost sharing from United Solar and from NY State).

*Empire State Development Corp.* (8/15/07-12/31/10). "Seed research on periodic mesoporous titania and polyaniline in solar cells." PI, co-PI's T. Asefa (chemistry) and Anthony Terrinoni (Antek, Inc.). \$300k + \$150k F&A reduction (Syracuse Univ.).

*National Science Foundation* (10/1/02-9/30/04). "Cosmic Connection," co-PI w. Carl Rosenzweig, \$600k.

*National Renewable Energy Laboratory.*

(2/11/02-9/30/06) "Transport, Interfaces and Modeling in Amorphous Silicon Solar Cells." \$550k.

(4/1/98-7/15/2001) "Electroabsorption and Transport Measurements and Modeling Research in Amorphous Silicon Based Solar Cells" (~\$420k)

(4/15/94 - 1/15/98) "Research on High Bandgap Materials and Amorphous Silicon-Based Solar Cells" (~\$380k)

(2/20/91 - 4/19/94) "Research on Defects and Transport in Amorphous Silicon-Based Semiconductors" (~\$330k)

*Solar Energy Research Institute* (9/1/86 - 11/30/90). "Defects and photocarrier processes in amorphous hydrogenated silicon alloys." \$450k.

*National Science Foundation* (7/15/83 - 8/31/86). "Photocarrier dynamics and recombination in amorphous hydrogenated silicon." \$190k.

*Research Corporation* (6/1/82 - 6/1/84). "Photoconductive characterization of amorphous hydrogenated silicon." \$15k.

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*Empire State Development Corp.* (8/15/07-12/31/10). "Seed research on periodic mesoporous titania and polyaniline in solar cells." PI, co-PI's T. Asefa (chemistry) and Anthony Terrinoni (Antek, Inc.). \$300k + \$150k F&A reduction (Syracuse Univ.).

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*National Renewable Energy Laboratory.*

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*National Science Foundation* (7/15/83 - 8/31/86). "Photocarrier dynamics and recombination in amorphous hydrogenated silicon." \$190k.

*Research Corporation* (6/1/82 - 6/1/84). "Photoconductive characterization of amorphous hydrogenated silicon." \$15k.

## Published Work of E. A. Schiff

### 2013

"Methods and Apparatus for the Production of Group IV Nanoparticles in a Flow-through Plasma Reactor", Xuegeng Li, Christopher Alcantara, Maxim Kelman, Elena Rogojina, Eric Schiff, Mason Terry, and Karel Vanheusden, United States Patent 8471170 B2 issued June 25, 2013.[[pdf](#)]

"Entropy-enthalpy Compensation of Biomolecular Systems in Aqueous Phase: a Dry Perspective", L. Movileanu and E. A. Schiff, *Monatshefte für Chemie - Chemical Monthly* **144**, 59-65 (2013). [doi: [10.1007/s00706-012-0839-9](https://doi.org/10.1007/s00706-012-0839-9)][[pdf](#)]

### 2012

"Electron drift-mobility measurements in polycrystalline  $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$  solar cells", S. A. Dinca, E. A. Schiff, W. N. Shafarman, B. Egaas, R. Noufi, and D. L. Young, *Appl. Phys. Lett.* **100**, 103901-1..3 (2012).[doi:10.1063/1.3692165][[pdf](#)]

"Drift-mobility characterization of silicon thin-film solar cells using photocapacitance", J.-K. Lee, A.M. Hamza, S. Dinca, Q. Long, E.A. Schiff, Q. Wang, B. Yan, J. Yang, and S. Guha, *J. Non-Cryst. Solids* **358** 2194-7 (2012).[doi: [10.1016/j.noncrysol.2012.01.024](https://doi.org/10.1016/j.noncrysol.2012.01.024)][[pdf](#)]

### 2011

"Thermodynamic limit to photonic-plasmonic light-trapping in thin films on metals", E. A. Schiff, *J. Appl. Phys.* **110**, 104501-1..9 (2011).[[pdf](#)]

"Amorphous Silicon-Based Solar Cells", E. A. Schiff, S. Hegedus, and X. Deng, in *Handbook of Photovoltaic Science and Engineering*, edited by Antonio Luque and Steven Hegedus (J. W. Wiley & Sons, Chichester, 2011), pp. 487-545.

"Layer-by-Layer Processing and Optical Properties of Core/Alloy Nanostructures", Peter N. Njoki, Wenjie Wu, Hui Zhao, Lukas Hutter, Eric A. Schiff, and Mathew M. Maye, *J. Am. Chem. Soc.* **133** 5224–5227 (2011). [[pdf](#)]

"Processing Core/Alloy/Shell Nanoparticles: Tunable Optical Properties and Evidence for Self-Limiting Alloy Growth", Wenjie Wu, Peter N. Njoki, Hyunjoo Han, Hui Zhao, Eric A. Schiff, Patrick S. Lutz, Louis Solomon, Sean Matthews, and Mathew M. Maye, *J. Phys. Chem. C* **115**, 9933–9942 (2011).[[pdf](#)] [doi: 10.1021/jp201151m]

"Light Trapping in Thin Film Solar Cells: An Assessment", Hui Zhao, E. A. Schiff, L. Sivec, J. Yang, and S. Guha, in *Thin Film Solar Technology III*, edited by Louay A. Eldada (SPIE Proceedings Vol. 8110), pp. E-1..9.[[pdf](#)]

"Industry-academia partnership helps drive commercialization of new thin-film silicon technology design", Subhendu Guha, David Cohen, Eric Schiff, Paul Stradins, P. Craig Taylor, and Jeffrey Yang, *Photovoltaics International* Thirteenth Edition August 2011, pp. 144-150 (2011).[[pdf](#)]

"Electron emission from deep traps in hydrogenated amorphous silicon and silicon-germanium: Meyer-Neldel behavior and ionization entropy", Qi Long, Steluta Dinca, Eric A. Schiff, Baojie Yan, Jeff Yang, and Subhendu Guha, in *Amorphous and Polycrystalline Thin-Film Silicon Science and Technology-2011*, edited by Baojie Yan, Seiichiro Higashi, Chuang-Chuang Tsai, Qi Wang, & Helena Gleskova (Mater. Res. Soc. Symp. Proc. Volume 1321, Warrendale, PA, 2011), pp. A04-4-1..6. [doi: 10.1557/opl.2011.1229] [[pdf](#)]

### 2010

"Plasmonic Light-trapping and Quantum Efficiency Measurements on Nanocrystalline Silicon Solar Cells and Silicon-On-Insulator Devices", Hui Zhao, Birol Ozturk, E. A. Schiff, Baojie Yan, J. Yang and S. Guha, in *Amorphous and Polycrystalline Thin-Film Silicon Science and Technology — 2010*, edited by Q. Wang, B. Yan, S. Higashi, C.C. Tsai, A. Flewitt (Mater. Res. Soc. Symp. Proc. Volume 1245, Warrendale, Pennsylvania), pp. A03-02 – A03-07.[[pdf](#)]

### 2009

"Hole drift-mobility measurements in polycrystalline  $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$ ", S. A. Dinca, E. A. Schiff, B. Egaas, R. Noufi, D. L. Young, and W. N. Shafarman, *Phys. Rev. B* 80, 235201-1..12 (2009). [doi: 10.1103/PhysRevB.80.235201][[.pdf](#)]

"Solvent-washable polymer templated synthesis of mesoporous materials and solid-acid nanocatalysts in one-pot", Richard E. Mishler II, Ankush V. Biradar, Cole T. Duncan, Eric A. Schiff, and Tewodros Asefa, *Chem. Comm.* 6201-6203 (2009).[doi: 10.1039/B913035G][[.pdf](#)]

"Transit time measurements of charge carriers in disordered silicons: amorphous, nanocrystalline, and nanoporous", E. A. Schiff, *Phil. Mag. B* 89, 2505-2518 (2009). [doi:10.1080/14786430902915370][[.pdf](#)]

"Methods for Optimizing Thin Film Formation with Reactive Gases", Mason Terry, Malcolm Abbott, Maxim Kelman, Andreas Meisel, Dmitry Poplavsky, and Eric Schiff, United States Patent 7,572,740 B2 (issued August 11, 2009).[[.pdf](#)]

"Concentric Flow-through Plasma Reactor and Methods Therefor", Xuegeng Li, Maxim Kelman, Mason Terry, Elena Rogojina, Eric Schiff, and Karel Vanheusden, United States Patent application 2009/0014423 (published January 15, 2009).[[.pdf](#)]

"Methods and Apparatus for the Production of Group IV Nanoparticles in a Flow-through Plasma Reactor", Xuegeng Li, Christopher Alcantara, Maxim Kelman, Elena Rogojina, Eric Schiff, Mason Terry, and Karel Vanheusden, United States Patent application 2009/0044661 A1 (published February 19, 2009).[[.pdf](#)]

"Hole Drift Mobility Measurements on a-Si:H using Surface and Uniformly Absorbed Illumination", Steluta A. Dinca, Eric A. Schiff, Subhendu Guha, Baojie Yan, and Jeff Yang, in *Amorphous and Polycrystalline Thin-Film Silicon Science and Technology-2009*, edited by A. Flewitt, Q. Wang, J. Hou, S. Uchikoga, A. Nathan (Mater. Res. Soc. Symp. Proc. Volume 1153, Warrendale, PA, 2009), pp. 1153-A16-07.[[.pdf](#)]

"Nanosphere lithography of nanostructured silver films on thin-film silicon solar cells for light-trapping", B. Ozturk, E. A. Schiff, Hui Zhao, S. Guha, Baojie Yan, and J. Yang, in *Amorphous and Polycrystalline Thin-Film Silicon Science and Technology-2009*, edited by A. Flewitt, Q. Wang, J. Hou, S. Uchikoga, A. Nathan (Mater. Res. Soc. Symp. Proc. Volume 1153, Warrendale, PA, 2009), pp. 1153-A07-14.[[.pdf](#)]

"Carrier drift-mobilities and solar cell models for amorphous and nanocrystalline silicon", E. A. Schiff, in *Amorphous and Polycrystalline Thin-Film Silicon Science and Technology-2009*, edited by A. Flewitt, Q. Wang, J. Hou, S. Uchikoga, A. Nathan (Mater. Res. Soc. Symp. Proc. Volume 1153, Warrendale, PA, 2009), 1153-A15-01.[[.pdf](#)]

## 2008

"Amorphous silicon/polyaniline heterojunction solar cells: Fermi levels and open-circuit voltages," Weining Wang, E. A. Schiff, and Qi Wang, *J. Non-Cryst. Solids* 354, 2862-2865 (2008).[doi: 10.1016/j.jnoncrysol.2007.10.104][[.pdf](#)].

Co-editor: *Proceedings of the 22nd International Conference on Amorphous and Microcrystalline Semiconductors*, edited by P. C. Taylor, H. Branz, R. W. Collins, and E. A. Schiff; published as *J. Non-Cryst. Solids* 354 (2008).

## 2007

"Polyaniline on crystalline silicon heterojunction solar cells," Weining Wang and E. A. Schiff, *Appl. Phys. Lett.* 91, 133504-133506 (2007). [doi: 10.1063/1.2789785][[.pdf](#)]

## 2006

"Hole mobilities and the physics of amorphous silicon solar cells," E. A. Schiff, *J. Non-Cryst. Solids* 352, 1087-1092 (2006). doi:10.1016/j.jnoncrysol.2005.11.074 [[.pdf](#)]

"Hole mobility limit of amorphous silicon solar cells," Jianjun Liang, E. A. Schiff, S. Guha, Baojie Yan, and J. Yang, *Appl. Phys. Lett.* 88 063512-063514 (2006). doi:10.1063/1.2170405 [[.pdf](#)]

"Temperature dependence of the electron diffusion coefficient in electrolyte-filled TiO<sub>2</sub> nanoparticle films: Evidence against multiple trapping in exponential conduction-band tails," Nikos Kopidakis, Kurt D. Benkstein, Jao van de Lagemaat, and Arthur J. Frank, Quan Yuan, Eric A. Schiff, *Phys. Rev. B* 73, 045326 (2006). [[.pdf](#)] doi:10.1103/PhysRevB.73.045326

"Hole mobilities and the physics of amorphous silicon solar cells," E. A. Schiff, *J. Non-Cryst. Solids* 352, 1087–1092 (2006). [[.pdf](#)]

"Hole mobility limit of amorphous silicon solar cells," Jianjun Liang, E. A. Schiff, S. Guha, Baojie Yan, and J. Yang, *Appl. Phys. Lett.* 88 063512 (2006). DOI:[10.1063/1.2170405](#) [[.pdf](#)]

"Temperature dependence of the electron diffusion coefficient in electrolyte-filled TiO<sub>2</sub> nanoparticle films: Evidence against multiple trapping in exponential conduction-band tails," Nikos Kopidakis, Kurt D. Benkstein, Jao van de Lagemaat, and Arthur J. Frank, Quan Yuan, Eric A. Schiff, *Phys. Rev. B* 73, 045326 (2006). DOI:[10.1103/PhysRevB.73.045326](#) [[.pdf](#)]

## 2005

"Conducting polymer and hydrogenated amorphous silicon hybrid solar cells," E. L. Williams, G. E. Jabbour, Q. Wang, S. E. Shaheen, D. S. Ginley, and E. A. Schiff, *Appl. Phys. Lett.* 87, 223504 (2005). DOI:[10.1063/1.2136409](#) [[.pdf](#)]

"Hole Drift Mobility Measurements in Microcrystalline Silicon," T. Dylla, F. Finger, and E. A. Schiff, *Appl. Phys. Lett.* 87, 032103 (2005). DOI:[10.1063/1.1984087](#). [[.pdf](#)].

"Light-soaking Effects on the Open-circuit Voltage of Amorphous Silicon Solar Cells," J. Liang, E. A. Schiff, S. Guha, B. Yan, and J. Yang, in *Amorphous and Nanocrystalline Silicon Science and Technology – 2005*, edited by R. Collins, P.C. Taylor, M. Kondo, R. Carius, R. Biswas (Materials Research Society Symposium Proceedings Vol. 862, Pittsburgh, 2005), A13.6 [[.pdf](#)].

"Temperature-dependent Open-circuit Voltage Measurements and Light-soaking in Hydrogenated Amorphous Silicon Solar Cells," J. Liang, E. A. Schiff, S. Guha, B. Yan, and J. Yang, in *Amorphous and Nanocrystalline Silicon Science and Technology – 2005*, edited by R. Collins, P.C. Taylor, M. Kondo, R. Carius, R. Biswas (Materials Research Society Symposium Proceedings Vol. 862, Pittsburgh, 2005), A21.8 [[.pdf](#)].

## 2004

"Drift-mobility measurements and mobility-edges in disordered silicons," E. A. Schiff, *J. Phys.: Condens. Matter* 16, S5265-5275 (2004). DOI:[10.1088/0953-8984/16/44/023](#) [[.pdf](#)].

"Zero interference effect and electroabsorption in amorphous silicon-based solar cells," J.-H. Lyou and E. A. Schiff, *Rev. Sci. Inst.* 75, 921-927 (2004).

"Hole Drift-Mobility Measurements and Multiple-Trapping in Microcrystalline Silicon," T. Dylla, F. Finger, and E. A. Schiff, in *Amorphous and Nanocrystalline Silicon Science and Technology – 2004*, edited by G. Ganguly, M. Kondo, E. A. Schiff, R. Carius, and R. Biswas (Materials Research Society, Symposium Proc. Vol. 808, 2004), 109-114. [[.pdf](#)]

## 2003

"Low-mobility Solar Cells: A Device Physics Primer with Application to Amorphous Silicon," E. A. Schiff, *Solar Energy Materials and Solar Cells* 78, 567-595 (2003). DOI:[10.1016/S0927-0248\(02\)00452-X](#). [[.pdf](#)]

"Amorphous Silicon Based Solar Cells," Xunming Deng and Eric A. Schiff, in *Handbook of Photovoltaic Science and Engineering*, Antonio Luque and Steven Hegedus, editors (John Wiley & Sons, Chichester, 2003), pp. 505 – 565. [[.pdf](#)]

"Hole Drift-Mobility Measurements in Contemporary Amorphous Silicon," S. Dinca, G. Ganguly, Z. Lu, E. A. Schiff, V. Vlahos, C. R. Wronski, Q. Yuan, in *Amorphous and Nanocrystalline Silicon Based Films – 2003*, edited by J.R. Abelson, G. Ganguly, H. Matsumura, J. Robertson, E. A. Schiff (Materials Research Society Symposium Proceedings Vol. 762, Pittsburgh, 2003), pp. 345--350. [[.pdf](#)]



"Bandtail Limits to Solar Conversion Efficiencies in Amorphous Silicon Solar Cells," K. Zhu, J. Yang, W. Wang, E. A. Schiff, J. Liang, and S. Guha, in *Amorphous and Nanocrystalline Silicon Based Films – 2003*, edited by J.R. Abelson, G. Ganguly, H. Matsumura, J. Robertson, E. A. Schiff (Materials Research Society Symposium Proceedings Vol. 762, Pittsburgh, 2003), pp. 297--302.[\[.pdf\]](#)

## 2002

"Photocarrier Drift Mobility Measurements and Electron Localization in Nanoporous Silicon," P. N. Rao, E. A. Schiff, L. Tsybeskov, and P. Fauchet, *Chemical Physics* **284**, 129—138 (2002). DOI: [10.1016/S0301-0104\(02\)00544-X](https://doi.org/10.1016/S0301-0104(02)00544-X) [\[.pdf\]](#)

"Determining the Locus for Photocarrier Recombination in Dye-Sensitized Solar Cells," Kai Zhu, E. A. Schiff, N.-G. Park, J. van de Lagemaat, and A. J. Frank, *Appl. Phys. Lett.* **80**, 685—687 (2002). DOI: [10.1063/1.1436533](https://doi.org/10.1063/1.1436533) [\[.pdf\]](#)

"Thermionic Emission Model for Interface Effects on the Open-Circuit Voltage of Amorphous Silicon Based Solar Cells," E. A. Schiff, in *Conference Record of the 29<sup>th</sup> IEEE Photovoltaics Specialists Conference* (Institute of Electrical and Electronics Engineers, Inc., Piscataway, 2002), 1086--1089.[\[.pdf\]](#)

"Infrared Modulation Spectroscopy of Interfaces in Amorphous Silicon Solar Cells," K. Zhu, E. A. Schiff, and G. Ganguly, *J. Non-Cryst. Solids* **299-302**, 1162-1166 (2002).[\[.pdf\]](#)

"Infrared Charge-Modulation Spectroscopy of Defects in Phosphorus Doped Amorphous Silicon," Kai Zhu, E. A. Schiff, and G. Ganguly, in *Amorphous and Heterogeneous Silicon-Based Films- 2002*, edited by J.R. Abelson, J.B. Boyce, J.D. Cohen, H. Matsumura, J. Robertson (Materials Research Society Symposium Proceedings Vol. 715, Pittsburgh, 2002), 301--306.[\[.pdf\]](#)

"Lifetime Regime in the Electrically-Detected Transient Grating Method Applied to Amorphous and Microcrystalline Silicon Films," P. Sanguino, M. Niehus, S. Koyanov, P. Brogueira, R. Schwarz, J.P. Conde, V. Chu, and E.A. Schiff, in *Amorphous and Heterogeneous Silicon-Based Films- 2002*, edited by J.R. Abelson, J.B. Boyce, J.D. Cohen, H. Matsumura, J. Robertson (Materials Research Society Symposium Proceedings Vol. 715, Pittsburgh, 2002), 315--320.

## 2001

"Electroabsorption Measurements and Built-in Potentials in Amorphous Silicon-Germanium Solar Cells," J. H. Lyou, E. A. Schiff, S. Guha, and J. Yang, *Appl. Phys. Lett.* **78**, 1924-1926 (2001). DOI: [10.1063/1.1356443](https://doi.org/10.1063/1.1356443) [\[.pdf\]](#)

"Open-Circuit Voltage Physics in Amorphous Silicon Solar Cells," L. Jiang, J. H. Lyou, S. Rane, E. A. Schiff, Q. Wang, and Q. Yuan, in *Amorphous and Heterogeneous Films – 2000*, edited by H. M. Branz, R. W. Collins, S. Guha, H. Okamoto, and M. Stutzmann (Materials Research Society, Symposium Proceedings Vol. 609, Pittsburgh, 2001), A18.3.1-12.[\[.pdf\]](#)

## 2000

"Charge Modulation Spectra in Phosphorus-Doped a-Si:H," J.-H. Lyou, N. Kopidakis, E. A. Schiff, *J. Non-Cryst. Solids* **266-269**, 227-231 (2000).[\[.pdf\]](#)

"Hydrogen-mediated models for metastability in a-Si:H: role of dihydride bonding," N. Kopidakis and E. A. Schiff, *J. Non-Cryst. Solids* **266-269**, 415-418 (2000).[\[.pdf\]](#)

"Ambipolar Diffusion of Photocarriers in Electrolyte-Filled, Nanoporous TiO<sub>2</sub>," N. Kopidakis, E. A. Schiff, N.-G. Park, J. van de Lagemaat, and A. J. Frank, *J. Phys. Chem. B* **104**, 3930-3936 (2000). DOI: [10.1021/jp9936603](https://doi.org/10.1021/jp9936603) [\[.pdf\]](#)

Co-editor: *Proceedings of the 20<sup>th</sup> International Conference on Amorphous and Microcrystalline Semiconductors*, edited by R. A. Street, P. C. Taylor, S. Wagner, and E. A. Schiff; published as *J. Non-Cryst. Solids* **266-269** (2000).

"Interfacial Optical Spectra in Amorphous Silicon Based pin Solar Cells," Kai Zhu, J. H. Lyou, E. A. Schiff, R. S. Crandall, G. Ganguly, S. S. Hegedus, in *Conference Record of the 28<sup>th</sup> IEEE Photovoltaics Specialists Conference* (Institute of Electrical and Electronics Engineers, Inc., Piscataway, 2000) 725-727.[\[.pdf\]](#)

## 1999

"Infrared Electroabsorption Spectra in Amorphous Silicon Solar Cells," J. H. Lyou, E. A. Schiff, S. S. Hegedus, S. Guha, and J. Yang, in *Amorphous and Heterogeneous Silicon Thin Films: Fundamentals to Devices - 1999* (Materials Research Society, Symposium Proceedings Vol. 557, Pittsburgh, 1999), pp. 457-463.

"Grazing Incidence Measurements of Polarized Electroabsorption and Light Soaking Effect on Amorphous Silicon Based Solar Cells," L. Jiang, E. A. Schiff, Q. Wang, S. Guha, and J. Yang, in *Amorphous and Microcrystalline Silicon Technology - 1998*, edited by R. Schropp, H.M. Branz, M. Hack, I. Shimizu, and S. Wagner (Materials Research Society Symposium Proceedings Vol. 507, Pittsburgh, 1999), 631-636.

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