

BIOGRAPHICAL DATA

NAME: Eli Yablonovitch

DATE OF BIRTH: December 15, 1946

ACADEMIC DEGREES:

Ph. d.	Harvard University, Cambridge, Massachusetts	1972
A. M.	Harvard University, Cambridge, Massachusetts	1969
B. Sc.	McGill University, Montreal, Canada	1967

POSITIONS HELD:

2007-present University of California, Berkeley, The James & Katherine Lau Engineering Chair; Professor of Electrical Engineering & Computer Sciences,
2010-present Director of the NSF S&T Center for Energy Efficient Electronics Science (E³S),
2007-present Senior Faculty Scientist, Lawrence Berkeley National Laboratory, & Member, Kavli Energy Nano-Sciences Institute at Berkeley.
1993-2007 University of California, Los Angeles, The Northrop-Grumman Optoelectronics Chair; Professor of Electrical Engineering.
1984-1993 Bell Communications Research, Director, Solid-State Physics Research, 1991-1993 Distinguished Member of Staff, 1990-1993.
1979-1984 Exxon Research Center, Research Associate and Head of Optical Sciences Group.
1974-1979 Harvard University Associate Professor of Applied Physics, 1976-1979 Assistant Professor of Applied Physics, 1974-1976.
1972-1974 Bell Telephone Laboratories, Member of Technical Staff.
1971,1972 Teaching Fellow, Harvard University.

ADDITIONAL POSTS:

2012-present Technion, Haifa, Israel, Distinguished Visiting Professor.
2010-present Hong Kong University of Science & Technology, Visiting Professor, Institute for Advanced Study.
2007-present Adjunct Professor of Electrical Engineering, UCLA.

HONORS:

2018 Edison Medal of the IEEE, for “leadership, innovations, and entrepreneurial achievements in photonics, semi-conductor lasers, antennas, and solar-cells.”
2017 William R. Cherry Award; the IEEE’s highest award in solar cells & photovoltaics.
2016 Oliver Buckley Condensed Matter Physics Prize, American Physical Society, for “seminal achievements in solar cells, strained lasers, & photonic crystals.”
2015 Isaac Newton Medal & Prize, the highest award of the UK Institute of Physics, for “his visionary and foundational contributions to photonic nanostructures.”
2014 Rank Prize (UK), for “the idea that strained semiconductor lasers would have superior performance due to reduced valence band (hole) effective mass.” Almost all semiconductor lasers use this concept, including for optical telecommunications, DVD players, red laser pointers, etc. With almost every human interaction with the internet, optical telecommunication occurs by strained semiconductor lasers.

- 2017 Elected to the National Academy of Inventors,
- 2013 Elected as Foreign Member of the Royal Society of London,
- 2012 Elected to the American Academy of Arts and Sciences,
- 2003 Elected to the National Academy of Sciences,
- 2003 Elected to the National Academy of Engineering.
- 2012 Harvey Prize of Israel, for “pioneering discoveries in photonics, optoelectronics, and semiconductors--that impacted our lives”.
- 2012 IEEE Photonics Award, for “pioneering contributions to photonic crystals, the photonic bandgap, and photonic bandgap engineering”.
- 2010 Mountbatten Medal of the British IET, for “outstanding contributions to electronics”.
- 2001 Julius Springer Prize in Applied Physics, “for the impact of photonic crystals on basic research, as well as on a great variety of applications”.
- 1996 R. W. Wood Prize of the Optical Society of America, “for proposing the concept of Photonic Crystals and electromagnetic band structure engineering”.
- 1993 The W. Streifer Scientific Achievement Award of the IEEE/LEOS, “for contributions to opto-electronics, including the physics of strained-layer lasers and photonic applications of low dimensional structures”.
- 1978 The Adolf Lomb Medal of the Optical Society of America.
- 1978-9 Alfred P. Sloan Fellow.
- 1992 Fellow of the Institute of Electrical & Electronics Engineers,
- 1990 Fellow of the American Physical Society,
- 1982 Fellow of the Optical Society of America.

UNIVERSITY HONORS:

Ph. d. (honoris causa)	McGill University, Montreal Canada	2018
Honorary Professorship	Nanjing University, China	2015
Ph. d. (honoris causa)	Hong Kong University of Science & Technology	2011
Ph. d. (honoris causa)	KTH, Royal Inst. of Tech., Stockholm, Sweden	2004

SPECIAL HONORS:

Yablonoitch’s paper: "Inhibited Spontaneous Emission in Solid-State Physics and Electronics," Phys. Rev. Lett., Vol. 58, 2059 (1987), has over 10,000 citations.
 It has the 2nd highest citation count of any paper ever published in Physical Review Letters.

NAMED LECTURESHIPS:

MIT Energy Initiative IHS Seminar, MIT, Cambridge Massachusetts	Feb. 8, 2017
Paint Branch Lecture, University of Maryland, College Park, Maryland	Oct. 25, 2016
Guptill Lecturer, Dalhousie University, Halifax, Nova Scotia	Oct. 17-18, 2016
Celsius Lecturer, Uppsala University, Sweden	Feb. 18-19, 2016
Nippon Sheet Glass Lecture, UCLA, Los Angeles	Jan. 29, 2016
A.W. Scott Lecturer, University of Cambridge, United Kingdom	May 13-17, 2013
Vincent Meyer Colloquium, Technion, Haifa, Israel	Mar. 26-29, 2012
Cave Memorial Lecture, Queens University, Kingston, Ontario, Canada	Mar. 24, 2011
Edison Lecture, Naval Research Laboratory	Dec. 7, 2010
Herman Haus Lecture, Massachusetts Institute of Technology	April 18, 2007
Walter Schottky Lecture, Aachen University, Germany	July 11, 2006
Morris Loeb Lecturer, Harvard University	April 5-9, 2005
Anson L. Clark Memorial Lecture at Univ. of Texas, Dallas	April 5-6, 2004
Edison Lecture, Notre-Dame University	Mar. 17, 2004
Moore Distinguished Scholar, California Institute of Technology	Sept. 2003-Jun. 2004
Clifford Paterson Lecturer of the Royal Society (London)	May 15-19, 2000

Research Highlights of Yablonovitch's career:

In his photovoltaic research, Yablonovitch introduced the $4(n^2)$ light-trapping factor that is in worldwide use, for almost all commercial solar panels. This factor increased the theoretical limits and practical efficiency of solar cells. $4n^2$ is based on statistical mechanics, and is sometimes called the "*Yablonovitch Limit*".

His mantra that "A Great Solar Cell Also Needs to be a Great LED", is the basis of the world record solar cells: single-junction 28.8% efficiency; dual-junction 31.5%; quadruple-junction 38.8% efficiency; all at 1 sun.

Yablonovitch introduced the idea that strained semiconductor lasers could have superior performance due to reduced valence band (hole) effective mass. Today, almost all semiconductor lasers use this concept, including for optical telecommunications, for DVD players, and in the ubiquitous red laser pointers. In almost every human interaction with the internet, optical telecommunication occurs by strained semiconductor lasers.

Yablonovitch is regarded as a Father of the Photonic Bandgap concept, and coined the term "Photonic Crystal". The geometrical structure of the first experimentally realized Photonic Bandgap, is sometimes called "*Yablonovite*".

In entrepreneurship, Yablonovitch is the Co-Founder of the following science-based companies:

Co-Founder of Ethertronics, Inc. San Diego, CA; antennas for portable electronics:
<http://www.ethertronics.com/> 2000-2018, acquired by AVX Inc.
Ethertronics was the major independent cellphone antenna manufacturer,
and had shipped $>2 \times 10^9$ antennas.

Co-Founder & Board Member of Luxtera, Inc. Carlsbad, CA; nano-photonic integration in
foundry Silicon: <http://www.luxtera.com/> 2001-present
Luxtera is the Global Leader in Silicon Photonics, shipping the most Silicon Photonics chips.

Co-Founder of Luminescent, Inc. Palo Alto, CA; a photolithography software company:
<http://www.luminescent.com/> 2002-2012, acquired by Synopsys Inc.
Luminescent provided the first successful use of sophisticated Mathematical Optimization for
the design of the Photo-masks used in semiconductor manufacturing. This was the beginning of
Inverse Electromagnetic Design. Since 2008 this has been employed for DRAM's, Flash
memory, and for Intel micro-processors.

Co-Founder of Alta Devices, Inc. Santa Clara, CA; thin film GaAs solar cells:
<http://www.altadevices.com/> 2008-2014, acquired by Hanergy Inc.
Alta Devices holds the world record for solar cell efficiency, single junction 28.8%; dual-
junction 31.5%; all at 1 sun, based on Yablonovitch's mantra "A Great Solar Cell Also Needs to
be a Great LED".

PATENTS:

1. "Nano-Fabricated Plasmonic Optical Transformer", (with H. Choo, S. Cabrini, P.J. Schuck, X. Liang,) U.S. Patent No. 9,052,450 (Jun. 9, 2015).
2. "Probes for Multi-Dimensional Spectroscopic Imaging, and Methods of Fabrication Thereof", (with A. Weber-Bargioni, S. Cabrini, W. Bao, M. Melli, and P.J. Schuck) U.S. Patent No. 8,984,661 (Mar. 17, 2015).
3. "Shielded Spiral Sheet Antenna Structure and Method", (with L. Declos and S. Rowson), U. S. Patent No. 6,677,915 (January 13, 2004).
4. "Magnetic Dipole Antenna Structure and Method", (with L. Declos and S. Rowson), U. S. Patent No. 6,567,053 (May 20, 2003).
5. "Circuit and Method for Eliminating Surface Currents on Metals", (with D. Sievenpiper), U. S. Patent No. 6,262,495 (July 17, 2001).
6. "Patterning Method for Epitaxial Lift-off Processing," (with T. J. Gmitter) U. S. Patent No. 5,201,996 (Apr. 13, 1993).
7. "Optical Reflector Structure, Device, Method of Fabrication, and Communications Method," U. S. Patent No. 5,172,267 (Dec. 15, 1992).
8. "Arsenic Sulfide Surface Passivation of III-V Semiconductors," (with B. G. Bagley and T. J. Gmitter) U. S. Patent No. 4,920,078 (Apr. 27, 1990).
9. "Passivation of Indium Gallium Arsenide Surfaces," (with T. J. Gmitter), U. S. Patent No. 4,843,037 (June 27, 1989).
10. "Method of Making a DH Laser With Strained Layers by MBE," U. S. Patent No. 4,804,639 (Feb. 14, 1989).
11. "Method for Lifting-Off Epitaxial Films" (with T. J. Gmitter), U. S. Patent No. 4,846,931 (July 11, 1989).
12. "Lift-off and Subsequent Bonding of Epitaxial Films," (with T. J. Gmitter) U. S. Patent No. 4,883,561 (Nov. 28, 1989).
13. "Passivation of Gallium Arsenide Surfaces," (with T. J. Gmitter and C. J. Sandroff), U. S. Patent No. 4,751,200 (June 14, 1988).
14. "Method for Producing an Electronically Passivated Surface on Crystalline Silicon Using a Fluorination Treatment and an Organic Overlayer, Using Hydrogen Fluoride," (with H. W. Deckman and B. R. Weinberger), U. S. Patent No. 4,608,097 (Aug. 26, 1986).
15. "Method for Making Optically Enhanced Thin Film Photovoltaic Device Using Lithographically Defined Random Surfaces," (with H. W. Deckman, H. Witzke, and C. Wronski), U. S. Patent No. 4,554,727 (Nov. 26, 1985).
16. "Inverted Optically Enhanced Solar Cell," U. S. Patent No. 4,525,593 (June 25, 1985).
17. "Short Laser Pulse Generation by Gas Breakdown Switching and Highly Selective Spectral Filtering," (with J. Goldhar), U. S. Patent No. 3,979,694 (Sept. 7, 1976).

PUBLICATIONS LIST:

1. Yablonovitch, E., Bloembergen, N., Wynne, J.J. "Dispersion of the Nonlinear Optical Susceptibility in n-InSb," Phys. Rev. B, Vol. 3(6), pp. 2060-2062, March 1971.
2. Yablonovitch, E. "Optical Dielectric Strength of Alkali-Halide Crystals Obtained by Laser-Induced Breakdown," Appl. Phys. Lett., Vol. 19(11), pp. 495-497, December 1971.
3. Yablonovitch, E., Flytzanis, C., Bloembergen, N. "Anisotropic Interference of Three-Wave and Double Two-Wave Frequency Mixing in GaAs," Phys. Rev. Lett., Vol. 29(13), pp. 865-868, September 1972.
4. Yablonovitch, E., Bloembergen, N. "Avalanche Ionization and the Limiting Diameter of Filaments Induced by Light Pulses in Transparent Media," Phys. Rev. Lett., Vol. 29(14), pp. 907-910, October 1972.
5. Yablonovitch, E. "Nonlinear Optics with the CO₂ Laser," PhD. Thesis, Harvard University, Division of Engineering and Applied Physics (1972).
6. Fradin, D.W., Yablonovitch, E., Bass, M. "Confirmation of an Electron Avalanche Causing Laser-induced Bulk Damage at 1.06 μ m," Appl. Optics, Vol. 12(4), pp. 700-709, April 1973.
7. Yablonovitch, E., Goldman, L.; Richfield, D.; and Bloembergen N., "Studies in Laser safety of new high-output systems. II. TEA CO₂ laser impacts," (Optics and Laser Technology, vol.5, (no.2), p.58-9, April 1973.
8. Yablonovitch, E. "Similarity Principles for Laser-Induced Breakdown in Gases," Appl. Phys. Lett., Vol. 23(3), pp. 121-122, August 1973.
9. Yablonovitch, E. "Spectral Broadening in the Light Transmitted through a Rapidly Growing Plasma," Phys. Rev. Lett., Vol. 31(14), pp. 877-879, October 1973.
10. L. Goldman, E. Yablonovitch, N. Bloembergen, D. Richfield, "Studies in Laser Safety of New High Output Systems, 2. TEA CO₂ Laser Impacts", Optics and Laser Technology, vol. 5, p. 58-59, (1973).
11. Yablonovitch, E. "Self-Phase Modulation of Light in a Laser-Breakdown Plasma," Phys. Rev. Lett., Vol. 32(20), pp. 1101-1104, May 1974.
12. Yablonovitch, E. "Self-Phase Modulation and Short-Pulse Generation from Laser-Breakdown Plasmas," Phys. Rev. A, Vol. 10(5), pp. 1888-1895, November 1974.
13. Yablonovitch, E., Goldhar, J. "Short CO₂ Laser Pulse Generation by Optical Free Induction Decay," Appl. Phys. Lett., Vol. 25(10), pp. 580-582, November 1974.
14. Kwok, H-S., Yablonovitch, E. "CO₂ Oscillator-Pulse Shaper-Amplifier System Producing 0.1 J in a 500 psec Laser Pulse," Rev. Sci. Instrum., Vol. 46(7), pp. 814-816, July 1975.
15. Yablonovitch, E. "Generation of a Short Optical Pulse of Arbitrary Shape and Phase Variation," IEEE J. Quantum Electron., Vol. QE-11, pp. 789-791, September 1975.
16. Yablonovitch, E. "Plasma Resonance in the X-Ray Emission from Gaseous Laser Targets," Phys. Rev. Lett., Vol. 35(20), pp. 1346-1349, November 1975.
17. Kwok, H.S., Yablonovitch, E. "Electrical Triggering of an Optical Breakdown Plasma with Subnanosecond Jitter," Appl. Phys. Lett., Vol. 27(11), pp. 583-585, December 1975.
18. Kolodner, P., Yablonovitch, E. "Proof of the Resonant Acceleration Mechanism for Fast Electrons in Gaseous Laser Targets," Phys. Rev. Lett., Vol. 37(26), pp. 1754-1757, December 1976.

19. Yablonovitch, E., "Collisionless Multiphoton Dissociation of SF₆: A Statistical Thermodynamics Process," *The Significance of Nonlinearity in the Natural Sciences*, pp. 207-226, 1977 (B. Kursunoglu, A. Perlmutter, L.F. Scott, eds., Plenum, New York)
20. Kolodner, P., Winterfeld, C., Yablonovitch, E. "Molecular Dissociation of SF₆ by Ultra-Short CO₂ Laser Pulses," *Optics Commun.*, Vol. 20(1), pp. 119-122, January 1977.
21. Kwok, H.S., Yablonovitch, E. "30-psec CO₂ Laser Pulses Generated by Optical Free Induction Decay," *Appl. Phys. Lett.*, Vol. 30(3), pp. 158-160, February 1977.
22. Black, J., Yablonovitch, E. "Avalanche Initiating Electron Produced by Laser-Induced Tunneling," *IEEE J. of Quantum Electron.*, pp. 117-119, April 1977.
23. Kwok, H.S., Yablonovitch, E. "A Simple Self-Triggered Plasma Shutter," *Optics Commun.*, Vol. 21(2), pp. 252-254, May 1977.
24. Black, J.G., Yablonovitch, E., Bloembergen, N. "Collisionless Multiphoton Dissociation of SF₆: A Statistical Thermodynamic Process," *Phys. Rev. Lett.*, Vol. 38(20), pp. 1131-1134, May 1977.
25. Yablonovitch, E. "Laser-Pulse Requirements for Coherent and Mode-Selective Excitation in the Quasicontinuum of Polyatomic Molecules," *Optics Lett.*, Vol. 1(3), pp. 87-89, September 1977.
26. Yablonovitch, E., "The Physics of Laser-Plasma Interaction in Gaseous Targets," in *Laser Interaction and Related Plasma Phenomena, Vol. 4* (H. J. Schwarz and H. Hora, eds., Plenum, 1977).
27. Shultz, M.J., Yablonovitch, E. "A Statistical Theory for Collisionless Multiphoton Dissociation of SF₆," *J. Chem. Phys.*, Vol. 68(7), pp. 3007-3013, April 1978.
28. Bloembergen, N., Yablonovitch, E. "Infrared-Laser-Induced Unimolecular Reactions," *Physics Today*, Vol. 31(5), pp. 23-30, May 1978.
29. Kwok, H.S., Yablonovitch, E. "Collisionless Intramolecular Vibrational Relaxation in SF₆," *Phys. Rev. Lett.*, Vol. 41(11), pp. 745-749, September 1978.
30. Kolodner, P., Kwok, H.S., Black, J.G., Yablonovitch, E. "Exact Decomposition of a Gaussian-Averaged Nonlinear Function," *Optics Letters*, Vol. 4(1), pp. 38-39, January 1979.
31. Black, J.G., Kolodner, P., Shultz, M.J., Yablonovitch, E., Bloembergen, N. "Collisionless Multiphoton Energy Deposition and Dissociation of SF₆," *Phys. Rev. A*, Vol. 19(2), pp. 704-716, February 1979.
32. Tsao, J.Y., Sharp, R.C., Yablonovitch, E. "Digital Feedback Stabilization of a Single-Axial-Mode CO₂ TEA," *Rev. Sci. Instrum.*, Vol. 50(8), pp. 1023-1024, August 1979.
33. Kolodner, P., Yablonovitch, E. "Two-Dimensional Distribution of Self-Generated Magnetic Fields Near the Laser-Plasma Resonant-Interaction Region," *Phys. Rev. Lett.*, Vol. 43(19), pp. 1402-1403, November 1979.
34. Burak, I., Tsao, J., Prior, Y., Yablonovitch, E. "Multiphoton Vibrational Pumping of Optically Prepared NO₂ Molecules," *Chem. Phys. Letts.*, Vol. 68(1), pp. 31-34, December 1979.
35. Tsao, J.Y., Black, J.G., Yablonovitch, E. "Observation of Direct Infrared Multiphoton Pumping of the Triplet Manifold of Biacetyl," *J. Chem. Phys.*, Vol. 73(5), pp. 2076-2083, September 1980.
36. Yablonovitch, E. "Thermodynamics of the Fluorescent Planar Concentrator," *J. Opt. Soc. Am.*, Vol. 70(11), pp. 1362-1363, November 1980.

37. Kolodner, P., Yablonovitch, E. "Nonrandom Suprathermal Electron Emission in Resonance Absorption," *Phys. Rev. Letts.*, Vol. 45(22), pp. 1790-1794, December 1980.
38. Kolodner, P., Yablonovitch, E. "Hot-Electron Production and Resonance Absorption of Laser Light in the Shock-Front Targets," *Phys. Fluids*, Vol. 24(4), pp. 759-773, April 1981.
39. Sharp, R.C., Yablonovitch, E., Bloembergen, N. "Picosecond Infrared Double Resonance Studies on SF₆," *J. Chem. Phys.*, Vol. 74(10), pp. 5357-5365, May 1981.
40. Kwok, H.S., Yablonovitch, E., Bloembergen, N. "Study of Collisionless Multiphoton Absorption in SF₆ using Picosecond CO₂ Laser Pulses," *Phys. Rev. A*, Vol. 23(6), pp. 3094-3106, June 1981.
41. Yablonovitch, E., Cody, G.D. "Intensity Enhancement in Textured Optical Sheets for Solar Cells," *IEEE Trans. Elec. Dev.*, Vol. 29, pp. 300, 1982.
42. Yablonovitch, E. "Statistical Ray Optics," *J. of the Opt. Soc. Am.*, Vol. 72, pp. 899, 1982.
43. Yablonovitch, E., Tiedje, T., Witzke, H. "The Meaning of the Photovoltaic Bandgap for Amorphous Semiconductors," *Appl. Phys. Lett.*, Vol. 41, pp. 953, 1982.
44. Sharp, R.C., Yablonovitch, E., Bloembergen, N. "Picosecond Infrared Double Resonance Studies on Pentafluorobenzene," *J. Chem. Phys.*, Vol. 76(5), pp. 2147-2154, March 1982.
45. Yablonovitch, E., Deckman, H.W., Roxlo, C.B. "Maximum Statistical Increase of Optical Absorption in Textured Semiconductor Films," *Optics Lett.*, Vol. 8, pp. 491, 1983.
46. Yablonovitch, E., Deckman, H.W., Wronski, C., Witzke, H. "Optically Enhanced a-SiHx Solar Cells," *Appl. Phys. Lett.*, Vol. 42, pp. 968, 1983.
47. C. B. Roxlo and E. Yablonovitch, "Thermodynamics of the Daylight Pumped Laser," *Optics Lett.*, Vol. 8, pp. 271, 1983.
48. Tiedje, T., Yablonovitch, E., Cody, G.D., Brooks, B.G. "Limiting Efficiency of Silicon Solar Cells," *IEEE Trans. Elec. Dev.*, Vol. 31, pp. 711, 1984.
49. Yablonovitch, E., Gmitter, T. "Ribbon-to-Ribbon Float Zone Single Crystal Growth Stabilized by a Thin Silicon Dioxide Skin," *Appl. Phys. Lett.*, Vol. 45, pp. 63, 1984.
50. Yablonovitch, E., Gmitter, T. "Wetting Angles and Surface Tension in the Crystallization of Thin Liquid Films," *J. Electrochem. Soc.*, Vol. 131, pp. 2625, 1984.
51. Yablonovitch, E., Gmitter, T., Swanson, R.M., Kwark, Y.H. "A 720 mV Open Circuit Voltage SiO_x/c-Si/SiO_x Double Heterostructure Solar Cell," *Appl. Phys. Lett.*, Vol. 47, pp. 1211, 1985.
52. Yablonovitch, E., Gmitter, T. "A Study of n(+)-SIPOS/p-Si Heterojunctions," *IEEE Elec. Dev. Lett.*, Vol. 6, pp. 597, 1985.
53. Weinberger, B.R., Deckman, H.W., Gmitter, T., Kobasz, W., Garoff, S. "The Passivation of Electrically Active Sites on the Surface of Crystalline Silicon by Fluorination," *J. Vac. Sci. Technology*, Vol. A3, pp. 887, 1985.
54. Simpson, T.B., Black, J.G., Burak, I., Yablonovitch, E., Bloembergen, N. "Infrared Multiphoton Excitation of Polyatomic Molecules," *J. Chem. Phys.*, Vol. 83(2), pp. 628-640, July 1985.
55. Yablonovitch, E., Swanson, R.M., Eades, W.D., Weinberger, B.R. "Electron-Hole Recombination at the Si-SiO₂ Interface," *Appl. Phys. Lett.*, Vol. 48, pp. 245, 1986.
56. Yablonovitch, E., Kane, E.O. "Reduction of Lasing Threshold Current Density by the Lowering of Valence Band Effective Mass," *J. Lightwave Technol.*, Vol. 4, pp. 504, 1986 (Erratum LT-4, pp. 961, 1986).

57. Yablonovitch, E. "Reply to 'Comments on Intensity Enhancement in Textured Optical Sheets'", IEEE Trans. Elec. Dev., Vol. 33, pp. 313, 1986.
58. Yablonovitch, E., Allara, D.L., Chang, C.C., Gmitter, T., Bright, T.B. "Unusually Low Surface-Recombination Velocity on Silicon and Germanium Surfaces," Phys. Rev. Letts., Vol. 57(2), pp. 249-252, July 1986.
59. Yablonovitch, E., Gmitter, T. "Auger Recombination in Silicon at Low Carrier Densities," Appl. Phys. Lett., Vol. 49(10), pp. 587-589, September 1986.
60. Yablonovitch, E., Gmitter, T., Harbison, J.P., Bhat, R. "Extreme Selectivity in the Lift-Off of Epitaxial GaAs Films," Appl. Phys. Lett., Vol. 51, pp. 2222, 1987.
61. Yablonovitch, E., Bhat, R., Harbison, J.P., Logan, R.A. "Survey of Defect-Mediated Recombination Lifetimes in GaAs Epilayers Grown by Different Methods," Appl. Phys. Lett., Vol. 50(17), pp. 1197-1199, April 1987.
62. Yablonovitch, E. "Inhibited Spontaneous Emission in Solid-State Physics and Electronics," Phys. Rev. Letts., Vol. 58(20), pp. 2059-2062, May 1987.
63. Yablonovitch, E., Sandroff, C.J., Bhat, R., Gmitter, T. "Nearly Ideal Electronic Properties of Sulfide Coated GaAs Surfaces," Appl. Phys. Lett., Vol. 51(6), pp. 439-441, August 1987.
64. Skromme, B.J., Sandroff, C.J., Yablonovitch, E., Gmitter, T. "Effects of Passivating Ionic Films on the Photoluminescence Properties of GaAs," Appl. Phys. Lett., Vol. 51(24), pp. 2022-2024, December 1987.
65. Yablonovitch, E. "Energy Conservation in the Picosecond and Subpicosecond Photoelectric Effect," Phys. Rev. Letts., Vol. 60(9), pp. 795-796, February 1988.
66. Yablonovitch, E., Cox, H.M., Gmitter, T.J. "Nearly Ideal Electronic Surfaces on Naked In_{0.53}Ga_{0.47}As Quantum Wells," Appl. Phys. Lett., Vol. 52(12), pp. 1002-1004, March 1988.
67. Yablonovitch, E., Kane, E.O. "Band Structure Engineering of Semiconductor Lasers for Optical Communications," J. Lightwave Technol., Vol. 6(8), pp. 1292-1299, August 1988.
68. Gmitter, T.J., Yablonovitch, E., Heller, A. "Recombination Velocities on GaAs<100> Surfaces Immersed in Aqueous Solutions," J. Electrochem. Soc., Vol. 135(9), pp. 2391-2392, September 1988.
69. Yablonovitch, E., Gmitter, T.J., Bhat, R. "Inhibited and Enhanced Spontaneous Emission from Optically Thin AlGaAs/GaAs Double Heterostructures," Phys. Rev. Lett., Vol. 61(22), pp. 2546-2549, November 1988.
70. Yablonovitch, E., Palmstrom, C. J., Schwarz, S. A., Marshall, E. D. , Harbison, J. P., Schwartz, C. L., Florez, L. ., Gmitter, T. J, Wang, L. C., and Lau, S. S. "A High Depth Resolution Backside Secondary Ion Mass Spectrometry Technique Used for Studying Metal/GaAs Contacts," Mat. Res. Soc. Symp. Proc. 126, 283, 1988.
71. Yablonovitch, E., Gmitter, T. J, "Minority Carrier Lifetime of Heterostructures, Surfaces, Interfaces and Bulk Wafers," in Proc. of the Symposium on Diagnostic Techniques for Semiconductor Materials and Devices, ed. by T. J. Shaffner and D. K. Schroder, Proc. vol. 88-20, 207, The Electrochem. Soc., Pennington, N. J. 1988.
72. Schumacher, H., Gmitter, T.J., LeBlanc, H.P., Bhat, R., Koza, M. "A High-Speed InP/InGaAs Photodiode on a Sapphire Substrate," Elec. Lett., Vol. 25, pp. 1653, 1989.
73. Yablonovitch, E., Heritage, J.P., Aspnes, D.E., Yafet, Y. "Virtual Photoconductivity," Phys. Rev. Lett., Vol. 63, pp. 976, 1989.

74. Yablonovitch, E., Kash, K., Gmitter, T.J., Florez, L.T., Harbison, J.P., Colas, E. "Regrowth of GaAs Quantum Wells on GaAs Lift-off Films 'Van Der Waals Bonded' to Silicon Substrates," *Electronics Letts.*, Vol. 25, pp. 171, January 1989.
75. Morais, P.C., Cox, H.M., Bastos, P.L., Hwang, D.M., Worlock, J.M., Yablonovitch, E. "Optical Investigation of Atomic Steps in Ultrathin InGaAs/InP Quantum Wells Grown by Vapor Levitation Epitaxy," *Appl. Phys. Lett.*, Vol. 54(5), pp. 442-444, January 1989.
76. Yablonovitch, E., Kapon, E., Gmitter, T.J., Yun, C.P., Bhat, R. "Double Heterostructure GaAs/AlGaAs Thin Film Diode Lasers on Glass Substrates," *IEEE Phot. Technol. Lett.*, Vol. 1(2), pp. 41-42, February 1989.
77. Yablonovitch, E., Skromme, B.J., Bhat, R., Harbison, J.P., Gmitter, T.J. "Band Bending, Fermi Level Pinning, and Surface Fixed Charge on Chemically Prepared GaAs Surfaces," *Appl. Phys. Lett.*, Vol. 54(6), pp. 555-557, February 1989.
78. Yablonovitch, E. "Accelerating Reference Frame for Electromagnetic Waves in a Rapidly Growing Plasma: Unruh-Davies-Fulling-DeWitt Radiation and the Nonadiabatic Casimir Effect," *Phys. Rev. Lett.*, Vol. 62(15), pp. 1742-1745, April 1989.
79. Yablonovitch, E. "The Chemistry of Solid-State Electronics," *Science*, Vol. 246, pp. 347-351, October 1989.
80. Yablonovitch, E., Gmitter, T.J. "Photonic Band Structure: The Face-Centered-Cubic Case," *Phys. Rev. Lett.*, Vol. 63(18), pp. 1950-1953, October 1989.
81. Yi-Yan, A., Chan, W.K., Gmitter, T.J., Florez, L.T., Jackel, J.L., Yablonovitch, E., Bhat, R., Harbison, J.P. "Grafted GaAs Detectors on Lithium Niobate and Glass Optical Waveguides," *IEEE Phot. Tech. Lett.*, Vol. 1(11), pp. 379-380, November 1989.
82. Smestad, G., Ries, H., Winston, R., Yablonovitch, E. "The Thermodynamic Limits of Light Concentrators," *Solar Energy Materials*, Vol. 21, pp. 99-111, 1990.
83. Yablonovitch, E., Hwang, D.M., Gmitter, T.J., Florez, L.T., Harbison, J.P. "Van Der Waals Bonding of GaAs Epitaxial Lift-off Films Onto Arbitrary Substrates," *Appl. Phys. Lett.*, Vol. 56, pp. 2419, 1990.
84. Palmstrom, C.J., Schwarz, S.A., Yablonovitch, E., Harbison, J.P., Schwartz, C.L., Florez, L.T., Gmitter, T.J., Marshall, E.D., Lau, S.S. "Ge Redistribution in Solid-Phase Ge/Pd/GaAs Ohmic Contact Formation," *J. Appl. Phys.*, Vol. 67(1), pp. 334-339, January 1990.
85. Chan, W.K., Yi-Yan, A., Gmitter, T.J., Florez, L.T., Jackel, J.L., Hwang, D.M., Yablonovitch, E., Bhat, R., Harbison, J.P. "Optical Coupling of GaAs Photodetectors Integrated with Lithium Niobate Waveguides," *IEEE Phot. Tech. Lett.*, Vol. 2(3), pp. 194-196, March 1990.
86. Yablonovitch, E., Gmitter, T.J. "Photonic Band Structure: the Face-Centered-Cubic Case," *J. Opt. Soc. Am. A*, Vol. 7(9), pp. 1792-1800, September 1990.
87. Zah, C.E., Bhat, R., Cheung, K.W., Andreadakis, N.C., Favire, F.J., Menocal, S.G., Yablonovitch, E., Hwang, D.M., Koza, M., Gmitter, T.J., Lee, T.P. "Low-Threshold (<92 A/cm²) 1.6 μ m Strained-Layer Single Quantum Well Laser Diodes Optically Pumped by a 0.8 μ m Laser Diode," *Appl. Phys. Lett.*, Vol. 57(16), pp. 1608-1609, October 1990.
88. Chuang, H.L., Carpenter, M.S., Melloch, M.R., Lundstrom, M.S., Yablonovitch, E., Gmitter, T.J. "Surface Passivation Effects of As₂S₃ Glass on Self-Aligned AlGaAs/GaAs Heterojunction Bipolar Transistors," *Appl. Phys. Lett.*, Vol. 57(20), pp. 2113-2115, November 1990.

89. Yablonovitch, E., Gmitter, T.J., Bagley, B.G. "As₂S₃/GaAs, a New Amorphous/Crystalline Heterojunction for the III-V Semiconductors," *Appl. Phys. Lett.*, Vol. 57(21), pp. 2241-2243, November 1990.
90. Yablonovitch, E., "Black Hole Radiation: Can Nonlinear Optics Produce a Similar Effect in Semiconductors?" "RESONANCES, a Volume in Honor of the 70th Birthday of N. Bloembergen," ed. by M. D. Levenson, E. Mazur, P. S. Pershan and Y. R. Shen, (World Scientific Publishers, Teaneck, N.J. 1990).
91. Stellweg, T.B., Dodd, P.E., Carpenter, M.S., Lundstrom, M.S., Pierret, R.F., Melloch, M.R., Yablonovitch, E., Gmitter, T.J., "Effects of Perimeter Recombination on GaAs-Based Solar Cells," *Proc. of the 1990 Photovoltaic Specialists Conf.*, (IEEE, New York, 1990)
92. Yablonovitch, E., "Epitaxial Liftoff of GaAs, Chapt. 17.3" in *Properties of Gallium Arsenide*, 2nd ed. p. 484, Inspec, Inst. of Elec. Eng., London, 1990.
93. Yablonovitch, E., "Photonic Band Structure" in "Analogies in Optics and Microelectronics," ed. by W. van Haeringen and D. Lenstra, Kluwer, Hingham MA, pp.117-133, 1990.
94. Yablonovitch, E., Smestad, G., Ries, G., Winston, R., "The thermodynamic limits of light concentrators," *Solar Energy Materials* 21, pp. 99-111 (1990).
95. Yablonovitch, E., Gmitter, T.J., Leung, K.M. "Photonic Band Structure: The Face-Centered-Cubic Case Employing Non-Spherical Atoms," *Phys. Rev. Lett.*, Vol. 67, pp. 2295, 1991.
96. Yafet, Y., Yablonovitch, E. "Virtual Photoconductivity Due to Intense Optical Radiation Transmitted Through a Semiconductor," *Phys. Rev. B*, Vol. 43(15), pp. 12 480-12 489, May 1991.
97. Yablonovitch, E., Leung, K.M. "Hope for Photonic Bandgaps," *Nature*, Vol. 351, pp. 278, May 1991.
98. Yablonovitch, E., Gmitter, T.J., Leung, K.M. "Photonic Band Structure: The Face-Centered-Cubic Case Employing Nonspherical Atoms," *Phys. Rev. Lett.*, Vol. 67(17), pp. 2295-2298, October 1991.
99. Park, R.M., Troffer, M.B., Yablonovitch, E., Gmitter, T.J. "Noncontact Electrical Characterization of Low-Resistivity p-type ZnSe:N Grown by Molecular Beam Epitaxy," *Appl. Phys. Lett.*, Vol. 59(15), pp. 1896-1898, October 1991.
100. Yablonovitch, E., Gmitter, T.J., Meade, R.D., Rappe, A.M., Brommer, K.D., Joannopoulos, J.D. "Donor and Acceptor Modes in Photonic Band Structure," *Phys. Rev. Lett.*, Vol. 67(24), pp. 3380-3383, December 1991.
101. Yablonovitch, E., Sands, T., Hwang, D.M., Schnitzer, I., Gmitter, T.J., Shastry, S.K., Hill, D.S., Fan, J.C.C. "Van der Waals Bonding of GaAs on Pd Leads to a Permanent, Solid-Phase-Topotaxial, Metallurgical Bond," *Appl. Phys. Lett.*, Vol. 59(24), pp. 3159-3161, December 1991.
102. Yablonovitch, E., Leung, K.M., "Photonic band structure: Non-Spherical atoms in the face-centered-cubic case," *Physica B* 175, pp. 81-86, 1991.
103. Yablonovitch, E., Gmitter, T.J., Leung, K.M., Meade, R.D., Rappe, A.M., Brommer, K.D., Joannopoulos, J.D. "Electromagnetic Microresonators in 3-Dimensional Photonic Band Structure," *Optical and Quantum Elec.*, Vol. 24, pp. S273-S283, 1992.

104. Yablonovitch, E., Gmitter, T.J. "A Contactless Minority Lifetime Probe of Heterostructures, Surfaces, Interfaces and Bulk Wafers," *Solid-State Elec*, Vol. 35(3), pp. 261-267, 1992.
105. Yablonovitch, E., Bhat, R., Zah, C.E., Gmitter, T.J., Koza, M.A. "Nearly Ideal InP/In_{0.53}Ga_{0.47}As Heterojunction Regrowth on Chemically Prepared In_{0.53}Ga_{0.47}As Surfaces," *Appl. Phys. Lett.*, Vol. 60(3), pp. 371-373, January 1992.
106. Ersen, A., Schnitzer, I., Yablonovitch, E., Gmitter, T. "Direct Bonding of GaAs Films on Silicon Circuits by Epitaxial Liftoff," *Solid-State Electronics*, Vol. 36(12), pp. 1731-1739, 1993.
107. Yablonovitch, E., Stringfellow, G.B., Greene, J.E. "Growth of Photovoltaic Semiconductors," *J. Elec. Mater.*, Vol. 22(1), pp. 49-55, 1993.
108. Yablonovitch, E. "Photonic Band-Gap Crystals," *J. Phys.: Condens. Matter*, Vol. 5, pp. 2443-2460, 1993.
109. Schnitzer, I., Yablonovitch, E., Caneau, C., Gmitter, T.J. "Ultrahigh Spontaneous Emission Quantum Efficiency, 99.7% Internally and 72% Externally, from AlGaAs/GaAs/AlGaAs Double Heterostructures," *Appl. Phys. Lett.*, Vol. 62(2), pp. 131-133, January 1993.
110. Yablonovitch, E. "Photonic Band-gap Structures," *J. Opt. Soc. Am. B*, Vol. 10 (2), pp. 283-295, February 1993.
111. Schnitzer, I., Yablonovitch, E., Caneau, C., Gmitter, T.J., Scherer, A. "30% External Quantum Efficiency from Surface Textured, Thin-Film Light-Emitting Diodes," *Appl. Phys. Lett.*, Vol. 63(16), pp. 2174-2176, October 1993.
112. Brown, E.R., Parker, C.D., Yablonovitch, E., "Radiation Properties Of A Planar Antenna On A Photonic-Crystal Substrate," *J. Opt. Soc., Am. B*10, 404, 1993.
113. Yablonovitch, E. "Photonic Crystals," *J. Modern Optics*, Vol. 41(2), pp. 173-194, 1994.
114. Yablonovitch, E., "Electronic Materials," p. 219 in Volume 9 of the Kirk-Othmer Encyclopedia of Chemical Technology, 4th. Ed., John-Wiley and Sons, New York, 1994.
115. Yablonovitch, E., "Light Emission in Photonic Crystal Micro-Cavities," in *Confined Electrons and Photons: New Physics and Applications*, Proceedings of the International School of Materials Science and Technology at the Ettore Majorana Centre, Erice, Sicily, Italy, July 1993. (Plenum, New York, 1994).
116. Arbet-Engels, V., Chang, W., Yablonovitch, E., Sullivan, G.J., Swed, M.K., Chang, M.F. "Flexible, Thin-Film, GaAs Hetero-Junction Bipolar Transistors Mounted on Natural Diamond Substrates," *Solid-State Electronics*, Vol. 38(11), pp. 1972-1974, 1995.
117. Chan, W. K., Yablonovitch, E., "Epitaxial Liftoff and Related Techniques," Chap. 8 on p. 297 in *Integrated Optoelectronics*, ed. by M. Dagenais, R. F. Leheny and J. Crow, Academic Press, New York, 1995.
118. Cheng, C.C., Arbet-Engels, V., Scherer, A., Yablonovitch, E. "Nanofabricated Three Dimensional Photonic Crystals Operating at Optical Wavelengths," *Physica Scripta*, Vol. T68, pp. 17-20, 1996.
119. Sievenpiper, D.F., Sickmiller, M.E., Yablonovitch, E. "3D Wire Mesh Photonic Crystals," *Physical Review Letters*, Vol. 76(14), pp. 2480-2483, April 1996.
120. Yablonovitch, E., Sievenpiper, D.F. "Knitting a Finer Net for Photons," *Nature*, Vol. 383, pp. 665-666, October 1996.

121. Cheng, C.C., Scherer, A., Arbet-Engels, V., Yablonovitch, E. "Lithographic Band Gap Tuning in Photonic Band Gap Crystals," J. Vac. Sci. Technol., Vol. 14(6), pp. 4110-4114, November/December, 1996.
122. Yablonovitch, E., "Epitaxial GaAs Liftoff", in Properties of Gallium Arsenide, 3rd Ed., edited by M.R. Brozel, G.E. Stillman,; INSPEC, The Inst. of Elec. Eng., London, pp. 672-676, 1996
123. Yang, H.-Y. D., Alexopoulos, N.G., Yablonovitch, E. "Photonic Band-Gap Materials for High-Gain Printed Circuit Antennas," IEEE Transactions on Antennas and Propagation, Vol. 45(1), pp. 185-187, January 1997.
124. Boroditsky, M., Yablonovitch, E. "Photonic Crystals Boost Light Emission," Phys. World, Vol. 10, No. 7, pp. 25, July 1997.
125. Cheng, C.C., Scherer, A. R.-C Tyan, Fainman, Y., Witzgall, G., Yablonovitch, E. "New fabrication techniques for high quality photonic crystals," J. Vac. Sci. Technol. B, Vol. 15(6), pp. 2764-2767, November/December, 1997.
126. Sievenpiper, D.F., Lam, C.F., Yablonovitch, E. "Two-dimensional photonic-crystal vertical-cavity array for nonlinear optical image processing," Applied Optics, vol.37, (no.11), Opt. Soc. America, p.2074-8, 10 April 1998.
127. Lam, C.F., Vrijen, R.B., Chang-Chien, P.P.L., Sievenpiper, D.F., Yablonovitch, E. "A tunable wavelength demultiplexer using logarithmic filter chains," Journal of Lightwave Technology, vol.16, (no.9), IEEE, p.1657-62, Sept. 1998.
128. Contopanagos, H., Alexopoulos, N.G., Yablonovitch, E. "High-Q radio-frequency structures using one-dimensionally periodic metallic films," IEEE Transactions on Microwave Theory and Techniques, vol.46, (no.9), IEEE, p.1310-12, Sept. 1998.
129. Wang, S., Erlig, H., Fetterman, H.R., Yablonovitch, E., Grubsky, V., Starodubov, D.S., Feinberg, J. "Group velocity dispersion cancellation and additive group delays by cascaded fiber Bragg gratings in transmission," IEEE Microwave and Guided Wave Letters, vol.8, (no.10), IEEE, p.327-9, Oct. 1998.
130. Yablonovitch, E. "Engineered omnidirectional external-reflectivity spectra from one-dimensional layered interference filters," Optics Letters, vol.23, (no.21), Opt. Soc. America, p.1648-9, 1 Nov. 1998.
131. Witzgall, G., Vrijen, R., Yablonovitch, E., Doan, V., Schwartz, B.J. "Single-shot two-photon exposure of commercial photoresist for the production of three-dimensional structures," Optics Letters, vol.23, (no.22), Opt. Soc. America, p.1745-7, 15 Nov. 1998.
132. Coccioli, R., Boroditsky, M., Kim, K.W., Rahmat-Samii, Y., Yablonovitch, E. "Smallest possible electromagnetic mode volume in a dielectric cavity," IEE Proceedings-Optoelectronics, vol.145, (no.6), IEE, p.391-7, Dec. 1998.
133. Sievenpiper, D., Yablonovitch, E., Winn, J., Fan, S., Villeneuve, P., Joannopoulos, J., "3D Metallo-Dielectric Photonic Crystals With Strong Capacitive Coupling Between Metallic Islands," Phys. Rev. Lett. 80, 2829, 1998.
134. Lam, C.F., Tong, D.T.K., Wu, M.C., Yablonovitch, E., "Experimental Demonstration of Bipolar Optical CDMA System Using a Balanced Transmitter and Complementary Spectral Encoding," IEEE Photonics Technology Letters, vol.10, No.10, pp. 1504-1506 (October 1998).
135. Qian, Y., Coccioli, R., Sievenpiper, D., Radisic, V., Yablonovitch, E., Itoh, T. "A microstrip patch antenna using novel photonic band-gap structures," Microwave Journal,

- Euro-Global Edition, vol.42, (no.1), Horizon House Publications, p.66, 68, 70, 72, 74, 76, Jan. 1999.
136. Wang, S., Erlig, H., Fetterman, H.R., Yablonovitch, E., Grubsky, V., Starodubov, D.S., Feinberg, J. "Measurement of the temporal delay of a light pulse through a one-dimensional photonic crystal," *Microwave and Optical Technology Letters*, vol.20, (no.1), Wiley, p.17-21, 5 Jan. 1999.
 137. Yablonovitch, E., Vrijen, R.B. "Optical projection lithography at half the Rayleigh resolution limit by two-photon exposure," *Optical Engineering*, vol.38, (no.2), SPIE, p.334-8, Feb. 1999.
 138. Boroditsky, M., Ragan, R., Yablonovitch, E. "Absorption enhancement in ultra-thin textured AlGaAs films," *Solar Energy Materials and Solar Cells*, vol.57, (no.1), Elsevier, p.1-7, 22 Feb. 1999.
 139. Wu, P.W., Dunn, B., Yablonovitch, E., Doan, V., Schwartz, B.J. "Two-photon exposure of photographic film," *Journal of the Optical Society of America B (Optical Physics)*, vol.16, (no.4), Opt. Soc. America, p.605-8, April 1999.
 140. Chen, C.H., Hargis, M., Woodall, J.M., Melloch, M.R., Reynolds, J.S., Yablonovitch, E., Wang, W. "GHz bandwidth GaAs light-emitting diodes," *Applied Physics Letters*, vol.74, (no.21), AIP, p.3140-2, 24 May 1999.
 141. Chang, W., Kao, C.P., Pike, G.A., Slone, J.A., Yablonovitch, E. "Vapor phase epitaxial liftoff of GaAs and silicon single crystal films," *Solar Energy Materials and Solar Cells*, vol.58, (no.2), Elsevier, p.141-6, June 1999.
 142. Contopanagos, A., Yablonovitch, E., Alexopoulos, N.G. "Electromagnetic properties of periodic multilayers of ultrathin metallic films from dc to ultraviolet frequencies," *Journal of the Optical Society of America A (Optics, Image Science and Vision)*, vol.16, (no.9), Opt. Soc. America, p.2294-306, Sept. 1999.
 143. Boroditsky, M., Krauss, T.F., Coccioli, R., Bhat, R., Yablonovitch, E. "Light extraction from optically pumped light-emitting diode by thin-slab photonic crystals," *Applied Physics Letters*, vol.75, (no.8), AIP, p.1036-8, 23 Aug. 1999.
 144. Gontijo, I., Boroditsky, M., Yablonovitch, E., Keller, S., Mishra, U.K., DenBaars, S.P. "Coupling of InGaN Quantum-Well Photoluminescence to Silver Surface Plasmons," *Physical Review B*, vol.60, pp.11564-7, (1999).
 145. Yablonovitch, E., "Liquid Versus Photonic Crystals", *Nature*, vol. 401, (no.6753), Macmillan Magazines, Ltd.; p. 539, 541, October 1999.
 146. Sievenpiper, D., Lijun Zhang, Broas, R.F.J., Alexopolous, N.G., Yablonovitch, E. "High-impedance electromagnetic surfaces with a forbidden frequency band," *IEEE Transactions on Microwave Theory and Techniques*, vol.47, (no.11), IEEE, p.2059-74, Nov. 1999.
 147. Boroditsky, M., Vrijen, R., Krauss, T.F., Coccioli, R., Bhat, R., Yablonovitch, E. "Spontaneous emission extraction and Purcell enhancement from thin-film 2-D photonic crystals," *Journal of Lightwave Technology*, vol.17, (no.11), IEEE, p.2096-112, Nov. 1999.
 148. Scherer, A., Doll, T., Yablonovitch, E., Everitt, H., Higgins, J., "Guest Editorial: Electromagnetic Crystal Structures, Design, Synthesis, and Applications", *Journal of Lightwave Technology*, vol.17, p. 1928, no. 11, November 1999, and *IEEE Trans. Microwave Theory & Techniques*, vol. 47, p. 2057, November 1999.
 149. Lam, C.F., Yablonovitch, E., "Multi-Wavelength Optical Code Division Multiplexing", *Future Trends in Microelectronics; A Wiley-Interscience Publication*, pp. 407-421, 1999.

150. Boroditsky, M., Gontijo, I., Jackson, M., Vrijen, R., Yablonovitch, E., Krauss, T., Chuan-Cheng Cheng, Scherer, A., Bhat, R., Krames, M. "Surface recombination measurements on III-V candidate materials for nanostructure light-emitting diodes," *Journal of Applied Physics*, vol.87, (no.7), AIP, p.3497-504, 1 April 2000.
151. Narasimha, A., Meng, X.J., Wu, M.C., Yablonovitch, E. "Tandem single sideband modulation scheme for doubling spectral efficiency of analogue fibre links," *Electronics Letters*, vol.36, (no.13), IEE, p.1135-6, 22 June 2000.
152. Vrijen, R., Yablonovitch, L., Kang Wang, Hong Wen Jiang, Balandin, A., Roychowdhury, V., Mor, T., DiVincenzo, D. "Electron-spin-resonance transistors for quantum computing in silicon-germanium heterostructures," *Physical Review A* vol.62, (no.1), p.012306/1-10, July 2000.
153. Yablonovitch, E. "How to Be Truly Photonic?," *Science*, Vol. 289, pp. 557, 559, 28 July 2000.
154. Wu, P.W., Cheng Wei, Martini, I.B., Dunn, B., Schwartz, B.J., Yablonovitch, E. "Two-photon photographic production of three-dimensional metallic structures within a dielectric matrix," *Advanced Materials*, vol.12, (no.19), VCH Verlagsgesellschaft, p.1438-41, 2 Oct. 2000.
155. Wu, P., Dunn, B., Doan, V., Schwartz, B., Yamane, Yablonovitch, E., "Controlling the Spontaneous Precipitation of Silver Nanoparticles in Sol-Gel Materials," *Journal of Sol-Gel Science and Technology* 19, p. 249-252., 2000.
156. Kosaka, H., Kiselev, A.A., Baron, F.A., Ki Wook Kim, Yablonovitch, E. "Electron g factor engineering in III-V semiconductors for quantum communications," *Electronics Letters*, vol.37, (no.7), IEE, p.464-5, 29 March 2001.
157. Vrijen, R., Yablonovitch, E. "A spin-coherent semiconductor photodetector for quantum communication," *Physica E*, vol.10, (no.4), Elsevier, p.569-75, June 2001.
158. Broas, R.F.J., Sievenpiper, D.F., Yablonovitch, E. "A high-impedance ground plane applied to a cellphone handset geometry," *IEEE Transactions on Microwave Theory and Techniques*, vol.49, (no.7), IEEE, p.1262-5, July 2001.
159. Jiang, H.W., Yablonovitch, E. "Gate-controlled electron spin resonance in GaAs/Al_xGa_{1-x}As heterostructures," *Physical Review B (Condensed Matter and Materials Physics)*, vol.64, (no.4), APS through AIP, p.041307/1-4, 15 July 2001.
160. Narasimha, A., Xuejun Meng, Lam, C.F., Wu, M.C., Yablonovitch, E. "Maximizing spectral utilization in WDM systems by microwave domain filtering of tandem single sidebands," *IEEE Transactions on Microwave Theory and Techniques*, vol.49, (no.10, pt.2), IEEE, p.2042-7, Oct. 2001.
161. Kiselev, A.A., Kim, K.W., Yablonovitch, E. "In-plane light-hole g factor in strained cubic heterostructures," *Physical Review B (Condensed Matter and Materials Physics)*, vol.64, (no.12), APS through AIP, p.125303/1-7, 15 Sept. 2001.
162. Yablonovitch, E. "Photonic Crystals: Semiconductors of Light," *Scientific American (International Edition)*, vol.285, (no.6), Scientific American, p.47-55, Dec. 2001.
163. Kiselev, A.A., Kim, K.W., Yablonovitch, E., "Designing a heterostructure for the quantum receiver," *Appl. Phys. Letters*, Vol. 80(16), pp. 2857-9, 22 April 2002.
164. Kosaka, H., Rao, D.S., Robinson, H.D., Bandaru, P., Sakamoto, T., Yablonovitch, E., "Photoconductance quantization in a single-photon detector," *Phys. Rev. B-Condensed Matter*, Vol. 65(20), pp. 201301/1-4, 15 May 2002.

165. Korobkin, D., Yablonovitch, E., "Twofold spatial resolution enhancement by two-photon exposure of photographic film," *Optical Engineering*, Vol. 41(7), pp.1729-32, July 2002.
166. Yablonovitch, E., "Photonic Crystals," *APS News*, Vol. 11(8), p. 6, August/September 2002.
167. Neogi, A., Lee C.W., Everitt, H.O., Kuroda, T., Tackeuchi, A., Yablonovitch, E., "Enhancement of spontaneous recombination rate in a quantum well by resonant surface plasmon coupling," *Phys. Rev. B-Condensed Matter*, Vol. 66(15), pp.153305-1-4, 15 October 2002.
168. Bandaru, P., Yablonovitch, E., "Semiconductor surface-molecule interactions," *Journal of Electrochemical Soc.*, Vol. 149(11), pp.G599-602, November 2002.
169. Alvarado-Rodriguez, I., Yablonovitch, E., "Separation of Radiation and absorption losses in two-dimensional photonic crystal single defect cavities," *Journal of Applied Physics*, Vol. 92(11), pp. 6399-402, 1 December 2002.
170. Kosaka, H., Rao, D.S., Robinson, H.D., Bandaru, P., Makita, K., Yablonovitch, E., "Single photoelectron trapping, storage, and detection in a field effect transistor," *Phys. Rev. B-Condensed Matter*, Vol. 67(4), pp. 45104-1-5, 15 January 2003.
171. Narasimha, A., Yablonovitch, E., "Code-selective frequency shifting by RF photonic mixing in a dual-electrode Mach-Zehnder modulator," *Elec. Letters*, Vol. 39(7), pp. 619-20, 3 April 2003.
172. Yablonovitch, E., Jiang, H.W., Kosaka, H., Robinson, H.D., Rao, D.S., Szkopek, T., "Optoelectronic quantum telecommunications based on spins in semiconductors," *Proc. of the IEEE*, Vol. 91(5), pp. 761-80, May 2003.
173. Baron F.A., Kiselev A.A., Robinson H.D., Kim K.W., Wang K.L., Yablonovitch E., "Manipulating the L-valley electron g factor in Si-Ge heterostructures," *Physical Review B-Condensed Matter*, vol.68, no.19, pp.195306-1-10, 15 Nov. 2003.
174. Yablonovitch, E., "A Light Read," *Materials Today*, vol. 7, no.3:49, March 2004.
175. Burger, M., Osher, S., Yablonovitch, E., "Inverse Problem Techniques for the Design of Photonic Crystals," *IEICE Transactions on Electronics*, vol E87-C, no. 3, pp. 258-265, March 2004.
176. Tirapu-Azpiroz J., and Yablonovitch, E., "Modeling of Near-Field Effects in Sub-Wavelength Deep Ultraviolet Lithography," In *Future Trends in Microelectronics: The Nano, the Giga, and the Ultra*, (Hoboken, NJ: John Wiley & Sons, Inc., 2004), 80-93.
177. Liu J., Kim H.J., Hul'ko O., Xie Y.H., Sahni S., Bandaru P., Yablonovitch E., "Ge films grown on Si substrates by molecular-beam epitaxy below 450 degrees C," *Journal of Applied Physics*, vol.96, no.1, 1 July 2004, pp.916-18.
178. Xiao M., Martin I., Yablonovitch E., Jiang H.W., "Electrical detection of the spin resonance of a single electron in a silicon field-effect transistor," *Nature*, vol.430, no.6998, 22 July 2004, pp.435-9.
179. Bandaru P.R., Sahni S., Yablonovitch E., Liu J., Kim H.J., Xie Y.H., "Fabrication and characterization of low temperature (<450 degrees C) grown p-Ge/n-Si photodetectors for silicon based photonics," *Materials Science & Engineering B-Solid State Materials for Advanced Technology*, vol. B113, no.1, 15 Oct. 2004, pp.79-84.
180. Broas R., Sievenpiper D., Yablonovitch E., "An Application of High-Impedance Ground Planes to Phased Array Antennas," *IEEE Transactions on Antennas and Propagation*, vol. 53, no. 4, April 2005, pp.1377-81.

181. Kao C.Y., Osher S., Yablonovitch E., “Maximizing band gaps in two-dimensional photonic crystals by using level set methods,” *Applied Physics B-Lasers & Optics*, vol. B81, no.2-3, July 2005, pp.235-44.
182. Deepak S. Rao, Thomas Szkopek, HongWen Jiang, Eli Yablonovitch, “What is the Fastest Speed at which a Single Electron Can Be Detected?”, <http://arxiv.org/abs/quant-ph/0507224>
183. Sakr M.R., Jiang H.W., Yablonovitch E., Croke E.T., “Fabrication and characterization of electrostatic Si/SiGe quantum dots with an integrated read-out channel,” *Applied Physics Letters*, vol.87, no.22, 28 Nov. 2005, pp.223104-1-3.
184. Rao D.S., Szkopek T., Robinson H.D., Yablonovitch E., Jiang H.W., “Single photoelectron trapping, storage, and detection in a one-electron quantum dot,” *Journal of Applied Physics*, vol. 98, no.11, 1 Dec. 2005, pp.114507-1-4.
185. Szkopek T., Roychowdhury V., Yablonovitch E., Abrams D.S., “Eigenvalue estimation of differential operators with a quantum algorithm,” *Physical Review A*, vol.72, no.6, Dec. 2005, pp.62318-1-11.
186. Szkopek, T., Boykin, O., Fan, H., Roychowdhury, V., Yablonovitch, E., Simms, G., Gyure, M., Fong, B., “Threshold Error Penalty for Fault-Tolerant Quantum Computation With Nearest Neighbor Communication,” *IEEE Transactions on Nanotechnology*, vol. 3, no. 1, January 2006, pp. 42-49.
187. Tirapu-Azpiroz J., Yablonovitch E., “Incorporating mask topography edge diffraction in photolithography simulations,” *Journal of the Optical Society of America A (Optics, Image Science and Vision)*, vol.23, no.4, April 2006, pp. 821-8.
188. Aliev A., Zakhidov A., Baughman R., Yablonovitch E., “Chalcogenide inverted opal photonic crystal as infrared pigments,” *International Journal of Nanoscience*, vol. 5, no. 1 (2006) 157–172.
189. Scott GD, Xiao M, Jiang HW Croke ET Yablonovitch E “Sputtered Gold As An Effective Schottky Gate For Strained Si/SiGe Nanostructures”, *Applied Physics Letters* 90, Article Number: 032110 (2007).
190. Backer SA, Suez I, Fresco ZM, Frechet JMJ, Conway JA, Vedantam S, Lee H, Yablonovitch E, “Evaluation Of New Materials For Plasmonic Imaging Lithography At 476nm Using Near Field Scanning Optical Microscopy”, *J. Vac. Sci. Tech B* 25, 1336-1339 (2007)
191. Lu J, Petre C, Yablonovitch E, Conway J, “Numerical Optimization of a Grating Coupler for the Efficient Excitation of Surface Plasmons at an Ag-SiO₂ Interface”, *J. Opt. Soc. Am. B* 24, 2268-2272 (2007).
192. Sahni S, Luo X, Liu J, Xie YH, Yablonovitch E, “Junction Field-Effect-Transistor-Based Germanium Photodetector On Silicon-On-Insulator”, *Opt. Lett.* 33 1138-1140 (2008)
193. Chan H, Vila AI, Basak J, Griot M, Weng WY, Wesel R, Jalali B, Yablonovitch E, & Verbaunwhede I, “Demonstration of Uncoordinated Multiple Access in Optical Communications”, *IEEE Trans. Circuits and Systems* 55, 3259-3269 (2008).
194. Zhang X.C., Mazzeo G., Brataas A., Xiao M., Yablonovitch E., Jiang H.W., “Tunable Electron Counting Statistics In A Quantum Dot At Thermal Equilibrium”, *Phys. Rev. B* 80, 035321 (2009).
195. “Single-Electron-Spin Measurements in Si-Based Semiconductor Nanostructures”, by Jiang HW, Yablonovitch E, Xiao M, Sakr M, Scott G, & Croke ET, published in *Electron*

- Spin Resonance And Related Phenomena In Low-Dimensional Structures, Book Series: Topics In Applied Physics, Vol. 115, 81-100 (Springer-Verlag, Berlin, 2009)
196. Yablonovitch E, "Photonics One-Way Road For Light" *Nature* 461, 744 (2009).
 197. Vedantam S, Lee H, Tang J, Conway J, Staffaroni M, Yablonovitch E, "A Plasmonic Dimple Lens for Nanoscale Focusing of Light" *Nano Letters* 9, 3447-3452 (2009).
 198. Mazzeo G, Yablonovitch E, Jiang HW, Bai Y, Fitzgerald EA, "Conduction Band Discontinuity and Electron Confinement at the $\text{Si}_x\text{Ge}_{1-x}/\text{Ge}$ Interface" *Appl. Phys. Lett.*, 96, 213501 (2010).
 199. Seok, TJ; Jamshidi, A; Kim, M; Dhuey, S; Lakhani, A; Choo, H; Schuck, PJ; Cabrini, S; Schwartzberg, AM; Bokor, J; Yablonovitch, E; Wu, MC; "Radiation Engineering of Optical Antennas for Maximum Field Enhancement", *Nano Letters* Vol. 11 pp. 2606-2610 (2011).
 200. M. Staffaroni, J. Conway, S. Vedantam, J. Tang, & E. Yablonovitch "Circuit Analysis in Metal-Optics", *Photonics and Nanostructures* vol. 10 pp. 166–176 (2012). DOI: 10.1016/j.photonics.2011.12.002
 201. O. D. Miller, Eli Yablonovitch, and S. R. Kurtz, "Strong Internal and External Luminescence as Solar Cells Approach the Shockley–Queisser Limit", *IEEE J. Photovoltaics*, vol. 2, pp. 303-311 (2012). DOI: 10.1109/JPHOTOV.2012.2198434
 202. Haiwei Yin, Biqin Dong, Xiaohan Liu, Tianrong Zhan, Lei Shi, Jian Zi, & Eli Yablonovitch, "Amorphous Diamond-Structured Photonic Crystal in the Feather Barbs of the Scarlet Macaw", *Proc. Nat. Ac. Sci.* vol. 109 no. 27, pp.10798-10801 (2012).
 203. E. Yablonovitch, "In the Limelight-Interview" *Nature Materials* 11, Issue: 12, pp. 1000-1001, DOI: 10.1038/nmat3504 (Dec 2012).
 204. H. Choo, M.K. Kim, M. Staffaroni, T.J. Seok Bokor, J. Bokor, S. Cabrini, P.J. Schuck, M.C. Wu, E. Yablonovitch, "Nanofocusing In A Metal-Insulator-Metal Gap Plasmon Waveguide With A Three-Dimensional Linear Taper" *Nature Photonics* 6, Issue: 12, pp. 837-843, DOI: 10.1038/NPHOTON.2012.277 (Dec 2012)
 205. W. Bao, M. Melli, N. Caselli, F. Riboli, D.S. Wiersma, M. Staffaroni, H. Choo, D.F. (Ogletree, S. Aloni, J. Bokor, S. Cabrini, F. Intonti, M.B. Salmeron, E. Yablonovitch, P.J. Schuck, A. Weber-Bargioni "Mapping Local Charge Recombination Heterogeneity by Multidimensional Nanospectroscopic Imaging, *SCIENCE* 338 Issue: 6112, pp. 1317-1321, DOI: 10.1126/science.1227977 (2012).
 206. E. Yablonovitch and O. D. Miller, "The Opto-Electronics of Solar Cells", *IEEE Photonics Society Newsletter*, vol. 27, No. 1, p. 4, (February 2013).
 207. Teherani, J.T.; Agarwal, S.; Yablonovitch, E.; Hoyt, J.L.; Antoniadis, D.A.; "Impact of Quantization Energy and Gate Leakage in Bilayer Tunneling Transistors", *IEEE Elec. Dev. Lett.* Vol. 34, pp. 298-300 DOI: 10.1109/LED.2012.2229458 (2013).
 208. Hegyi, A.; Yablonovitch, E.; "Molecular Imaging by Optically Detected Electron Spin Resonance of Nitrogen-Vacancies in Nanodiamonds" *Nano Letters*, Vol. 13 pp. 1173-1178 DOI: 10.1021/nl304570b (2013).
 209. Bao, W.; Staffaroni, M.; Bokor, J.; ; Salmeron, MB ; Yablonovitch, E.; Cabrini, S.; Weber-Bargioni, A.; Schuck, P.J. "Plasmonic Near-Field Probes: A Comparison of the Campanile Geometry With Other Sharp Tips", *Optics Express*, Vol. 21, pp. 8166-8176, DOI: 10.1364/OE.21.008166 (2013).

210. Fang, H.; Bechtel, H.A.; Plis, E.; Martin, M.C.; Krishna, S.; Yablonovitch, E.; Javey, A.; "Quantum of Optical Absorption in Two-Dimensional Semiconductors" *Proc. Nat. Acad. Sci.* Vol. 110, pp. 11688-11691 DOI: 10.1073/pnas.1309563110 (2013).
211. C. M. Lalau-Keraly, S. Bhargava, O. D. Miller, and E. Yablonovitch "Adjoint Shape Optimization Applied To Electromagnetic Design" *Optics Express* Vol. 21, pp. 21693-21701 DOI: 10.1364/OE.21.021693 (2013).
212. A. Hegyi & E. Yablonovitch, "Nanodiamond Molecular Imaging With Enhanced Contrast And Expanded Field Of View", *J. Biomed. Optics* 19, 011015 (2014).
213. V. Ganapati, O.D. Miller, & E. Yablonovitch, "Light Trapping Textures Designed by Electromagnetic Optimization for Sub-Wavelength Thick Solar Cells", *J. Photovoltaics* 4, 175 (2014). [dx.doi.org/10.1109/JPHOTOV.2013.2280340](https://doi.org/10.1109/JPHOTOV.2013.2280340)
214. S. Agarwal, J. T. Teherani, J. L. Hoyt, D. A. Antoniadis, & E. Yablonovitch "Engineering the Electron–Hole Bilayer Tunneling Field-Effect Transistor" *IEEE Trans. Elec. Dev.* 61, 1599 (2014). [10.1109/TED.2014.2312939](https://doi.org/10.1109/TED.2014.2312939)
215. S. Agarwal & E. Yablonovitch, "Band-Edge Steepness Obtained From Esaki/Backward Diode Current–Voltage Characteristics", *IEEE Trans. Elec. Dev.* 61, 1488 (2014). [dx.doi.org/10.1109/TED.2014.2312731](https://doi.org/10.1109/TED.2014.2312731)
216. H. Fang, C. Battaglia C. Carraro, S. Nemsak, B. Ozdol, J.S. Kang, H.A. Bechtel, S.B. Desai, F. Kronast, A.A. Unal, G. Conti, C. Conlon, G.K. Palsson, M.C. Martin, A.M. Minor, C.S. Fadley, E. Yablonovitch, R. Maboudian, & A. Javey, "Strong Interlayer Coupling in van der Waals Heterostructures Built From Single-Layer Chalcogenides", *Proc. Nat. Acad. Sci.* 111, 6198 (2014), doi: 10.1073/pnas.1405435111.
217. T.-T. D. Tran, H. Sun, K. W. Ng, F. Ren, K. Li, F. Lu, E. Yablonovitch, & C. J. Chang-Hasnain, "High Brightness InP Micropillars Grown on Silicon with Fermi Level Splitting Larger than 1 eV", [dx.doi.org/10.1021/nl500621j](https://doi.org/10.1021/nl500621j) *Nano Lett.* 14, 3235–3240 (2014)
218. A. R. Schmidt, E. Henry, C. C. Lo, Y.-T. Wang, H. Li, L. Greenman, O. Namaan, T. Schenkel, K. B. Whaley, J. Bokor, E. Yablonovitch, and I. Siddiqi; "A Prototype Silicon Double Quantum Dot With Dispersive Microwave Readout", *J. Applied Physics* 116, 044503 (2014); [dx.doi.org/10.1063/1.4890835](https://doi.org/10.1063/1.4890835).
219. S. Agarwal, E. Yablonovitch, "Fundamental Conductance/Voltage Limit in Low Voltage Tunnel Switches", *IEEE Elec. Dev. Lett.* 35, 1061 (2014). [dx.doi.org/10.1109/LED.2014.2350434](https://doi.org/10.1109/LED.2014.2350434).
220. T.T.D. Tran, H. Sun, K. W. Ng, Fan Ren, Kun Li, Fanglu Lu, E. Yablonovitch, & C. J. Chang-Hasnain, "High Brightness InP Micropillars Grown on Silicon with Fermi Level Splitting Larger than 1 eV", *NANO LETTERS* 14, 3235-3240 (2014) [dx.doi.org/10.1021/nl500621j](https://doi.org/10.1021/nl500621j)
221. G. Scranton, S. Bhargava, V. Ganapati, & E. Yablonovitch, "Single Spherical Mirror Optic For Extreme Ultraviolet Lithography Enabled By Inverse Lithography Technology", *Optics Express* 22, 25027-25042 (2014). [dx.doi.org/10.1364/OE.22.025027](https://doi.org/10.1364/OE.22.025027)
222. S. Agarwal & E. Yablonovitch, "A Nanoscale Piezoelectric Transformer for Low-Voltage Transistors", *NANO LETTERS* 14, 6263-6268 (2014). [dx.doi.org/10.1021/n1502578q](https://doi.org/10.1021/n1502578q)
223. Xing Sheng , Myoung Hee Yun , Chen Zhang , Ala'a M. Al-Okaily , Maria Masouraki , Ling Shen , Shuodao Wang , William L. Wilson , Jin Young Kim , Placid Ferreira , Xiuling Li , Eli Yablonovitch , and John A. Rogers, "Device Architectures for Enhanced Photon Recycling in Thin-Film Multijunction Solar Cells", *Adv. Energy Mater.* 5, 1400919 (2015). [dx.doi.org/10.1002/aenm.201400919](https://doi.org/10.1002/aenm.201400919)

224. S. Agarwal and E. Yablonovitch, "Designing a Low Voltage, High Current Tunneling Transistor," in CMOS and Beyond: Logic Switches for Terascale Integrated Circuits, T.-J. K. Liu and K. Kuhn, Eds., Cambridge University Press, pp.79-116 (2015). Available: <http://www.eecs.berkeley.edu/Pubs/TechRpts/2013/EECS-2013-250.html>
225. V. Ganapati, C.S. Ho, & E. Yablonovitch, "Air Gaps as Intermediate Selective Reflectors to Reach Theoretical Efficiency Limits of Multibandgap Solar Cells", IEEE J. Photovoltaics 5, 410-417 (2015). [dx.doi.org/10.1109/JPHOTOV.2014.2361013](https://doi.org/10.1109/JPHOTOV.2014.2361013)
226. M.S Eggleston, K. Messer, L. L. Zhang, E. Yablonovitch, M.C. Wu, "Optical Antenna Enhanced Spontaneous Emission", Proc. Nat. Acad. Sci. 112, 1704-1709 (2015). [dx.doi.org/10.1073/pnas.1423294112](https://doi.org/10.1073/pnas.1423294112)
227. Bhargava, S.; Yablonovitch, E.; "Lowering HAMR Near-Field Transducer Temperature via Inverse Electromagnetic Design" IEEE Trans. Magnetics 51, 3100407 (2015) [dx.doi.org/10.1109/TMAG.2014.2355215](https://doi.org/10.1109/TMAG.2014.2355215)
228. E. Yablonovitch, "Energy Efficient Electronics Science: Searching for a Low-Voltage Switch", MRS Bulletin Vol. 40, 551-552 (July 2015) <http://dx.doi.org/10.1557/mrs.2015.145>
229. Niroui, F., Wang, A.I., Sletten, E.M., Song, Y., Kong, J., Yablonovitch, E., Swager, T.M., Lang, J.H., Bulovic, V.; "Tunneling Nanoelectromechanical Switches Based on Compressible Molecular Thin Films" ACS NANO vol. 9, 7886-7894, (2015). <http://dx.doi.org/10.1021/acsnano.5b02476>
230. Chen I-Ru.; Qian C.; Yablonovitch, E.; Liu, T.-J.K.; "Nanomechanical Switch Designs to Overcome the Surface Adhesion Energy Limit", IEEE Electron Device Letters, vol. 36, 963-965 (2015) <http://dx.doi.org/10.1109/LED.2015.2463119>
231. "Inverse Optical Design" by O. D. Miller & E. Yablonovitch, pp. 729-732 in the Encyclopedia of Applied and Computational Mathematics, ed. by Bjoern Engquist (Springer –Verlag, New York, 2015), <http://dx.doi.org/10.1007/978-3-540-70529-1>
232. M. Amani, D.H. Lien, D. Kiriya, J. Xiao, A. Azcatl, J. Noh, S.R. Madhupathy, R. Addou, K.C. Santosh, M. Dubey, K. Cho, R.M. Wallace, S.C. Lee, J.H. He, J.W. Ager, X. Zhang, E. Yablonovitch, A. Javey, "Near-Unity Photoluminescence Quantum Yield in MoS₂", SCIENCE 350, 1065-1068 (2015). <http://dx.doi.org/10.1126/science.aad2114>
233. E. Yablonovitch, "Lead Halides Join The Top Optoelectronic League", SCIENCE Vol. 351, Issue 6280, pp. 1401, (25 Mar 2016) <http://dx.doi.org/10.1126/science.aaf4603>
234. Sutter-Fella, CM; Li, YB; Amani, M; Ager, JW; Toma, FM; Yablonovitch, E; Sharp, ID; Javey, A; "High Photoluminescence Quantum Yield in Band Gap Tunable Bromide Containing Mixed Halide Perovskites", Nano Lett. Vol: 16, pp: 800-806 (2016). <http://dx.doi.org/10.1021/acs.nanolett.5b04884>
235. T. Patrick Xiao, O. S. Cifci, S. Bhargava, Hao Chen, T. Gissibl, Weijun Zhou, H. Giessen, K. C. Toussaint, Jr., E. Yablonovitch, and Paul V. Braun, "Diffractive Spectral-Splitting Optical Element Designed by Adjoint-Based Electromagnetic Optimization and Fabricated by Femtosecond 3D Direct Laser Writing", ACS Photonics Vol. 3, pp. 886-894, (2016). <http://dx.doi.org/10.1021/acsp Photonics.6b00066>
236. V. Ganapati, M.A. Steiner, E. Yablonovitch, "The Voltage Boost Enabled by Luminescence Extraction in Solar Cells", IEEE Journal of Photovoltaics Vol. 6, pp. 801-809 (Jul. 2016). <http://dx.doi.org/10.1109/JPHOTOV.2016.2547580>

237. E. Yablonovitch in “Roadmap On Optical Energy Conversion” ed. by S.V. Boriskina, M.A. Green, K. Catchpole, Kylie; et al., *J. of Optics* Vol. 18, Issue: 7, Article Number: 073004, (Jul 2016). <http://dx.doi.org/10.1088/2040-8978/18/7/073004>
238. K. L. Tsakmakidis, R. W. Boyd, E. Yablonovitch, & X. Zhang, “Large Spontaneous-Emission Enhancements In Metallic Nanostructures: Towards LEDs Faster Than Lasers”, *Optics Express* Vol. 24, No. 16 (8 Aug 2016) <http://dx.doi.org/10.1364/OE.24.017916> |
239. J. T. Teherani, S. Agarwal, W. Chern, P. M. Solomon, E. Yablonovitch, and D. A. Antoniadis, “Auger Generation as an Intrinsic Limit to Tunneling Field-Effect Transistor Performance”, *J. Appl. Phys.* 120, 084507 (2016); <http://dx.doi.org/10.1063/1.4960571>
240. H. Ramezani, Y. Wang, E. Yablonovitch, X. Zhang, “Unidirectional Perfect Absorber”, *IEEE Journal Of Selected Topics In Quantum Electronics* Vol. 22, Issue: 5, (Sep. 2016). DOI: <http://dx.doi.org/10.1109/JSTQE.2016.2545644>
241. M. Abdelhamid, B.K. Widyolar, L. Jiang, R. Winston, E. Yablonovitch, G. Scranton, D. Cygan, H. Abbasi, A. Kozlov, Novel Double-Stage High-Concentrated Solar Hybrid Photovoltaic/Thermal (PV/T) Collector With Nonimaging Optics and GaAs Solar Cells Reflector, *Applied Energy* Vol. 182, pp. 68-79, (2016). <http://dx.doi.org/10.1016/j.apenergy.2016.07.127>
242. B.K. Widyolar, M. Abdelhamid, L. Jiang, R. Winston, E. Yablonovitch, G. Scranton, D. Cygan, H. Abbasi, A. Kozlov, “Design, Simulation And Experimental Characterization Of A Novel Parabolic Trough Hybrid Solar Photovoltaic/Thermal (PV/T) Collector”, *Renewable Energy* Vol. 101 pp. 1379-1389 (2017). <http://dx.doi.org/10.1016/j.renene.2016.10.014>
243. J.H. Kang, S. Wang, S. Sheng; Z. Shi, W. Zhao, E. Yablonovitch, F. Wang, “Goos-Hanchen Shift And Even-Odd Peak Oscillations In Edge-Reflections Of Surface Polaritons In Atomically Thin Crystals. *Nano Letters* (2017). <http://dx.doi.org/10.1021/acs.nanolett.6b05077>
244. K. Chen, T. P. Xiao, P. Santhanam, E. Yablonovitch, and S. Fan, “High-Performance Near-Field Electroluminescent Refrigeration Device Consisting of a GaAs Light Emitting Diode and a Si Photovoltaic Cell” *J. of Appl. Physics* 122, 143104 (2017); <http://dx.doi.org/10.1063/1.5007712>
245. K. T. Settaluri, C. Lalau-Keraly, E. Yablonovitch, & V. Stojanovic, “First Principles Optimization of Opto-Electronic Communication Links”, *IEEE Trans. Circ. & Sys.* 64, 1270 (2017) <http://dx.doi.org/10.1109/TCSI.2016.2633942>
246. P. Zhao, M. Amani, D. H. Lien, G. H Ahn, D. Kiriya, J. P. Mastandrea, J. W. Ager III, E. Yablonovitch, D. C. Chrzan, and A. Javey, “Measuring the Edge Recombination Velocity of Monolayer Semiconductors”, *Nano Lett.* 17, 5356 (2017). <http://dx.doi.org/10.1021/acs.nanolett.7b01770/>
247. J. P. Llinas, A. Fairbrother, G. B. Barin, W. Shi, K. Lee, S. Wu, B. Y. Choi, R. Braganza, J. Lear, N. Kau, W. Choi, C. Chen, Z. Pedramrazi, T. Dumsloff, A. Narita, X. Feng, K. Müllen, F. Fischer, A. Zettl, P. Ruffieux, E. Yablonovitch, M. Crommie, R. Fasel, J. Bokor, “Short-Channel Field-Effect Transistors With 9-atom and 13-atom Wide Graphene Nanoribbons” *Nature Comm.* 8:633, pp.1-7 (2017) <http://dx.doi.org/10.1038/s41467-017-00734-x>