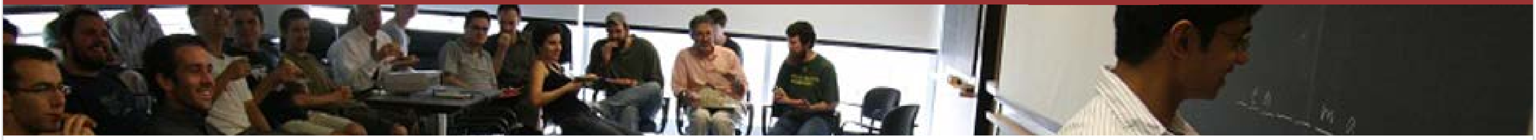

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Faculty

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RELATED LINKS:

- The Joannopoulos Research Group at MIT
- The Microphotonic Materials and Structures Group (MIT CMSE)
- MIT Research Laboratory of Electronics

Area of Physics:

Condensed Matter Theory

Research Interests

The research of Prof. Joannopoulos has spanned two major directions. The first is devoted to creating a realistic and microscopic theoretical description of the properties of material systems. His approach is fundamental to predicting geometric, electronic and dynamical structure, *ab-initio*–that is, given only the atomic numbers of the constituent atoms as experimental input. *Ab-initio* investigations are invaluable because they can stand on their own, complement experimental observations, and probe into regimes inaccessible to experiment. Examples of recent work include the elucidation of electron transport in water and the deliberate computer design of a new semiconductor alloy for use as a novel optoelectronic material.

The second major direction, and current major thrust, involves the development of a new class of materials called *photonic crystals*, which are designed to affect the properties of photons in much the same way that semiconductors effect the properties of electrons. These materials provide a new dimension in the ability to control and mold the flow of light. Efforts include the design of novel channel drop microfilters, high efficiency LEDs, low threshold microlasers, low-loss waveguide bends and intersections, one-way waveguides, and novel THz sources.

Biographical Sketch

Professor John D. Joannopoulos is the Francis Wright Davis Professor of Physics at MIT. He is the author or coauthor of over 540 refereed journal articles, two textbooks on photonic crystals, and over 60 U.S. Patents. He is also co-founder of four startup companies: OmniGuide, Inc., Luminus Devices, Inc., WiTricity Corporation, and Typhoon HIL, Inc. He is a member of the National Academy of Sciences, a Fellow of the American Association for the Advancement of Science, a Fellow of the American Physical Society, a Fellow of the World Technology Network, an Alfred P. Sloan Fellow (1976-80), a John S. Guggenheim Fellow (1981-82), and has been on the Thompson ISI Most Highly Cited Researchers List since 2003. Professor Joannopoulos is the recipient of the MIT School of Science Graduate Teaching Award (1991), the William Buechner Teaching Prize of the MIT Department of Physics (1996), and the David Adler Award of the American Physical Society (1997). He is a former Divisional Associate Editor of *Physical Review Letters*, and former Member of the Editorial Board of *Reviews of Modern Physics*. Currently he is Director of the Institute for Soldier Nanotechnologies at MIT.

Selected Publications

RESEARCH LABORATORY OF ELECTRONICS

People / Directory (Principal Investigators)

Back to List

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Professor John D. Joannopoulos is a principal investigator in the Research Laboratory of Electronics (RLE) at the Massachusetts Institute of Technology (MIT).

He received his B.A. and Ph.D. in Physics from the University of California, Berkeley in 1968 and 1974, respectively. He has been on the Faculty of Physics at the Massachusetts Institute of Technology as Assistant Professor of Physics (1974), Associate Professor of Physics (1978), Professor of Physics (1983) and was awarded the Francis Wright Davis Professor of Physics Chair in 1996. He has served as Divisional Associate Editor of Physical Review Letters, member of the Editorial Board of Reviews of Modern Physics, and was appointed as the Director of the Institute for Soldier Nanotechnologies at MIT in 2006.

The research of Professor Joannopoulos spans two major directions. The first is devoted to creating a realistic and microscopic theoretical description of the properties of material systems. His approach is fundamental to predicting geometric, electronic and dynamical structure, ab-initio—that is, given only the atomic numbers of the constituent atoms as experimental input. Ab-initio investigations are invaluable because they can stand on their own, complement experimental observations, and probe into regimes inaccessible to experiment. The second major

Group Websites

ab initio Physics Group

direction involves the development of a new class of materials called photonic crystals, which are designed to affect the properties of photons in much the same way that semiconductors affect the properties of electrons. These materials provide a new dimension in the ability to control and mold the flow of light.

He is the author or coauthor of over 560 refereed scientific journal articles, three textbooks on Photonic Crystals, and holds over 70 issued U.S. Patents. He is also co-founder of 4 startup companies: OmniGuide Inc., Luminus Devices, Inc., WiTricity Corporation and Typhoon HIL, Inc..

Professor Joannopoulos is a Fellow of the American Physical Society (1983) and a Fellow of the American Association for the Advancement of Science (2002). He has been an Alfred P. Sloan Fellow (1976–1980) and John S. Guggenheim Fellow (1981–1982). He is the recipient of the Student Council Graduate Teaching Award (1991), the William Buechner Teaching Prize (1996), the David Adler Award of the American Physical Society (1997), and the School of Science Graduate Teaching Award (2002). Since 2003, he has been recognized as one of the Thompson ISI most Highly Cited Researchers. In 2009, Professor Joannopoulos was elected to membership in the National Academy of Sciences.

Keywords

semiconductor surface studies, condensed matter physics, photonic crystals and optics, resonant cavities, atomic systems and electronic structure, wet electrons, MITite

Selected Publications

01.02.2017
Efficient plasmonic emission by the quantum Čerenkov effect from hot carriers in graphene

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(These listings omit many papers published in conference proceedings, since in most cases the same material is later published in a "real" journal.)

See also the publication lists of professors Yoel Fink, Steven G. Johnson, and Marin Soljacic at MIT. You can find another historical catalogue of Prof. Joannopoulos' publications as part of his listing as one of the ISI's "Most Highly Cited" scientists.

If there are any missing papers, please send an email with the reference to the ab-initio webmasters. The listings were generated with the help of bibtex2html, a fine free tool for this sort of thing.

Books

- John D. Joannopoulos, Steven G. Johnson, Joshua N. Winn, and Robert D. Meade, *Photonic Crystals: Molding the Flow of Light*, **second edition** (Princeton Univ. Press, 2008). See our page on the second edition for more information, including links to purchase the book.

- S. G. Johnson and J. D. Joannopoulos, *Photonic Crystals: The Road from Theory to Practice* (Kluwer, Boston, 2002). (Buy it from Kluwer or Amazon.) This book is actually a reprint of of SGJ's PhD thesis, and is mainly a collection of several journal articles available above. It is superseded by the *Molding the Flow of Light* second edition.

Photonics Papers

See also our main Papers and Publications page, as well as the publications pages of the Fink, Johnson, and Soljacic groups.

[308]
B. G. DeLacy, O. D. Miller, C. W. Hsu, Z. Zander, S. Lacey, R. Yagloski, A. W. Fountain, E. Valdes, E. Anquillare, M. Soljacic, S. G. Johnson, and J. D. Joannopoulos, “Coherent plasmon–exciton coupling in silver platelet-J-aggregate nanocomposites,” *Nano Letters*, March 2015. Published online before print. [bib | DOI | Abstract]

[307]
C. Hou, X. Jia, L. Wei, S.-C. Tan, X. Zhao, J. D. Joannopoulos, and Y. Fink, “Crystalline silicon core fibres from aluminium core preforms,” *Nature Communications*, vol. 6, p. 6248, January 2015. [bib | http | .pdf | Abstract]

[306]
Y. Shen, V. Rinnerbauer, I. Wang, V. Stelmakh, J. D. Joannopoulos, and M. Soljacic, “Structural colors from fano resonances,” *ACS Photonics*, vol. 2, pp. 27–32, January 2015. [bib | http | Abstract]

[305]
Y. Shen, D. Kim, Ye, L. Wang, I. Celanovic, L. Ran, J. D. Joannopoulos, and M. Soljacic, “Metamaterial broadband angular selectivity,” *Physical Review B*, vol. 90, p. 125422, September 2014. [bib | http | Abstract]

[304]
L. Lu, J. D. Joannopoulos, and M. Soljacic, “Topological photonics,” *Nature Photonics*, vol. 8, pp. 821–829, September 2014. Invited review article. [bib | http | .pdf | Abstract]

[303]
V. Rinnerbauer, A. Lenert, D. Bierman, Y. X. Yeng, W. R. Chan, R. D. Geil, J. J. Senkevich, J. D. Joannopoulos, E. N. Wang, M. Soljacic, and I. Celanovic, “Metallic photonic crystal absorber-emitter for efficient spectral control in high-temperature solar thermophotovoltaics,” *Advanced Energy Materials*, vol. 4, p. 1400334, August 2014. [bib | DOI | .pdf | Abstract]

[302]
Y. X. Yeng, J. B. Chou, V. Rinnerbauer, Y. Shen, S.-G. Kim, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Global optimization of omnidirectional wavelength selective emitters/absorbers based on dielectric-filled anti-reflection coated two-dimensional metallic photonic crystals,” *Optics Express*, vol. 22, p. 21711, August 2014. [bib | http | .pdf | Abstract]

[301]
C. W. Hsu, B. G. DeLacy, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Theoretical criteria for scattering dark states in nanostructured particles,” *Nano Letters*, vol. 14, pp. 2783–2788, May 2014. [bib | DOI | .pdf | Abstract]

[300]
S.-L. Chua, L. Lu, J. Bravo-Abad, J. D. Joannopoulos, and M. Soljacic, “Larger-area single-mode photonic crystal surface-emitting lasers enabled by an accidental dirac point,” *OL*, vol. 39, pp. 2072–2075, April 2014. [bib | DOI | .pdf | Abstract]

[299]
O. D. Miller, C. W. Hsu, M. T. H. Reid, W. Qiu, B. G. DeLacy, J. D. Joannopoulos, M. Soljacic, and S. G. Johnson, “Fundamental limits to extinction by metallic nanoparticles,” *Physical Review Letters*, vol. 112, p. 123903, March 2014. [bib | DOI | .pdf | arXiv | Abstract]

[298]
Y. Shen, D. Ye, I. Celanovic, S. G. Johnson, J. D. Joannopoulos, , and M. Soljacic, “Optical broadband angular selectivity,” *Science*, vol. 343, pp. 1499–1501, March

2014. [bib | DOI | .pdf | Abstract]

[297]
C. W. Hsu, B. Zhen, W. Qiu, O. Shapira, B. G. DeLacy, J. D. Joannopoulos, and M. Soljacic, “Transparent displays enabled by resonant nanoparticle scattering,” *Nature Communications*, vol. 5, p. 3152, January 2014. [bib | http | .pdf | Abstract]

[296]
V. Stelmakh, V. Rinnerbauer, J. D. Joannopoulos, M. Soljacic, I. Celanovic, J. J. Senkevich, C. Tucker, T. Ives, and R. Shrader, “Evolution of sputtered tungsten coatings at high temperature,” *Journal of Vacuum Science Technology A: Vacuum, Surfaces, and Films*, vol. 31, p. 061505, November 2013. [bib | DOI | .pdf | Abstract]

[295]
Y. X. Yeng, W. R. Chan, V. Rinnerbauer, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Performance analysis of experimentally viable photonic crystal enhanced thermophotovoltaic systems,” *OE*, vol. 21, pp. A1035–A1051, November 2013. [bib | DOI | http | .pdf | Abstract]

[294]
V. Stelmakh, V. Rinnerbauer, R. D. Geil, P. R. Aimone, J. J. Senkevich, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “High-temperature tantalum tungsten alloy photonic crystals: Stability, optical properties, and fabrication,” *APL*, vol. 103, p. 123903, September 2013. [bib | DOI | http | .pdf]

[293]
B. G. DeLacy, W. Qiu, M. Soljacic, C. W. Hsu, O. D. Miller, S. G. Johnson, and J. D. Joannopoulos, “Layer-by-layer self-assembly of plexcitonic nanoparticles,” *Optics Express*, vol. 21, pp. 19103–19112, August 2013. [bib | DOI | http | Abstract]

[292]
B. Zhen, S.-L. Chua, J. Lee, A. W. Rodriguez, X. Liang, S. G. Johnson, J. D. Joannopoulos, M. Soljacic, and O. Shapira, “Enabling enhanced emission and low-threshold lasing of organic molecules using special Fano resonances of macroscopic photonic crystals,” *Proceedings of the National Academy of Sciences*, vol. 110, pp. 13711–13716, August 2013. [bib | DOI | .pdf | Abstract]

[291]
C. W. Hsu, B. Zhen, J. Lee, S.-L. Chua, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Observation of trapped light within the radiation continuum,” *Nature*, vol. 499, pp. 188–191, July 2013. [bib | DOI | .pdf | Abstract]

[290]
C. W. Hsu, B. Zhen, S.-L. Chua, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Bloch surface eigenstates within the radiation continuum,” *Light: Science & Applications*, vol. 2, p. e84, July 2013. Invited paper. [bib | DOI | .pdf | Abstract]

[289]
V. Rinnerbauer, Y. X. Yeng, W. R. Chan, J. J. Senkevich, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “High-temperature stability and selective thermal emission of polycrystalline tantalum photonic crystals,” *OE*, vol. 21, pp. 11482–11491, May 2013. [bib | DOI | http | .pdf | Abstract]

[288]
L. Lu, L. Fu, J. D. Joannopoulos, and M. Soljacic, “Weyl points and line nodes in gyroid photonic crystals,” *Nature Photonics*, vol. 7, pp. 294–299, April 2013. [bib | http | .pdf]

[287]
A. W. Rodriguez, M. T. H. Reid, J. Varela, J. D. Joannopoulos, F. Capasso, and S. G. Johnson, “Anomalous near-field heat transfer between a cylinder and a perforated surface,” *Physical Review Letters*, vol. 110, p. 014301, January 2013. [bib | DOI | .pdf | arXiv | Abstract]

[286]
W. R. Chan, P. Bermel, R. C. N. Pilawa-Podgurski, C. H. Marton, K. F. Jensen, J. J. Senkevich, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Toward high-energy-density, high-efficiency, and moderate-temperature chip-scale thermophotovoltaics,” *PNAS*, vol. 110, pp. 5309–5314, January 2013. [bib | DOI | http | .pdf | Abstract]

[285]
V. Rinnerbauer, S. Ndao, Y. Xiang Yeng, J. J. Senkevich, K. F. Jensen, J. D. Joannopoulos, M. Soljacic, I. Celanovic, and R. D. Geil, “Large-area fabrication of high aspect ratio tantalum photonic crystals for high-temperature selective emitters,” *Journal of Vacuum Science & Technology B*, vol. 31, p. 011802, January 2013. [bib | DOI | http | .pdf]

[284]
V. Rinnerbauer, J. J. Senkevich, J. D. Joannopoulos, M. Soljacic, I. Celanovic, R. R. Harl, and B. R. Rogers, “Low emissivity high-temperature tantalum thin film coatings for silicon devices,” *Journal of Vacuum Science & Technology A*, vol. 31, p. 011501, January 2013. [bib | DOI | http | .pdf]

[283]
D. Jukic, H. Buljan, D.-H. Lee, J. D. Joannopoulos, and M. Soljacic, “Flat photonic surface bands pinned between Dirac points,” *Optics Letters*, vol. 37, pp. 5262–5264, December 2012. [bib | DOI | .pdf | Abstract]

[282]
L. Lu, L. L. Cheong, H. I. Smith, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Three-dimensional photonic crystals by large-area membrane stacking,” *Optics Letters*, vol. 37, pp. 4726–4728, November 2012. [bib | http | .pdf | Abstract]

[281]
A. Oskooi, A. Mutapcic, S. Noda, J. D. Joannopoulos, S. P. Boyd, and S. G. Johnson, “Robust optimization of adiabatic tapers for coupling to slow-light photonic-crystal waveguides,” *Optics Express*, vol. 20, pp. 21558–21575, September 2012. [bib | http | Abstract]

[280]
J. Lee, B. Zhen, S.-L. Chua, W. Qiu, J. D. Joannopoulos, M. Soljacic, and O. Shapira, “Observation and differentiation of unique high-q optical resonances near zero wave vector in macroscopic photonic crystal slabs,” *Physical Review Letters*, vol. 109, p. 067401, August 2012. [bib | DOI | .pdf | Abstract]

[279]
Z. Wang, Z. Wang, J. Wang, B. Zhang, J. Huangfu, J. D. Joannopoulos, M. Soljacic, and L. Ran, “Gyrotropic response in the absence of a bias field,” *Proceedings of the National Academy of Sciences*, vol. 109, pp. 13194–13197, August 2012. [bib | DOI | .pdf | Abstract]

[278]
V. Rinnerbauer, S. Ndao, Y. X. Yeng, W. R. Chan, J. J. Senkevich, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Recent developments in high-temperature photonic crystals for energy conversion,” *Energy & Environmental Science*, vol. 5, pp. 8815–8823, August 2012. [bib | DOI | http | .pdf | Abstract]

[277]
W. Qiu, B. G. DeLacy, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Optimization of broadband optical response of multilayer nanospheres,” *Optics Express*, vol. 20, pp. 18494–18504, July 2012. [bib | DOI | Abstract]

[276]
H. Hashemi, C. W. Qiu, A. P. McCauley, J. D. Joannopoulos, and S. G. Johnson, “Diameter–bandwidth product limitation of isolated-object cloaking,” *Physical Review A*, vol. 86, p. 013804, July 2012. [bib | DOI | .pdf | arXiv | Abstract]

[275]
L. Lu, J. D. Joannopoulos, and M. Soljacic, “Waveguiding at the edge of a three-dimensional photonic crystal,” *Physical Review Letters*, vol. 108, p. 243901, June 2012. [bib | DOI | .pdf | Abstract]

[274]
J. Bravo-Abad, J. D. Joannopoulos, and M. Soljacic, “Enabling single-mode behavior over large areas with photonic Dirac cones,” *Proceedings of the National Academy of Sciences*, vol. 109, pp. 9761–9765, June 2012. [bib | DOI | .pdf | Abstract]

[273]
A. M. Stolyarov, A. Gumennik, W. McDaniel, O. Shapira, B. Schell, F. Sorin,

K. Kuriki, G. Benoit, A. Rose, J. D. Joannopoulos, and Y. Fink, “Enhanced chemiluminescent detection scheme for trace vapor sensing in pneumatically-tuned hollow core photonic bandgap fibers,” *Optics Express*, vol. 20, pp. 12407–12415, May 2012. [bib | DOI | Abstract]

[272]
O. Ilic, M. Jablan, J. D. Joannopoulos, I. Celanovic, and M. Soljacic, “Near-field thermal radiation transfer controlled by plasmons in graphene,” *Physical Review B*, vol. 85, p. 155422, April 2012. [bib | DOI | .pdf | Abstract]

[271]
O. Ilic, M. Jablan, J. D. Joannopoulos, I. Celanovic, and M. Soljacic, “Overcoming the black body limit in plasmonic and graphene near-field thermophotovoltaic systems,” *Optics Express*, vol. 20, pp. A366–A384, March 2012. [bib | DOI | .pdf | Abstract]

[270]
Y. X. Yeng, M. Ghebrebrhan, P. Bermel, W. R. Chan, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Enabling high-temperature nanophotonics for energy applications,” *Proceedings of the National Academy of Sciences*, December 2011. Published online before print. [bib | DOI | .pdf | Abstract]

[269]
P. Bermel, M. Ghebrebrhan, M. Harradon, Y. X. Yeng, I. Celanovic, J. D. Joannopoulos, and M. Soljacic, “Tailoring photonic metamaterial resonances for thermal radiation,” *Nanoscale Research Letters*, vol. 6, p. 549, October 2011. [bib | http | .pdf | Abstract]

[268]
M. Araghchini, Y. X. Yeng, N. Jovanovic, P. Bermel, L. A. Kolodziejski, M. Soljacic, I. Celanovic, and J. D. Joannopoulos, “Fabrication of two-dimensional tungsten photonic crystals for high-temperature applications,” *Journal of Vacuum Science and Technology B*, vol. 29, p. 061402, October 2011. [bib | DOI | .pdf | Abstract]

[267]
A. W. Rodriguez, O. Ilic, P. Bermel, I. Celanovic, J. D. Joannopoulos, M. Soljacic, and S. G. Johnson, “Frequency-selective near-field radiative heat transfer between photonic crystal slabs: A computational approach for arbitrary geometries and materials,” *Physical Review Letters*, vol. 107, p. 114302, September 2011. [bib | DOI | .pdf | arXiv | Abstract]

[266]
H. Hashemi, A. Oskooi, J. D. Joannopoulos, and S. G. Johnson, “General scaling limitations of ground-plane and isolated-object cloaks,” *Physical Review A*, vol. 84, p. 023815, August 2011. [bib | DOI | .pdf | arXiv | Abstract]

[265]
A. Kurs, J. D. Joannopoulous, M. Soljacic, and S. G. Johnson, “Abrupt coupling between strongly dissimilar waveguides with 100% transmission,” *Optics Express*, vol. 19, pp. 13714–13721, June 2011. [bib | http | Abstract]

[264]
A. P. McCauley, F. S. S. Rosa, A. W. Rodriguez, J. D. Joannopoulos, D. A. R. Dalvit, and S. G. Johnson, “Structural anisotropy and orientation-induced Casimir repulsion in fluids,” *Physical Review A*, vol. 83, p. 052503, May 2011. [bib | DOI | .pdf | arXiv | Abstract]

[263]
S.-L. Chua, C. A. Caccamise, D. J. Phillips, J. D. Joannopoulos, M. Soljacic, H. O. Everitt, and J. Bravo-Abad, “Spatio-temporal theory of lasing action in optically-pumped rotationally excited molecular gases,” *Optics Express*, vol. 19, pp. 7513–7529, April 2011. [bib | http | .pdf | Abstract]

[262]
D. Ramirez, A. W. Rodriguez, H. Hashemi, J. Joannopoulos, M. Soljacic, and S. G. Johnson, “Degenerate four-wave mixing in triply-resonant Kerr cavities,” *Physical Review A*, vol. 83, p. 033834, March 2011. [bib | DOI | .pdf | arXiv | Abstract]

[261]
M. Ghebrebrhan, P. Bermel, Y. X. Yeng, I. Celanovic, M. Soljacic, and J. D.

Joannopoulos, “Tailoring thermal emission via *q* matching of photonic crystal resonances,” *Physical Review A*, vol. 83, p. 033810, March 2011. [bib | DOI | .pdf | Abstract]

[260]
S. Danto, Z. Ruff, Z. Wang, J. D. Joannopoulos, and Y. Fink, “Ovonic memory switching in multimaterial fibers,” *Advanced Functional Materials*, vol. 21, pp. 1095–1101, March 2011. [bib | DOI | Abstract]

[259]
D. Chester, P. Bermel, J. D. Joannopoulos, M. Soljacic, and I. Celanovic, “Design and global optimization of high-efficiency solar thermal systems with tungsten cermets,” *Optics Express*, vol. 19, pp. A245–A257, March 2011. [bib | http | .pdf | Abstract]

[258]
K. Y. K. Lee, M. K. Nyein, D. F. Moore, J. D. Joannopoulos, S. Socrate, T. Imholt, R. Radovitzky, and S. G. Johnson, “Blast-induced electromagnetic fields in the brain from bone piezoelectricity,” *NeuroImage*, vol. 54, pp. S30–S36, January 2011. Invited paper, published online June 2010. [bib | DOI | Abstract]

[257]
N. D. Orf, O. Shapira, F. Sorin, S. Danto, M. A. Baldo, J. D. Joannopoulos, and Y. Fink, “Fiber draw synthesis,” *Proceedings of the National Academy of Sciences*, vol. 108, pp. 4743–4747, January 2011. [bib | DOI | Abstract]

[256]
F. Sorin, G. Lestoquoy, S. Danto, J. D. Joannopoulos, and Y. Fink, “Resolving optical illumination distributions along an axially symmetric photodetecting fiber,” *Optics Express*, vol. 18, pp. 24264–24275, November 2010. [bib | http | Abstract]

[255]
M. K. Nyein, A. M. Jason, L. Yu, C. M. Pita, J. D. Joannopoulos, D. F. Moore, and R. A. Radovitzky, “In silico investigation of intracranial blast mitigation with relevance to military traumatic brain injury,” *Proceedings of the National Academy of Sciences*, vol. 107, pp. 20703–20708, November 2010. [bib | DOI | Abstract]

[254]
A. P. McCauley, R. Zhao, M. T. H. Reid, A. W. Rodriguez, J. Zhou, F. S. S. Rosa, J. D. Joannopoulos, D. A. R. Dalvit, C. M. Soukoulis, and S. G. Johnson, “Microstructure effects for Casimir forces in chiral metamaterials,” *Physical Review B*, vol. 82, p. 165108, October 2010. [bib | DOI | .pdf | arXiv | Abstract]

[253]
S. Danto, F. Sorin, N. D. Orf, Z. Wang, S. A. Speakman, J. D. Joannopoulos, and Y. Fink, “Fiber field-effect device via in situ channel crystallization,” *Advanced Materials*, vol. 22, pp. 4162–4166, October 2010. [bib | DOI | Abstract]

[252]
A. W. Rodriguez, D. Woolf, A. P. McCauley, F. Capasso, J. D. Joannopoulos, and S. G. Johnson, “Achieving a strongly temperature-dependent Casimir effect,” *Physical Review Letters*, vol. 105, p. 060401, August 2010. [bib | DOI | .pdf | arXiv | Abstract]

[251]
P. Bermel, M. Ghebrebrhan, W. Chan, Y. X. Yeng, M. Araghchini, R. Hamam, C. H. Marton, K. F. Jensen, M. Soljacic, J. D. Joannopoulos, S. G. Johnson, and I. Celanovic, “Design and global optimization of high-efficiency thermophotovoltaic systems,” *Optics Express*, vol. 18, pp. A314–A334, August 2010. [bib | http | .pdf | Abstract]

[250]
S. Egusa, Z. Wang, N. Chocat, Z. M. Ruff, A. M. Stolyarov, D. Shemuly, F. Sorin, P. T. Rakich, J. D. Joannopoulos, and Y. Fink, “Multimaterial piezoelectric fibres,” *Nature Materials*, vol. 9, pp. 643–648, July 2010. [bib | DOI | Abstract]

[249]
H. Hashemi, B. Zhang, J. D. Joannopoulos, and S. G. Johnson, “Delay-bandwidth and delay-loss limitations for cloaking of large objects,” *Physical Review Letters*, vol. 104, p. 253903, June 2010. [bib | DOI | .pdf | arXiv | Abstract]

[248]
A. W. Rodriguez, A. P. McCauley, J. D. Joannopoulos, and S. G. Johnson, “Theoretical

ingredients of a Casimir analog computer," *Proceedings of the National Academy of Sciences*, vol. 107, pp. 9531–9536, May 2010. [bib | DOI | .pdf | arXiv | Abstract]

[247]
O. Shapira, A. F. Abouraddy, Q. Hu, D. Shemuly, J. D. Joannopoulos, and Y. Fink, "Enabling coherent superpositions of iso-frequency optical states in multimode fibers," *Optics Express*, vol. 18, pp. 12622–12629, May 2010. [bib | http | Abstract]

[246]
A. W. Rodriguez, A. P. McCauley, D. Woolf, F. Capasso, J. D. Joannopoulos, and S. G. Johnson, "Non-touching nanoparticle diclusters bound by repulsive and attractive Casimir forces," *Physical Review Letters*, vol. 104, p. 160402, April 2010. [bib | http | .pdf | arXiv | Abstract]

[245]
J. Bravo-Abad, A. W. Rodriguez, J. D. Joannopoulos, P. T. Rakich, S. G. Johnson, and M. Soljacic, "Efficient low-power terahertz generation via on-chip triply-resonant nonlinear frequency mixing," *Applied Physics Letters*, vol. 96, p. 101110, March 2010. [bib | DOI | .pdf | Abstract]

[244]
W. Chan, R. Huang, C. Wang, J. Kassakian, J. Joannopoulos, and I. Celanovic, "Modeling low-bandgap thermophotovoltaic diodes for high-efficiency portable power generators," *Solar Energy Materials and Solar Cells*, vol. 94, pp. 509–514, March 2010. [bib | DOI | Abstract]

[243]
I. D. Hosein, M. Ghebrebrhan, J. D. Joannopoulos, and C. M. Liddell, "Dimer shape anisotropy: A nonspherical colloidal approach to omnidirectonal photonic band gaps," *Langmuir*, vol. 26, pp. 2151–2159, February 2010. [bib | DOI | Abstract]

[242]
A. F. Oskooi, D. Roundy, M. Ibanescu, P. Bermel, J. D. Joannopoulos, and S. G. Johnson, "MEEP: A flexible free-software package for electromagnetic simulations by the FDTD method," *Computer Physics Communications*, vol. 181, pp. 687–702, January 2010. [bib | DOI | .pdf | Abstract]

[241]
A. P. McCauley, A. W. Rodriguez, J. D. Joannopoulos, and S. G. Johnson, "Casimir forces in the time domain: Applications," *Physical Review A*, vol. 81, p. 012119, January 2010. [bib | http | .pdf | arXiv | Abstract]

[240]
D. S. Deng, N. D. Orf, S. Danto, A. F. Abouraddy, J. D. Joannopoulos, and Y. Fink, "Processing and properties of centimeter-long, in-fiber, crystalline-selenium filaments," *Applied Physics Letters*, vol. 96, p. 023102, January 2010. [bib | DOI | Abstract]

[239]
C. Qiu, L. Gao, J. Joannopoulos, and M. Soljacic, "Light scattering from anisotropic particles: propagation, localization, and nonlinearity," *Laser & Photon. Rev.*, vol. 4, no. 2, pp. 268–282, 2010. [bib | .pdf | Abstract]

[238]
Z. Wang, Y. Chong, J. D. Joannopoulos, and M. Soljacic, "Observation of unidirectional backscattering-immune topological electromagnetic states," *Nature*, vol. 461, pp. 772–775, October 2009. [bib | DOI | Abstract]

[237]
A. F. Oskooi, C. Kottke, and S. G. Johnson, "Accurate finite-difference time-domain simulation of anisotropic media by subpixel smoothing," *Optics Letters*, vol. 34, pp. 2778–2780, September 2009. [bib | http | .pdf | Abstract]

[236]
R. E. Hamam, A. Karalis, J. D. Joannopoulos, and M. Soljacic, "Efficient weakly-radiative wireless energy transfer: An EIT-like approach," *Annals of Physics*, vol. 324, pp. 1783–1795, August 2009. [bib | DOI | .pdf | Abstract]

[235]
M. T. H. Reid, A. W. Rodriguez, J. White, and S. G. Johnson, "Efficient computation of Casimir interactions between arbitrary 3d objects," *Physical Review Letters*,

vol. 103, p. 040401, July 2009. Invited paper in August 3, 2009, issue of the *Virtual Journal of Nanoscale Science & Technology*. [bib | http | .pdf | arXiv | Abstract]

[234]

C. Qiu, L. Hu, B. Zhang, B.-I. Wu, S. G. Johnson, and J. D. Joannopoulos, “Spherical cloaking using nonlinear transformations for improved segmentation into concentric isotropic coatings,” *Optics Express*, vol. 17, pp. 13467–13478, July 2009. [bib | http | Abstract]

[233]

A. W. Rodriguez, A. P. McCauley, J. D. Joannopoulos, and S. G. Johnson, “Casimir forces in the time domain: Theory,” *Physical Review A*, vol. 80, p. 012115, July 2009. [bib | http | .pdf | arXiv | Abstract]

[232]

A. Karalis, J. D. Joannopoulos, and M. Soljacic, “Plasmonic-dielectric systems for high-order dispersionless slow or stopped subwavelength light,” *Physical Review Letters*, vol. 103, p. 043906, July 2009. Invited paper in July 2009 issue of the *Virtual Journal of Nanoscale Science & Technology*. [bib | DOI | .pdf | Abstract]

[231]

A. F. Oskooi, J. D. Joannopoulos, and S. G. Johnson, “Zero–group-velocity modes in chalcogenide holey photonic-crystal fibers,” *Optics Express*, vol. 17, pp. 10082–10090, June 2009. [bib | http | Abstract]

[230]

P.-R. Loh, A. F. Oskooi, M. Ibanescu, M. Skorobogatiy, and S. G. Johnson, “Fundamental relation between phase and group velocity, and application to the failure of perfectly matched layers in backward-wave structures,” *Physical Review E*, vol. 79, p. 065601(R), June 2009. [bib | http | .pdf | Abstract]

[229]

I. B. Burgess, A. W. Rodriguez, M. W. McCutcheon, J. Bravo-Abad, Y. Zhang, S. G. Johnson, and M. Loncar, “Difference-frequency generation with quantum-limited efficiency in triply-resonant nonlinear cavities,” *Optics Express*, vol. 17, pp. 9241–9251, May 2009. [bib | http | Abstract]

[228]

A. Mutapcic, S. Boyd, A. Farjadpour, S. G. Johnson, and Y. Avniel, “Robust design of slow-light tapers in periodic waveguides,” *Engineering Optimization*, vol. 41, pp. 365–384, April 2009. [bib | DOI | .html | Abstract]

[227]

R. E. Hamam, M. Ibanescu, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Broadband super-collimation in a hybrid photonic crystal structure,” *Optics Express*, vol. 17, pp. 8109–8118, April 2009. [bib | http | Abstract]

[226]

M. Ghebrebrhan, P. Bermel, Y. Avniel, J. D. Joannopoulos, and S. G. Johnson, “Global optimization of silicon photovoltaic cell front coatings,” *Optics Express*, vol. 17, pp. 7505–7518, April 2009. [bib | http | Abstract]

[225]

H. Hashemi, A. W. Rodriguez, J. D. Joannopoulos, M. Soljacic, and S. G. Johnson, “Nonlinear harmonic generation and devices in doubly-resonant Kerr cavities,” *Physical Review A*, vol. 79, p. 013812, January 2009. [bib | http | .pdf | arXiv | Abstract]

[224]

C. Jiang, M. Ibanescu, J. D. Joannopoulos, and M. Soljacic, “Zero-group-velocity modes in longitudinally uniform waveguides,” *Applied Physics Letters*, vol. 93, p. 241111, December 2008. [bib | http | Abstract]

[223]

L. Zeng, P. Bermel, Y. Yi, B. A. Alamariu, K. A. Broderick, J. Liu, C. Hong, X. Duan, J. Joannopoulos, and L. C. Kimerling, “Demonstration of enhanced absorption in thin film Si solar cells with textured photonic crystal back reflector,” *Applied Physics Letters*, p. 221105, December 2008. [bib | http | Abstract]

[222]

A. W. Rodriguez, J. N. Munday, J. D. Joannopoulos, F. Capasso, D. A. R. Dalvit, and S. G. Johnson, “Stable suspension and dispersion-induced transitions from repulsive Casimir forces between fluid-separated eccentric cylinders,” *Physical Review Letters*, vol. 101, p. 190404, November 2008. [bib | http | .pdf | arXiv | Abstract]

[221]

D. S. Deng, N. D. Orf, A. F. Abouraddy, A. M. Stolyarov, J. D. Joannopoulos, H. A. Stone, and Y. Fink, “In-fiber semiconductor filament arrays,” *Nano Letters*, vol. 8, pp. 4265–4269, October 2008. [bib | DOI | Abstract]

[220]

K. K. Lee, Y. Avniel, and S. G. Johnson, “Design strategies and rigorous conditions for single-polarization single-mode waveguides,” *Optics Express*, vol. 16, pp. 15170–15184, September 2008. [bib | http | Abstract]

[219]

R. E. Hamam, M. Ibanescu, E. J. Reed, P. Bermel, S. G. Johnson, E. Ippen, J. D. Joannopoulos, and M. Soljacic, “Purcell effect in nonlinear photonic structures: a coupled mode theory analysis,” *Optics Express*, vol. 16, pp. 12523–12537, August 2008. [bib | http | Abstract]

[218]

Z. Xu, X. Jiang, J. D. Joannopoulos, L. Torner, and M. Soljacic, “Nonlinear photonic crystals near the supercollimation point,” *Optics Letters*, vol. 33, pp. 1762–1764, August 2008. [bib | DOI | .pdf | Abstract]

[217]

A. F. Oskooi, L. Zhang, Y. Avniel, and S. G. Johnson, “The failure of perfectly matched layers, and towards their redemption by adiabatic absorbers,” *Optics Express*, vol. 16, pp. 11376–11392, July 2008. [bib | http | Abstract]

[216]

K. K. Y. Lee, Y. Avniel, and S. G. Johnson, “Rigorous sufficient conditions for index-guided modes in microstructured dielectric waveguides,” *Optics Express*, vol. 16, pp. 9261–9275, June 2008. [bib | DOI | http | Abstract]

[215]

A. W. Rodriguez, J. D. Joannopoulos, and S. G. Johnson, “Repulsive and attractive Casimir forces in a glide-symmetric geometry,” *Physical Review A*, vol. 77, p. 062107, June 2008. [bib | http | Abstract]

[214]

Y. D. Chong, X.-G. Wen, and M. Soljacic, “Effective theory of quadratic degeneracies,” *Physical Review B*, vol. 77, p. 235125, June 2008. [bib | http | Abstract]

[213]

A. W. Rodriguez, A. P. McCauley, Y. Avniel, and S. G. Johnson, “Computation and visualization of photonic quasicrystal spectra via Bloch's theorem,” *Physical Review B*, vol. 77, p. 104201, March 2008. [bib | http | .pdf | Abstract]

[212]

S. J. Rahi, A. W. Rodriguez, T. Emig, R. L. Jaffe, S. G. Johnson, and M. Kardar, “Nonmonotonic effects of parallel sidewalls on Casimir forces between cylinders,” *Physical Review A*, vol. 77, p. 030101(R), March 2008. [bib | http | .pdf | arXiv | Abstract]

[211]

C. Kottke, A. Farjadpour, and S. G. Johnson, “Perturbation theory for anisotropic dielectric interfaces, and application to sub-pixel smoothing of discretized numerical methods,” *Physical Review E*, vol. 77, p. 036611, March 2008. [bib | http | .pdf | Abstract]

[210]

J. D. Joannopoulos, S. G. Johnson, J. N. Winn, and R. D. Meade, *Photonic Crystals: Molding the Flow of Light*. Princeton University Press, second ed., February 2008. [bib | http | Abstract]

[209]

Z. Wang, Y. D. Chong, J. D. Joannopoulos, and M. Soljacic, “Reflection-free one-way edge modes in a gyromagnetic photonic crystal,” *Physical Review Letters*, vol. 100,

p. 013905, January 2008. [bib | http | .pdf | Abstract]

[208]

A. Karalis, J. D. Joannopoulos, and M. Soljacic, “Efficient wireless non-radiative mid-range energy transfer,” *Annals of Physics*, vol. 323, pp. 34–48, January 2008. [bib | DOI | .pdf | Abstract]

[207]

E. J. Reed, M. R. Manaa, L. E. Fried, K. R. Glaesemann, and J. D. Joannopoulos, “A transient semimetallic layer in detonating nitromethane,” *Nature Physics*, vol. 4, pp. 72–76, January 2008. [bib | DOI | Abstract]

[206]

S. Zaheer, A. W. Rodriguez, S. G. Johnson, and R. L. Jaffe, “Optical-approximation analysis of sidewall-spacing effects on the force between two squares with parallel sidewalls,” *Physical Review A*, vol. 76, p. 063816, December 2007. [bib | .pdf | Abstract]

[205]

M. Ghebrebrhan, M. Ibanescu, S. G. Johnson, M. Soljacic, and J. D. Joannopoulos, “Distinguishing zero-group-velocity modes in photonic crystals,” *Physical Review A*, vol. 76, p. 063810, December 2007. [bib | .pdf | Abstract]

[204]

P. Bermel, C. Luo, L. Zeng, L. C. Kimerling, and J. D. Joannopoulos, “Improving thin-film crystalline silicon solar cell efficiencies with photonic crystals,” *Optics Express*, vol. 15, pp. 16986–17000, December 2007. [bib | http | Abstract]

[203]

J. Bravo-Abad, A. Rodriguez, P. Bermel, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Enhanced nonlinear optics in photonic-crystal microcavities,” *Optics Express*, vol. 15, pp. 16161–16176, November 2007. [bib | http | .pdf | Abstract]

[202]

J. Bravo-Abad, S. Fan, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, “Modeling nonlinear optical phenomena in nanophotonics,” *Journal of Lightwave Technology*, vol. 25, pp. 2539–2546, September 2007. Invited paper. [bib | .pdf | Abstract]

[201]

A. Rodriguez, M. Ibanescu, D. Iannuzzi, J. D. Joannopoulos, and S. G. Johnson, “Virtual photons in imaginary time: Computing exact Casimir forces via standard numerical-electromagnetism techniques,” *Physical Review A*, vol. 76, p. 032106, September 2007. [bib | .pdf | arXiv | Abstract]

[200]

P. Bermel, A. Rodriguez, J. D. Joannopoulos, and M. Soljacic, “Tailoring optical nonlinearities via the Purcell effect,” *Physical Review Letters*, vol. 99, p. 053601, August 2007. [bib | http | .pdf | Abstract]

[199]

A. Rodriguez, M. Ibanescu, D. Iannuzzi, F. Capasso, J. D. Joannopoulos, and S. G. Johnson, “Computation and visualization of Casimir forces in arbitrary geometries: Nonmonotonic lateral-wall forces and the failure of proximity-force approximations,” *Physical Review Letters*, vol. 99, p. 080401, August 2007. [bib | .pdf | Abstract]

[198]

E. J. Reed, M. R. Armstrong, K. Kim, M. Soljacic, R. Gee, J. H. Glownia, and J. D. Joannopoulos, “Terahertz radiation from shocked materials,” *Materials Today*, vol. 10, pp. 44–50, July 2007. [bib | DOI | .pdf | Abstract]

[197]

X. Jiang, C. Zhou, X. Yu, S. Fan, M. Soljacic, and J. D. Joannopoulos, “The nonlinear effect from the interplay between the nonlinearity and the supercollimation of photonic crystal,” *Applied Physics Letters*, vol. 91, p. 031105, July 2007. [bib | http | .pdf | Abstract]

[196]

A. Kurs, A. Karalis, R. Moffat, J. D. Joannopoulos, P. Fisher, and M. Soljacic, “Wireless power transfer via strongly coupled magnetic resonances,” *Science*, vol. 317, pp. 83–86, July 2007. [bib | DOI | Abstract]

[195]
R. E. Hamam, A. Karalis, J. D. Joannopoulos, and M. Soljacic, “Coupled-mode theory for general free-space resonant scattering of waves,” *Physical Review A*, vol. 75, p. 053801, May 2007. [bib | http | .pdf | Abstract]
[194]
E. J. Reed, M. Soljacic, and J. D. Joannopoulos, “Maxwell equation simulations of coherent optical photon emission from shock waves in crystals,” *Physical Review E*, vol. 75, p. 056611, May 2007. [bib | http | .pdf | Abstract]
[193]
O. Shapira, A. Stolyarov, N. D. Orf, K. Kuriki, A. F. Abouraddy, J. D. Joannopoulos, and Y. Fink, “Towards dynamic surface-emitting fiber lasers,” *Optics and Photonics News*, vol. 18, pp. 26–31, May 2007. [bib | http | Abstract]
[192]
D.-Z. A. Chen, R. Hamam, M. Soljacic, J. D. Joannopoulos, and G. Chen, “Extraordinary optical transmission through subwavelength holes in a polaritonic silicon dioxide film,” *Applied Physics Letters*, vol. 90, p. 181921, May 2007. [bib | http | .pdf | Abstract]
[191]
E. J. Reed, M. Soljacic, R. Gee, and J. D. Joannopoulos, “Molecular dynamics simulations of coherent optical photon emission from shock waves in crystals,” *Physical Review B*, vol. 75, p. 174302, May 2007. [bib | http | .pdf | Abstract]
[190]
A. Rodriguez, M. Soljacic, J. D. Joannopoulos, and S. G. Johnson, “$?^{(2)}$ and $?^{(3)}$ harmonic generation at a critical power in inhomogeneous doubly resonant cavities,” *Optics Express*, vol. 15, pp. 7303–7318, May 2007. [bib | http | .pdf | arXiv | Abstract]
[189]
B. Maes, M. Ibanescu, J. D. Joannopoulos, P. Bienstman, and R. Baets, “Microcavities based on multimodal interference,” *Optics Express*, vol. 15, pp. 6268–6278, May 2007. [bib | http | Abstract]
[188]
E. Lidorikis, S. Egusa, and J. D. Joannopoulos, “Effective medium properties and photonic crystal superstructures of metallic nanoparticle arrays,” *Journal of Applied Physics*, vol. 101, p. 054304, March 2007. [bib | http | Abstract]
[187]
D. L. Chan, I. Celanovic, J. D. Joannopoulos, and M. Soljacic, “Emulating one-dimensional resonant *Q*-matching behavior in a two-dimensional system via Fano resonances,” *Physical Review A*, vol. 74, p. 064901, December 2006. [bib | http | .pdf | Abstract]
[186]
A. F. Abouraddy, O. Shapira, M. Bayindir, J. Arnold, J. D. Joannopoulos, and Y. Fink, “Fabrics that “see”: Photosensitive fibers,” *Optics and Photonics News*, vol. 17, p. 21, December 2006. [bib | http | Abstract]
[185]
S. A. Jacobs, B. Temelkuran, O. Weisberg, M. Ibanescu, S. G. Johnson, and M. Soljacic, “Hollow core fibers,” in *Specialty Optical Fibers Handbook* (A. Mendez and T. Morse, eds.), ch. 11, New York: Elsevier, December 2006. [bib]
[184]
M. Bayindir, A. F. Abouraddy, O. Shapira, J. Viens, D. S. Saygin-Hinczewski, F. Sorin, J. Arnold, J. D. Joannopoulos, and Y. Fink, “Kilometer-long ordered nanophotonic devices by preform-to-fiber fabrication,” *IEEE J. Selected Topics in Quantum Electronics*, vol. 12, pp. 1202–1213, November 2006. [bib | DOI | Abstract]
[183]
J. Bravo-Abad, M. Ibanescu, J. D. Joannopoulos, and M. Soljacic, “Photonic crystal optical waveguides for on-chip Bose-Einstein condensates,” *Physical Review A*, vol. 74, p. 053619, November 2006. [bib | http | .pdf | Abstract]
[182]
Y. Yi, S. Akiyama, P. Bermel, X. Duan, and L. C. Kimerling, “Sharp bending of on-

chip silicon Bragg cladding waveguide with light guiding in low index core materials," *IEEE J. Selected Topics in Quantum Electronics*, vol. 12, pp. 1345–1348, November 2006. [bib | DOI | .pdf | Abstract]

[181]
B. Maes, M. Soljacic, J. D. Joannopoulos, P. Bienstman, R. Baets, S.-P. Gorza, and M. Haelterman, "Switching through symmetry breaking in coupled nonlienar micro-cavities," *Optics Express*, vol. 14, pp. 10678–10683, October 2006. [bib | http | .pdf | Abstract]

[180]
P. Bermel, A. Rodriguez, S. G. Johnson, J. D. Joannopoulos, and M. Soljacic, "Single-photon all-optical switching using waveguide-cavity quantum electrodynamics," *Physical Review A*, vol. 74, p. 043818, October 2006. [bib | http | .pdf | Abstract]

[179]
A. Farjadpour, D. Roundy, A. Rodriguez, M. Ibanescu, P. Bermel, J. D. Joannopoulos, S. G. Johnson, and G. Burr, "Improving accuracy by subpixel smoothing in FDTD," *Optics Letters*, vol. 31, pp. 2972–2974, October 2006. [bib | .pdf | Abstract]

[178]
D. L. Chan, M. Soljacic, and J. D. Joannopoulos, "Direct calculation of thermal emission for three-dimensionally periodic photonic-crystal slabs," *Physical Review E*, vol. 74, p. 036615, September 2006. [bib | http | .pdf | Abstract]

[177]
D. L. C. Chan and M. Soljacic, "Thermal emission and design in 2d-periodic metallic photonic crystal slabs," *Optics Express*, vol. 14, pp. 8785–8796, September 2006. [bib | http | Abstract]

[176]
D. L. Chan, M. Soljacic, and J. D. Joannopoulos, "Thermal emission and design in one-dimensional periodic metallic photonic crystal slabs," *Physical Review E*, vol. 74, p. 016609, July 2006. [bib | http | .pdf | Abstract]

[175]
T. T. Ngo, C. M. Liddell, M. Ghebrebrhan, and J. D. Joannopoulos, "Tetrastack: Colloidal diamond-inspired structure with omnidirectional photonic band gap for low refractive index contrast," *Applied Physics Letters*, vol. 88, p. 241920, June 2006. [bib | http | Abstract]

[174]
A. F. Abouraddy, O. Shapira, M. Bayindir, J. Arnold, F. Sorin, D. S. Hinczewski, J. D. Joannopoulos, and Y. Fink, "Large-scale optical-field measurements with geometric fibre constructs," *Nature Materials*, vol. 5, pp. 532–536, June 2006. [bib | DOI | Abstract]

[173]
O. Shapira, K. Kuriki, N. D. Orf, A. F. Abouraddy, G. Benoit, J. F. Viens, A. Rodriguez, M. Ibanescu, J. D. Joannopoulos, Y. Fink, and M. M. Brewster, "Surface-emitting fiber lasers," *Optics Express*, vol. 14, pp. 3929–3935, May 2006. [bib | http | Abstract]

[172]
P. Bermel, E. Lidorikis, Y. Fink, and J. D. Joannopoulos, "Active materials embedded in photonic crystals and coupled to electromagnetic radiation," *Physical Review B*, vol. 73, p. 165125, April 2006. [bib | http | Abstract]

[171]
E. J. Reed, M. Soljacic, and J. D. Joannopoulos, "Comment on "explanation of the inverse Doppler effect observed in nonlinear transmission lines"," *Physical Review Letters*, vol. 96, p. 069402, February 2006. [bib | http | .pdf | Abstract]

[170]
C. Luo, M. Ibanescu, E. J. Reed, S. G. Johnson, and J. D. Joannopoulos, "Doppler radiation emitted by an oscillating dipole moving inside a photonic band-gap crystal," *Physical Review Letters*, vol. 96, p. 043903, February 2006. [bib | .pdf | Abstract]

[169]
P. T. Rakich, M. S. Dahlem, S. Tandon, M. Ibanescu, M. Soljacic, G. S. Petrich, J. D.

Joannopoulos, L. A. Kolodziejski, and E. P. Ippen, “Achieving centimetre scale supercollimation in a large area 2d photonic crystal,” *Nature Materials*, vol. 5, pp. 93–96, February 2006. [bib | .pdf | Abstract]

[168]

E. J. Reed, M. Soljacic, R. Gee, and J. D. Joannopoulos, “Coherent optical photons from shock waves in crystals,” *Physical Review Letters*, vol. 96, p. 013904, January 2006. [bib | http | .pdf | Abstract]

[167]

M. Ibanescu, E. J. Reed, and J. D. Joannopoulos, “Enhanced photonic band-gap confinement via Van Hove saddle point singularities,” *Physical Review Letters*, vol. 96, p. 033904, January 2006. [bib | http | Abstract]

[166]

M. L. Povinelli, M. Loncar, E. J. Smythe, M. Ibanescu, S. G. Johnson, F. Capasso, and J. D. Joannopoulos, “Enhancement mechanisms for optical forces in integrated optics,” *Proc. SPIE*, vol. 6326, p. 632609, 2006. [bib | .pdf | Abstract]

[165]

A. Farjadpour, D. Roundy, A. Rodriguez, M. Ibanescu, P. Bermel, J. D. Joannopoulos, S. G. Johnson, and G. W. Burr, “Improving accuracy by sub-pixel smoothing in FDTD,” *Proc. SPIE*, vol. 6322, p. 63220G, 2006. [bib | .pdf | Abstract]

[164]

M. L. Povinelli, S. G. Johnson, and J. D. Joannopoulos, “Tunable time delays in photonic-crystal waveguides,” *Proc. SPIE*, vol. 6128, p. 61280R, 2006. [bib | .pdf | Abstract]

[163]

M. Ibanescu, M. Soljacic, S. G. Johnson, and J. D. Joannopoulos, “Ultra-flat bands in two-dimensional photonic crystals,” *Proc. SPIE*, vol. 6128, p. 612808, 2006. Invited paper. [bib | .pdf | Abstract]

[162]

A. Rodriguez, M. Ibanescu, J. D. Joannopoulos, and S. G. Johnson, “Disorder-immune confinement of light in photonic-crystal cavities,” *Optics Letters*, vol. 30, pp. 3192–3194, December 2005. [bib | .pdf | Abstract]

[161]

M. L. Povinelli, M. Loncar, M. Ibanescu, E. J. Smythe, S. G. Johnson, F. Capasso, and J. D. Joannopoulos, “Evanescent-wave bonding between optical waveguides,” *Optics Letters*, vol. 30, pp. 3042–3044, November 2005. [bib | .pdf | Abstract]

[160]

M. Skorobogatiy, S. A. Jacobs, S. G. Johnson, C. Anastassiou, and B. Temelkuran, “Heating of hollow photonic Bragg fibers from field propagation, coupling, and bending,” *Journal of Lightwave Technology*, vol. 23, pp. 3517–3525, November 2005. [bib | .pdf | Abstract]

[159]

M. Bayindir, O. Shapira, D. Saygin-Hinczewski, J. Viens, A. F. Abouraddy, J. D. Joannopoulos, and Y. Fink, “Integrated fibres for self-monitored optical transport,” *Nature Materials*, vol. 4, pp. 820–825, November 2005. [bib | DOI | Abstract]

[158]

M. Povinelli, S. G. Johnson, M. Loncar, M. Ibanescu, E. Smythe, F. Capasso, and J. D. Joannopoulos, “High-Q enhancement of attractive and repulsive optical forces between coupled whispering-gallery-mode resonators,” *Optics Express*, vol. 13, pp. 8286–8295, October 2005. [bib | http | .pdf | Abstract]

[157]

M. Povinelli, S. G. Johnson, and J. D. Joannopoulos, “Slow-light, band-edge waveguides for tunable time delays,” *Optics Express*, vol. 13, pp. 7145–7159, September 2005. [bib | http | .pdf | Abstract]

[156]

S. N. Tandon, M. Soljacic, G. S. Petrich, J. D. Joannopoulos, and L. A. Kolodziejski, “The superprism effect using large area 2d-periodic photonic crystal slabs,” *Photonics and Nanostructures*, vol. 3, pp. 10–18, August 2005. [bib | DOI | .pdf | Abstract]

[155]

A. Karalis, E. Lidorikis, M. Ibanescu, J. D. Joannopoulos, and M. Soljacic, “Surface-plasmon-assisted guiding of broadband slow and subwavelength light in air,” *Physical Review Letters*, vol. 95, p. 063901, August 2005. [bib | http | .pdf | Abstract]

[154]

S. G. Johnson, M. L. Povinelli, M. Soljacic, A. Karalis, S. Jacobs, and J. D. Joannopoulos, “Roughness losses and volume-current methods in photonic-crystal waveguides,” *Applied Physics B*, vol. 81, pp. 283–293, July 2005. Invited paper, special issue on photonic crystals. [bib | .pdf | Abstract]

[153]

G. Benoit, K. Kuriki, J.-F. Viens, J. D. Joannopoulos, and Y. Fink, “Dynamic all-optical tuning of transverse resonant cavity modes in photonic bandgap fibers,” *Optics Letters*, vol. 30, pp. 1620–1622, July 2005. [bib | http | Abstract]

[152]

S. G. Johnson, M. Soljacic, and J. D. Joannopoulos, “Photonic crystals,” in *Encyclopedia of Nonlinear Science* (A. Scott, ed.), New York: Routledge, Taylor and Francis Group, July 2005. [bib]

[151]

D. L. Chan, E. Lidorikis, and J. D. Joannopoulos, “Point defect geometries in inverted opal photonic crystals,” *Physical Review E*, vol. 71, pp. 056602–056607, May 2005. [bib | http | Abstract]

[150]

X. Jiang, Y. Zhang, S. Feng, K. C. Huang, Y. Yi, and J. D. Joannopoulos, “Photonic band gaps and localization in the Thue–Morse structures,” *Applied Physics Letters*, vol. 86, p. 201110, May 2005. [bib | http | Abstract]

[149]

O. Shapira, A. F. Abouraddy, J. D. Joannopoulos, and Y. Fink, “Complete modal decomposition for optical waveguides,” *Physical Review Letters*, vol. 94, pp. 143902–143905, April 2005. [bib | http | Abstract]

[148]

M. Soljacic, E. Lidorikis, J. D. Joannopoulos, and L. V. Hau, “Ultralow-power all-optical switching,” *Applied Physics Letters*, vol. 86, p. 171101, April 2005. [bib | http | .pdf | Abstract]

[147]

M. Ibanescu, S. G. Johnson, D. Roundy, Y. Fink, and J. D. Joannopoulos, “Microcavity confinement based on an anomalous zero group-velocity waveguide mode,” *Optics Letters*, vol. 30, pp. 552–554, March 2005. [bib | .pdf | Abstract]

[146]

M. Soljacic, E. Lidorikis, L. V. Hau, and J. D. Joannopoulos, “Enhancement of microcavity lifetimes using highly dispersive materials,” *Physical Review E*, vol. 71, pp. 026602–026606, February 2005. [bib | http | .pdf | Abstract]

[145]

E. J. Reed, M. Soljacic, M. Ibanescu, and J. D. Joannopoulos, “Reversed and anomalous Doppler effects in photonic crystals and other time-dependent periodic media,” *Journal of Computer-Aided Materials Design*, vol. 12, pp. 1–15, January 2005. [bib | DOI | .pdf | Abstract]

[144]

P. T. Rakich, H. Sotobayashi, J. T. Gopinath, S. G. Johnson, J. W. Sickler, C. W. Wong, J. D. Joannopoulos, and E. P. Ippen, “Nano-scale photonic crystal microcavity characterization with an all-fiber based 1.2–2.0 µm supercontinuum,” *Optics Express*, vol. 13, pp. 821–825, January 2005. [bib | http | .pdf | Abstract]

[143]

P. T. Rakich, H. Sotobayashi, J. T. Gopinath, J. W. Sickler, C. W. Wong, S. G. Johnson, M. Qi, E. Lidorikis, H. I. Smith, J. D. Joannopoulos, and E. P. Ippen, “Broadband optical studies of 1-D and 3-D photonic crystals,” *Proc. SPIE*, vol. 6017, p. 601702, 2005. Invited paper. [bib | .pdf | Abstract]

[142]

M. L. Povinelli, S. G. Johnson, and J. D. Joannopoulos, "High-index-contrast, photonic-band-edge waveguides for tunable time delays," *Proc. SPIE*, vol. 5926, p. 59260D, 2005. [bib | .pdf | Abstract]

[141]
C. Luo, A. Narayanaswamy, G. Chen, and J. D. Joannopoulos, "Thermal radiation from photonic crystals: A direct calculation," *Physical Review Letters*, vol. 93, pp. 213905–213908, November 2004. [bib | http | Abstract]

[140]
S. G. Johnson and J. D. Joannopoulos, "Photonic crystals: Electromagnetic theory," in *Encyclopedia of Modern Optics* (B. D. Guenther, D. G. Steel, and L. Bayvel, eds.), pp. 120–127, Oxford: Elsevier, November 2004. [bib | DOI]

[139]
M. Bayindir, F. Sorin, A. F. Abouraddy, J. Viens, S. D. Hart, J. D. Joannopoulos, and Y. Fink, "Metal–insulator–semiconductor optoelectronic fibres," *Nature*, vol. 431, pp. 826–829, October 2004. [bib | DOI | Abstract]

[138]
Y. Yi, S. Akiyama, P. Bermel, X. Duan, and L. C. Kimerling, "On-chip Si-based Bragg cladding waveguide with high index contrast bilayers," *Optics Express*, vol. 12, pp. 4775–4780, October 2004. [bib | http | Abstract]

[137]
K. C. Huang, M. L. Povinelli, and J. D. Joannopoulos, "Negative effective permeability in polaritonic photonic crystals," *Applied Physics Letters*, vol. 85, pp. 543–545, July 2004. [bib | http | Abstract]

[136]
K. C. Huang, E. Lidorikis, X. Jiang, J. D. Joannopoulos, K. A. Nelson, P. Bienstman, and S. Fan, "Nature of lossy Bloch states in polaritonic photonic crystals," *Physical Review B*, vol. 69, pp. 195111–195120, May 2004. [bib | http | Abstract]

[135]
K. Kuriki, O. Shapira, S. Hart, G. Benoit, Y. Kuriki, J. Viens, M. Bayindir, J. D. Joannopoulos, and Y. Fink, "Hollow multilayer photonic bandgap fibers for NIR applications," *Optics Express*, vol. 12, pp. 1510–1517, April 2004. [bib | http | Abstract]

[134]
C. Luo, M. Soljacic, and J. D. Joannopoulos, "Superprism effect based on phase velocities," *Optics Letters*, vol. 29, pp. 745–747, April 2004. [bib | http | .pdf | Abstract]

[133]
E. Lidorikis, M. Soljacic, M. I. Y. Fink, and J. D. Joannopoulos, "Cutoff solitons in axially uniform systems," *Optics Letters*, vol. 29, pp. 851–853, April 2004. [bib | http | .pdf | Abstract]

[132]
M. Soljacic and J. D. Joannopoulos, "Enhancement of nonlinear effects using photonic crystals," *Nature Materials*, vol. 3, pp. 211–219, April 2004. [bib | DOI | .pdf | Abstract]

[131]
X. Jiang, S. Feng, C. M. Soukoulis, J. Zi, J. D. Joannopoulos, and H. Cao, "Coupling, competition, and stability of modes in random lasers," *Physical Review B*, vol. 69, pp. 104202–104208, March 2004. [bib | http | Abstract]

[130]
P. Bermel, J. D. Joannopoulos, Y. Fink, P. A. Lane, and C. Tapalian, "Properties of radiating pointlike sources in cylindrical omnidirectionally reflecting waveguides," *Physical Review B*, vol. 69, pp. 035316–035322, January 2004. [bib | http | Abstract]

[129]
D. Roundy, E. Lidorikis, and J. D. Joannopoulos, "Polarization-selective waveguide bends in a photonic crystal structure with layered square symmetry," *Journal of Applied Physics*, vol. 96, pp. 7750–7752, 2004. [bib | http | Abstract]

[128]

A. Karalis, S. G. Johnson, and J. D. Joannopoulos, “Discrete-mode cancellation mechanism for high-*Q* integrated optical cavities with small modal volume,” *Optics Letters*, vol. 29, pp. 2309–2311, 2004. [bib | .pdf | Abstract]

[127]

M. L. Povinelli, M. Ibanescu, S. G. Johnson, and J. D. Joannopoulos, “Slow-light enhancement of radiation pressure in an omnidirectional-reflector waveguide,” *Applied Physics Letters*, vol. 85, pp. 1466–1468, 2004. [bib | .pdf | Abstract]

[126]

M. L. Povinelli, S. G. Johnson, E. Lidorikis, J. D. Joannopoulos, and M. Soljacic, “Effect of a photonic band gap on scattering from waveguide disorder,” *Applied Physics Letters*, vol. 84, pp. 3639–3641, 2004. [bib | .pdf | Abstract]

[125]

M. Qi, E. Lidorikis, P. T. Rakich, S. G. Johnson, J. D. Joannopoulos, E. P. Ippen, and H. I. Smith, “A three-dimensional optical photonic crystal with designed point defects,” *Nature*, vol. 429, pp. 538–542, 2004. [bib | .pdf | Abstract]

[124]

C. W. Wong, P. T. Rakich, S. G. Johnson, M. Qi, H. I. Smith, E. P. Ippen, L. C. Kimerling, Y. Jeon, G. Barbastathis, and S.-G. Kim, “Strain-tunable silicon photonic band gap microcavities in optical waveguides,” *Applied Physics Letters*, vol. 84, pp. 1242–1244, 2004. [bib | .pdf | Abstract]

[123]

S. Assefa, P. T. Rakich, P. Bienstman, S. G. Johnson, G. S. Petrich, J. D. Joannopoulos, L. A. Kolodziejski, E. P. Ippen, and H. I. Smith, “Guiding 1.5µm light in photonic crystals based on dielectric rods,” *Applied Physics Letters*, vol. 85, pp. 6110–6112, 2004. [bib | .pdf | Abstract]

[122]

M. Soljacic, E. Lidorikis, M. Ibanescu, S. G. Johnson, J. D. Joannopoulos, and Y. Fink, “Optical bistability and cutoff solitons in photonic bandgap fibers,” *Optics Express*, vol. 12, pp. 1518–1527, 2004. [bib | http | .pdf | Abstract]

[121]

M. Ibanescu, S. G. Johnson, D. Roundy, C. Luo, Y. Fink, and J. D. Joannopoulos, “Anomalous dispersion relations by symmetry breaking in axially uniform waveguides,” *Physical Review Letters*, vol. 92, p. 063903, 2004. [bib | .pdf | Abstract]

[120]

Y. Sasaki, Y. Ohtera, S. G. Johnson, and S. Kawakami, “A reference analytical model of three-dimensional photonic crystal waveguides and their mode spectrum,” *Trans. Inst. Elect. Info. Comm. Eng. C*, vol. J87-C, no. 3, pp. 328–334, 2004. [bib]

[119]

Y. Tanaka, Y. Sugimoto, N. Ikeda, H. Nakamura, K. Asakawa, K. Inoue, and S. G. Johnson, “Group velocity dependence of propagation losses in single-line-defect photonic crystal waveguides on gaas membranes,” *Electronics Letters*, vol. 40, no. 3, pp. 174–176, 2004. [bib | .pdf | Abstract]

[118]

C. W. Wong, X. Yang, P. T. Rakich, S. G. Johnson, M. Qi, Y. Jeon, G. Barbastathis, and S.-G. Kim, “Strain-tunable photonic bandgap microcavity waveguides in silicon at 1.55 µm,” *Proc. SPIE*, vol. 5511, pp. 156–164, 2004. [bib | .pdf | Abstract]

[117]

M. Skorobogatiy, S. A. Jacobs, S. G. Johnson, M. Meunier, and Y. Fink, “Modeling the impact of manufacturing imperfections on photonic crystal device performance: design of perturbation-tolerant PBG components,” *Proc. SPIE*, vol. 5450, pp. 161–172, 2004. [bib | .pdf | Abstract]

[116]

C. Luo, S. G. Johnson, M. Soljacic, J. D. Joannopoulos, and J. B. Pendry, “Novel optical phenomena with photonic crystals,” *Proc. SPIE*, vol. 5166, pp. 207–219, 2004. [bib | .pdf | Abstract]

[115]

M. F. Yanik, S. Fan, M. Soljacic, and J. D. Joannopoulos, “All-optical transistor action with bistable switching in a photonic crystal cross-waveguide geometry," *Optics Letters*, vol. 28, pp. 2506–2508, December 2003. [bib | .pdf | Abstract]

[114]

E. J. Reed, M. Soljacic, and J. D. Joannopoulos, "Reversed Doppler effect in photonic crystals," *Physical Review Letters*, vol. Physical Review Letters, pp. 133901–133904, September 2003. [bib | http | .pdf | Abstract]

[113]

K. C. Huang, P. Bienstman, J. D. Joannopoulos, K. A. Nelson, and S. Fan, "Phonon-polariton excitations in photonic crystals," *Physical Review B*, vol. 68, pp. 075209–075220, August 2003. Erratum: ibid., vol. 68, p. 159903 (2004). [bib | http | Abstract]

[112]

D. Roundy and J. D. Joannopoulos, "Photonic crystal structure with square symmetry within each layer and a three-dimensional band gap," *Applied Physics Letters*, vol. 82, pp. 3835–3837, June 2003. [bib | http | Abstract]

[111]

K. C. Huang, P. Bienstman, J. D. Joannopoulos, K. A. Nelson, and S. Fan, "Field expulsion and reconfiguration in polaritonic photonic crystals," *Physical Review Letters*, vol. 90, pp. 196402–196405, May 2003. Erratum: ibid., vol. 92, p. 169901 (2004). [bib | http | Abstract]

[110]

E. J. Reed, M. Soljacic, and J. D. Joannopoulos, "Color of shock waves in photonic crystals," *Physical Review Letters*, vol. 90, pp. 203904–203907, May 2003. [bib | http | .pdf | Abstract]

[109]

C. Luo, M. Ibanescu, S. G. Johnson, and J. D. Joannopoulos, "Cerenkov radiation in photonic crystals," *Science*, vol. 299, pp. 368–371, 2003. [bib | .pdf | Abstract]

[108]

M. Soljacic, M. Ibanescu, S. G. Johnson, J. D. Joannopoulos, and Y. Fink, "Optical bistability in axially modulated OmniGuide fibers," *Optics Letters*, vol. 28, pp. 516–518, 2003. [bib | .pdf | Abstract]

[107]

C. Luo, S. G. Johnson, J. D. Joannopoulos, and J. Pendry, "Negative refraction without negative index in metallic photonic crystals," *Optics Express*, vol. 11, pp. 746–754, 2003. [bib | http | .pdf | Abstract]

[106]

T. Engeness, M. Ibanescu, S. G. Johnson, O. Weisberg, M. Skorobogatiy, S. Jacobs, and Y. Fink, "Dispersion tailoring and compensation by modal interactions in OmniGuide fibers," *Optics Express*, vol. 11, pp. 1175–1196, 2003. [bib | http | .pdf | Abstract]

[105]

M. Skorobogatiy, C. Anastassiou, S. G. Johnson, O. Weisberg, T. Engeness, S. Jacobs, R. Ahmad, and Y. Fink, "Quantitative characterization of higher-order mode converters in weakly multimoded fibers," *Optics Express*, vol. 11, pp. 2838–2847, 2003. [bib | http | .pdf | Abstract]

[104]

M. Ibanescu, S. G. Johnson, M. Soljacic, J. D. Joannopoulos, Y. Fink, O. Weisberg, T. D. Engeness, S. A. Jacobs, and M. Skorobogatiy, "Analysis of mode structure in hollow dielectric waveguide fibers," *Physical Review E*, vol. 67, p. 046608, 2003. [bib | .pdf | Abstract]

[103]

E. Lidorikis, M. L. Povinelli, S. G. Johnson, and J. D. Joannopoulos, "Polarization-independent linear waveguides in 3d photonic crystals," *Physical Review Letters*, vol. 91, p. 023902, 2003. [bib | .pdf | Abstract]

[102]

C. Luo, S. G. Johnson, and J. D. Joannopoulos, "Subwavelength imaging in photonic crystals," *Physical Review B*, vol. 68, p. 045115, 2003. [bib | .pdf | Abstract]

[101]

M. L. Povinelli, R. E. Bryant, S. Assefa, S. G. Johnson, S. Fan, A. A. Erchak, G. S. Petrich, E. Lidorikis, J. D. Joannopoulos, L. A. Kolodziejski, and E. P. Ippen, “Design of a nanoelectromechanical high-index-contrast guided-wave optical switch for single-mode operation at 1.55 µm,” *IEEE Photonics Technology Letters*, vol. 15, no. 9, pp. 1207–1209, 2003. [bib | DOI | .pdf | Abstract]

[100]

S. G. Johnson and J. D. Joannopoulos, “Designing synthetic optical media: Photonic crystals,” *Acta Materialia*, vol. 51, pp. 5823–5835, 2003. [bib | DOI | .pdf | Abstract]

[99]

E. Lidorikis, M. L. Povinelli, S. G. Johnson, M. Soljacic, M. Ibanescu, Y. Fink, and J. D. Joannopoulos, “Modeling of nanophotonics,” *Proc. SPIE*, vol. 5225, pp. 7–19, 2003. Invited paper. [bib | .pdf | Abstract]

[98]

M. Soljacic, M. Ibanescu, C. Luo, S. G. Johnson, S. Fan, Y. Fink, and J. D. Joannopoulos, “All-optical switching using optical bistability in nonlinear photonic crystals,” *Proc. SPIE*, vol. 5000, pp. 200–214, 2003. Invited paper. [bib | .pdf | Abstract]

[97]

M. Skorobogatiy, S. G. Johnson, S. A. Jacobs, and Y. Fink, “Dielectric profile variations in high-index-contrast waveguides, coupled mode theory, and perturbation expansions,” *Physical Review E*, vol. 67, p. 046613, 2003. [bib | .pdf | Abstract]

[96]

M. L. Povinelli, S. G. Johnson, J. D. Joannopoulos, and J. B. Pendry, “Toward photonic-crystal metamaterials: Creating magnetic emitters in photonic crystals,” *Applied Physics Letters*, vol. 82, pp. 1069–1071, 2003. [bib | .pdf | Abstract]

[95]

P. Bienstman, S. Assefa, S. G. Johnson, J. D. Joannopoulos, G. S. Petrich, and L. A. Kolodziejski, “Taper structures for coupling into photonic crystal slab waveguides,” *Journal of the Optical Society of America B*, vol. 20, pp. 1817–1821, 2003. [bib | .pdf | Abstract]

[94]

S. G. Johnson, M. L. Povinelli, P. Bienstman, M. Skorobogatiy, M. Soljacic, M. Ibanescu, E. Lidorikis, and J. D. Joannopoulos, “Coupling, scattering and perturbation theory: Semi-analytical analyses of photonic-crystal waveguides,” in *Proc. 2003 5th Intl. Conf. on Transparent Optical Networks and 2nd European Symp. on Photonic Crystals*, vol. 1, pp. 103–109, 2003. [bib | .pdf | Abstract]

[93]

B. Temelkuran, S. D. Hart, G. Benoit, J. D. Joannopoulos, and Y. Fink, “Wavelength-scalable hollow optical fibres with large photonic bandgaps for CO_2 laser transmission,” *Nature*, vol. 420, pp. 650–653, December 2002. [bib | DOI | Abstract]

[92]

P. A. Bermel and M. Warner, “Photonic band structure of highly deformable self-assembling systems,” *Physical Review E*, vol. 65, p. 010702(R), December 2002. [bib | http | Abstract]

[91]

Y. Yi, P. Bermel, K. Wada, X. Duan, J. D. Joannopoulos, and L. C. Kimerling, “Tunable multichannel optical filter based on silicon photonic band gap materials actuation,” *Applied Physics Letters*, vol. 81, pp. 4112–4114, November 2002. [bib | http | Abstract]

[90]

S. Fan and J. D. Joannopoulos, “Analysis of guided resonances in photonic crystal slabs,” *Physical Review B*, vol. 65, pp. 235112–235119, June 2002. [bib | http | Abstract]

[89]

P. A. Bermel and M. Warner, “Photonic band structure of cholesteric elastomers,” *Physical Review E*, vol. 65, p. 056614, May 2002. [bib | http | Abstract]

[88]

S. D. Hart, G. R. Maskaly, B. Temelkuran, P. H. Prideaux, J. D. Joannopoulos, and Y. Fink, “External reflection from omnidirectional dielectric mirror fibers,” *Science*, vol. 296, pp. 510–513, April 2002. [bib | DOI | Abstract]

[87]
S. Y. Lin, E. Chow, J. Bur, S. G. Johnson, and J. D. Joannopoulos, “Low-loss, wide-angle Y splitter at approximately ~1.6 µm wavelengths built with a two-dimensional photonic crystal,” *Optics Letters*, vol. 27, pp. 1400–1402, 2002. [bib | .pdf | Abstract]

[86]
M. R. Watts, S. G. Johnson, H. A. Haus, and J. D. Joannopoulos, “Electromagnetic cavity with arbitrary *Q* and small modal volume without a complete photonic bandgap,” *Optics Letters*, vol. 27, pp. 1785–1787, 2002. [bib | .pdf | Abstract]

[85]
C. Luo, S. G. Johnson, and J. D. Joannopoulos, “All-angle negative refraction without negative effective index,” *Physical Review B*, vol. 65, p. 201104, 2002. [bib | .pdf | Abstract]

[84]
S. G. Johnson, M. Ibanescu, M. A. Skorobogatiy, O. Weisberg, J. D. Joannopoulos, and Y. Fink, “Perturbation theory for Maxwell's equations with shifting material boundaries,” *Physical Review E*, vol. 65, p. 066611, 2002. [bib | .pdf | Abstract]

[83]
M. Soljacic, M. Ibanescu, S. G. Johnson, Y. Fink, and J. D. Joannopoulos, “Optimal bistable switching in nonlinear photonic crystals,” *Physical Review E*, vol. 66, p. 055601, 2002. [bib | .pdf | Abstract]

[82]
S. G. Johnson, P. Bienstman, M. A. Skorobogatiy, M. Ibanescu, E. Lidorikis, and J. D. Joannopoulos, “Adiabatic theorem and continuous coupled-mode theory for efficient taper transitions in photonic crystals,” *Physical Review E*, vol. 66, p. 066608, 2002. [bib | .pdf | Abstract]

[81]
C. Luo, S. G. Johnson, and J. D. Joannopoulos, “All-angle negative refraction in a three-dimensionally periodic photonic crystal,” *Applied Physics Letters*, vol. 81, pp. 2352–2354, 2002. [bib | .pdf | Abstract]

[80]
M. Skorobogatiy, S. Jacobs, S. G. Johnson, and Y. Fink, “Geometric variations in high index-contrast waveguides, coupled mode theory in curvilinear coordinates,” *Optics Express*, vol. 10, pp. 1227–1243, 2002. [bib | http | .pdf | Abstract]

[79]
M. Soljacic, S. G. Johnson, S. Fan, M. Ibanescu, E. Ippen, and J. D. Joannopoulos, “Photonic-crystal slow-light enhancement of nonlinear phase sensitivity,” *Journal of the Optical Society of America B*, vol. 19, pp. 2052–2059, 2002. [bib | .pdf | Abstract]

[78]
M. Skorobogatiy, M. Ibanescu, S. G. Johnson, O. Weisberg, T. D. Engeness, M. Soljacic, S. A. Jacobs, and Y. Fink, “Analysis of general geometric scaling perturbations in a transmitting waveguide: Fundamental connection between polarization-mode dispersion and group-velocity dispersion,” *Journal of the Optical Society of America B*, vol. 19, pp. 2867–2875, 2002. [bib | .pdf | Abstract]

[77]
S. G. Johnson, M. Ibanescu, M. A. Skorobogatiy, O. Weisberg, T. D. Engeness, M. Soljacic, S. A. Jacobs, J. D. Joannopoulos, and Y. Fink, “Breaking the glass ceiling: Hollow OmniGuide fibers,” *Proc. SPIE*, vol. 4655, pp. 1–15, 2002. [bib | .pdf | Abstract]

[76]
M. Soljacic, S. G. Johnson, S. Fan, M. Ibanescu, E. P. Ippen, and J. D. Joannopoulos, “Enhancement of phase sensitivity by exploring slow light in photonic crystals,” *Proc. SPIE*, vol. 4870, pp. 248–258, 2002. [bib | .pdf | Abstract]

[75]
E. K. Chow, S.-Y. Lin, S. G. Johnson, and J. D. Joannopoulos, “Transmission

measurement of quality factor in two-dimensional photonic-crystal microcavity," *Proc. SPIE*, vol. 4646, pp. 199–204, 2002. [bib | .pdf | Abstract]

[74]

S. Fan, P. R. Villeneuve, J. D. Joannopoulos, and H. A. Haus, "Loss-induced on/off switching in a channel add/drop filter," *Physical Review B*, vol. 64, pp. 245302–245308, December 2001. [bib | http | Abstract]

[73]

J. D. Joannopoulos, "Photonics: Self-assembly lights up," *Nature*, vol. 414, pp. 257–258, November 2001. [bib | DOI | Abstract]

[72]

B. Temelkuran, E. L. Thomas, J. D. Joannopoulos, and Y. Fink, "Low-loss infrared dielectric material system for broadband dual-range omnidirectional reflectivity," *Optics Letters*, vol. 26, pp. 1370–1372, September 2001. [bib | http | Abstract]

[71]

J. D. Joannopoulos, S. Fan, A. Mekis, and S. G. Johnson, "Novelties of light with photonic crystals," in *Photonic Crystals and Light Localization in the 21st Century* (C. M. Soukoulis, ed.), vol. 563 of *NATO Science Series C: Mathematical and Physical Sciences*, pp. 1–24, Dordrecht, Netherlands: Kluwer, May 2001. [bib | http]

[70]

A. Mekins and J. D. Joannopoulos, "Tapered couplers for efficient interfacing between dielectric and photonic crystal waveguides," *Journal of Lightwave Technology*, vol. 19, no. 9, pp. 861–865, 2001. [bib | DOI | http | Abstract]

[69]

A. A. Erchak, D. J. Ripin, S. Fan, P. Rakich, J. D. Joannopoulos, E. P. Ippen, G. S. Petrich, and L. A. Kolodziejski, "Enhanced coupling to vertical radiation using a two-dimensional photonic crystal in a semiconductor light-emitting diode," *Applied Physics Letters*, vol. 78, pp. 563–565, January 2001. [bib | http | Abstract]

[68]

S. G. Johnson and J. D. Joannopoulos, "Block-iterative frequency-domain methods for Maxwell's equations in a planewave basis," *Optics Express*, vol. 8, pp. 173–190, 2001. [bib | http | .pdf | Abstract]

[67]

S. G. Johnson, M. Ibanescu, M. Skorobogatiy, O. Weisberg, T. D. Engeness, M. Soljacic, S. A. Jacobs, J. D. Joannopoulos, and Y. Fink, "Low-loss asymptotically single-mode propagation in large-core OmniGuide fibers," *Optics Express*, vol. 9, pp. 748–779, 2001. [bib | http | .pdf | Abstract]

[66]

E. Chow, S. Y. Lin, J. R. Wendt, S. G. Johnson, and J. D. Joannopoulos, "Quantitative analysis of bending efficiency in photonic-crystal waveguide bends at ?= 1.55µm wavelengths," *Optics Letters*, vol. 26, pp. 286–288, 2001. [bib | .pdf | Abstract]

[65]

S. Y. Lin, E. Chow, S. G. Johnson, and J. D. Joannopoulos, "Direct measurement of the quality factor in a two-dimensional photonic-crystal microcavity," *Optics Letters*, vol. 26, pp. 1903–1905, 2001. [bib | .pdf | Abstract]

[64]

S. G. Johnson, S. Fan, A. Mekis, and J. D. Joannopoulos, "Multipole-cancellation mechanism for high-*Q* cavities in the absence of a complete photonic band gap," *Applied Physics Letters*, vol. 78, pp. 3388–3390, 2001. Invited paper. [bib | .pdf | Abstract]

[63]

S. G. Johnson, A. Mekis, S. Fan, and J. D. Joannopoulos, "Molding the flow of light," *Computing in Science and Engineering*, vol. 3, no. 6, pp. 38–47, 2001. Invited paper. [bib | .pdf | Abstract]

[62]

S. Fan, S. G. Johnson, J. D. Joannopoulos, C. Manolatou, and H. A. Haus, "Waveguide branches in photonic crystals," *Journal of the Optical Society of America B*, vol. 18, pp. 162–165, 2001. [bib | .pdf | Abstract]

[61]

M. L. Povinelli, S. G. Johnson, S. Fan, and J. D. Joannopoulos, “Emulation of two-dimensional photonic crystal defect modes in a photonic crystal with a three-dimensional photonic band gap,” *Physical Review B*, vol. 64, p. 075313, 2001. [bib | .pdf | Abstract]

[60]

S. G. Johnson, M. L. Povinelli, and J. D. Joannopoulos, “New photonic crystal system for integrated optics,” *Proc. SPIE*, vol. 4532, pp. 167–179, 2001. Invited paper. [bib | .pdf | Abstract]

[59]

E. K. Chow, S.-Y. Lin, S. G. Johnson, J. D. Joannopoulos, J. A. Bur, and P. R. Villeneuve, “Demonstration of high waveguide bending efficiency (>90%) in a photonic-crystal slab at 1.5-µm wavelengths,” *Proc. SPIE*, vol. 4283, pp. 453–461, 2001. [bib | .pdf | Abstract]

[58]

S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “Rate-equation analysis of output efficiency and modulation rate of photonic-crystal light-emitting diodes,” *IEEE Journal of Quantum Electronics*, vol. 36, pp. 1123–1130, October 2000. [bib | DOI | Abstract]

[57]

A. Mekis, A. Dodabalapur, R. E. Slusher, and J. D. Joannopoulos, “Two-dimensional photonic crystal couplers for unidirectional light output,” *Optics Letters*, vol. 25, pp. 942–944, July 2000. [bib | http | Abstract]

[56]

M. Ibanescu, Y. Fink, S. Fan, E. L. Thomas, and J. D. Joannopoulos, “An all-dielectric coaxial waveguide,” *Science*, vol. 289, pp. 415–419, July 2000. [bib | DOI | Abstract]

[55]

M. Skorobogatiy and J. D. Joannopoulos, “Photon modes in photonic crystals undergoing rigid vibrations and rotations,” *Physical Review B*, vol. 61, pp. 15554–15557, June 2000. Erratum: ibid., vol. 62, pp. 13230–13231 (2000). [bib | http | Abstract]

[54]

M. Skorobogatiy and J. D. Joannopoulos, “Rigid vibrations of a photonic crystal and induced interband transitions,” *Physical Review B*, vol. 61, pp. 5293–5302, February 2000. [bib | http | Abstract]

[53]

D. J. Ripin, K.-Y. Lim, G. S. Petrich, P. R. Villeneuve, S. Fan, E. R. Thoen, J. D. Joannopoulos, E. P. Ippen, and L. A. Kolodziejski, “Photonic band gap airbridge microcavity resonances in GaAs/Al_xO_y waveguides,” *Journal of Applied Physics*, vol. 87, pp. 1578–1580, February 2000. [bib | http | Abstract]

[52]

S. Y. Lin, E. Chow, S. G. Johnson, and J. D. Joannopoulos, “Demonstration of highly efficient waveguiding in a photonic crystal slab at the 1.5-µm wavelength,” *Optics Letters*, vol. 25, pp. 1297–1299, 2000. [bib | .pdf | Abstract]

[51]

S. G. Johnson, P. R. Villeneuve, S. Fan, and J. D. Joannopoulos, “Linear waveguides in photonic-crystal slabs,” *Physical Review B*, vol. 62, pp. 8212–8222, 2000. [bib | .pdf | Abstract]

[50]

E. Chow, S. Y. Lin, S. G. Johnson, P. R. Villeneuve, J. D. Joannopoulos, J. R. Wendt, G. A. Vawter, W. Zubrzycki, H. Hou, and A. Alleman, “Three-dimensional control of light in a two-dimensional photonic crystal slab,” *Nature*, vol. 497, pp. 983–986, 2000. [bib | .pdf | Abstract]

[49]

S. G. Johnson and J. D. Joannopoulos, “Three-dimensionally periodic dielectric layered structure with omnidirectional photonic band gap,” *Applied Physics Letters*, vol. 77, pp. 3490–3492, 2000. [bib | .pdf | Abstract]

[48]

A. Mekis, S. Fan, and J. D. Joannopoulos, “Absorbing boundary conditions for FDTD simulations of photonic crystal waveguides,” *IEEE Microwave and Guided Wave Letters*, vol. 9, pp. 502–504, December 1999. [bib | DOI | Abstract]

[47]
Y. Fink, D. J. Ripin, S. Fan, C. Chen, J. D. Joannopoulos, and E. L. Thomas, “Guiding optical light in air using an all dielectric structure,” *Journal of Lightwave Technology*, vol. 17, pp. 2039–2041, November 1999. [bib | http | Abstract]

[46]
D. J. Ripin, K.-Y. Lim, G. S. Petrich, P. R. Villeneuve, S. Fan, E. R. Thoen, J. D. Joannopoulos, E. P. Ippen, and L. A. Kolodziejski, “One-dimensional photonic bandgap microcavities for strong optical confinement in GaAs and GaAs/Al_xO_y semiconductor waveguides,” *Journal of Lightwave Technology*, vol. 17, pp. 2152–2160, November 1999. [bib | http | Abstract]

[45]
S. Fan, I. Appelbaum, and J. D. Joannopoulos, “Near-field scanning optical microscopy as a simultaneous probe of fields and band structure of photonic crystals: A computational study,” *Applied Physics Letters*, vol. 75, pp. 3461–3463, November 1999. [bib | http | Abstract]

[44]
M. J. Khan, C. Manolatou, S. Fan, P. R. Villeneuve, H. A. Haus, and J. D. Joannopoulos, “Mode-coupling analysis of multipole symmetric resonant add/drop filters,” *IEEE Journal of Quantum Electronics*, vol. 35, pp. 1451–1460, October 1999. [bib | DOI | Abstract]

[43]
C. Manolatou, M. J. Khan, S. Fan, P. R. Villeneuve, H. A. Haus, and J. D. Joannopoulos, “Coupling of modes analysis of resonant channel add-drop filters,” *IEEE Journal of Quantum Electronics*, vol. 35, pp. 1322–1331, September 1999. [bib | DOI | Abstract]

[42]
A. Mekis, M. Meier, A. Dodabalapur, R. E. Slusher, and J. D. Joannopoulos, “Lasing mechanism in two-dimensional photonic crystal lasers,” *Applied Physics A*, vol. 69, pp. 111–114, July 1999. [bib | DOI | Abstract]

[41]
S. Fan, P. R. Villeneuve, J. D. Joannopoulos, M. J. Khan, C. Manolatou, and H. A. Haus, “Theoretical analysis of channel drop tunneling processes,” *Physical Review B*, vol. 59, pp. 15882–15892, June 1999. [bib | http | Abstract]

[40]
K.-Y. Lim, D. J. Ripin, G. S. Petrich, L. A. Kolodziejski, E. P. Ippen, M. Mondol, H. I. Smith, P. R. Villeneuve, S. Fan, and J. D. Joannopoulos, “Photonic band-gap waveguide microcavities: Monorails and air bridges,” *Journal of Vacuum Science and Technology B*, vol. 17, pp. 1171–1174, February 1999. [bib | DOI | Abstract]

[39]
J. N. Winn, S. Fan, J. D. Joannopoulos, and E. P. Ippen, “Interband transitions in photonic crystals,” *Physical Review B*, vol. 59, pp. 1551–1554, January 1999. [bib | http | Abstract]

[38]
Y. Fink, A. M. Urbas, M. G. Bawendi, J. D. Joannopoulos, and E. L. Thomas, “Block copolymers as photonic bandgap materials,” *Journal of Lightwave Technology*, vol. 17, no. 11, pp. 1963–1969, 1999. [bib | DOI | http | Abstract]

[37]
C. Manolatou, S. G. Johnson, S. Fan, P. R. Villeneuve, H. A. Haus, and J. D. Joannopoulos, “High-density integrated optics,” *Journal of Lightwave Technology*, vol. 17, no. 9, pp. 1682–1692, 1999. [bib | .pdf | Abstract]

[36]
S. G. Johnson, S. Fan, P. R. Villeneuve, J. D. Joannopoulos, and L. A. Kolodziejski, “Guided modes in photonic crystal slabs,” *Physical Review B*, vol. 60, pp. 5751–5758, 1999. [bib | .pdf | Abstract]

[35]

Y. Fink, J. N. Winn, S. Fan, C. Chen, J. Michel, J. D. Joannopoulos, and E. L. Thomas, “A dielectric omnidirectional reflector,” *Science*, vol. 282, pp. 1679–1682, November 1998. [bib | DOI | Abstract]

[34]

J. N. Winn, Y. Fink, S. Fan, and J. D. Joannopoulos, “Omnidirectional reflection from a one-dimensional photonic crystal,” *Optics Letters*, vol. 23, pp. 1573–1575, October 1998. [bib | http | Abstract]

[33]

S.-Y. Lin, E. Chow, V. Hietala, P. R. Villeneuve, and J. D. Joannopoulos, “Experimental demonstration of guiding and bending of electromagnetic waves in a photonic crystal,” *Science*, vol. 282, pp. 274–276, October 1998. [bib | DOI | Abstract]

[32]

A. Mekis, S. Fan, , and J. D. Joannopoulos, “Bound states in photonic crystal waveguides and waveguide bends,” *Physical Review B*, vol. 58, pp. 4809–4817, August 1998. [bib | http | Abstract]

[31]

D. F. Sievenpiper, E. Yablonovitch, J. N. Winn, S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “3d metallo-dielectric photonic crystals with strong capacitive coupling between metallic islands,” *Physical Review Letters*, vol. 80, pp. 2829–2832, March 1998. [bib | http | Abstract]

[30]

S. Fan, P. R. Villeneuve, J. D. Joannopoulos, and H. A. Haus, “Channel drop tunneling through localized states,” *Physical Review Letters*, vol. 80, pp. 960–963, February 1998. [bib | http | Abstract]

[29]

P. R. Villeneuve, S. Fan, S. G. Johnson, and J. D. Joannopoulos, “Three-dimensional photon confinement in photonic crystals of low-dimensional periodicity,” *IEE Proceedings: Optoelectronics*, vol. 145, no. 6, pp. 384–390, 1998. [bib | .pdf | Abstract]

[28]

S. G. Johnson, C. Manolatou, S. Fan, P. Villeneuve, J. D. Joannopoulos, and H. A. Haus, “Elimination of cross talk in waveguide intersections,” *Optics Letters*, vol. 23, no. 23, pp. 1855–1857, 1998. [bib | .pdf | Abstract]

[27]

J. S. Foresi, P. R. Villeneuve, J. Ferrera, E. R. Thoen, G. Steinmeyer, S. Fan, J. D. Joannopoulos, L. C. Kimerling, H. I. Smith, and E. P. Ippen, “Photonic-bandgap microcavities in optical waveguides,” *Nature*, vol. 390, pp. 143–145, November 1997. [bib | DOI | Abstract]

[26]

S. Fan, P. R. Villeneuve, J. D. Joannopoulos, and E. F. Schubert, “High extraction efficiency of spontaneous emission from slabs of photonic crystals,” *Physical Review Letters*, vol. 78, pp. 3294–3297, April 1997. [bib | http | Abstract]

[25]

J. D. Joannopoulos, P. R. Villeneuve, and S. Fan, “Photonic crystals,” *Solid State Communications*, vol. 102, pp. 165–173, April 1997. [bib | DOI | Abstract]

[24]

J. D. Joannopoulos, P. R. Villeneuve, and S. Fan, “Photonic crystals: Putting a new twist on light,” *Nature*, vol. 386, pp. 143–149, March 1997. Erratum: ibid. vol. 387, p. 830 (1997). [bib | DOI | Abstract]

[23]

P. R. Villeneuve, D. S. Abrams, S. Fan, and J. D. Joannopoulos, “Single-mode waveguide microcavity for fast optical switching,” *Optics Letters*, vol. 21, pp. 2017–2019, December 1996. [bib | http | Abstract]

[22]

J. C. Chen, H. A. Haus, S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “Optical filters from photonic band gap air bridges,” *Journal of Lightwave Technology*, vol. 14, pp. 2575–2580, November 1996. [bib | DOI | Abstract]

[21]

S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “Large omnidirectional band gaps in metallodielectric photonic crystals,” *Physical Review B*, vol. 54, pp. 11245–11251, October 1996. [bib | http | Abstract]

[20]

A. Mekis, J. C. Chen, I. Kurland, S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “High transmission through sharp bends in photonic crystals waveguides,” *Physical Review Letters*, vol. 77, pp. 3787–3790, October 1996. [bib | http | Abstract]

[19]

P. R. Villeneuve, S. Fan, and J. D. Joannopoulos, “Microcavities in photonic crystals: Mode symmetry, tunability, and coupling efficiency,” *Physical Review B*, vol. 54, pp. 7837–7842, September 1996. [bib | http | Abstract]

[18]

S. Fan, P. R. Villeneuve, and J. D. Joannopoulos, “Theoretical investigation of fabrication-related disorder on the properties of photonic crystals,” *Journal of Applied Physics*, vol. 78, pp. 1415–1418, August 1995. [bib | http | Abstract]

[17]

S. Fan, J. N. Winn, A. Devenyi, J. C. Chen, R. D. Meade, and J. D. Joannopoulos, “Guided and defect modes in periodic dielectric waveguides,” *Journal of the Optical Society of America B*, vol. 12, pp. 1267–1272, July 1995. [bib | http | Abstract]

[16]

P. R. Villeneuve, S. Fan, J. D. Joannopoulos, K.-Y. Lim, G. S. Petrich, L. A. Kolodziejski, and R. Reif, “Air-bridge microcavities,” *Applied Physics Letters*, vol. 67, pp. 167–169, July 1995. [bib | http | Abstract]

[15]

S. Fan, J. N. Winn, A. Devenyi, J. C. Chen, R. D. Meade, and J. D. Joannopoulos, “Guided and defect modes in periodic dielectric waveguides,” *Journal of the Optical Society of America B*, vol. 12, pp. 1267–1272, July 1995. [bib | http | Abstract]

[14]

J. D. Joannopoulos, “Photonics: Minding the gap,” *Nature*, vol. 375, p. 278, May 1995. [bib]

[13]

S. Fan, P. R. Villeneuve, R. D. Meade, and J. D. Joannopoulos, “Design of three-dimensional photonic crystals at submicron lengthscales,” *Applied Physics Letters*, vol. 65, pp. 1466–1468, September 1994. [bib | http | Abstract]

[12]

R. D. Meade, A. Devenyi, J. D. Joannopoulos, O. L. Alerhand, D. A. Smith, and K. Kash, “Novel applications of photonic band gap materials: low-loss bends and high *Q* cavities,” *Journal of Applied Physics*, vol. 75, pp. 4753–4755, May 1994. [bib | http | Abstract]

[11]

J. N. Winn, R. D. Meade, and J. D. Joannopoulos, “Two-dimensional photonic band-gap materials,” *Journal of Modern Optics*, vol. 41, pp. 257–273, February 1994. [bib | DOI | Abstract]

[10]

R. D. Meade, A. M. Rappe, K. D. Brommer, J. D. Joannopoulos, and O. L. Alerhand, “Accurate theoretical analysis of photonic band-gap materials,” *Physical Review B*, vol. 48, pp. 8434–8437, September 1993. Erratum: ibid., vol. 55, p. 15942 (1997). [bib | http | Abstract]

[9]

W. M. Robertson, G. Arjavalingam, R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, “Observation of surface photons on periodic dielectric arrays,” *Optics Letters*, vol. 18, pp. 528–530, April 1993. [bib | http | Abstract]

[8]

W. M. Robertson, G. Arjavalingam, R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, “Measurement of the photon dispersion relation in two-dimensional ordered dielectric arrays," *Journal of the Optical Society of America B*, vol. 10, pp. 322–327, February 1993. [bib | http | Abstract]

[7]

R. D. Meade, A. M. Rappe, K. D. Brommer, and J. D. Joannopoulos, "Nature of the photonic band gap: some insights from field analysis," *Journal of the Optical Society of America B*, vol. 10, pp. 328–332, February 1993. [bib | http | Abstract]

[6]

E. Yablonovitch, T. J. Gmitter, K. M. Leung, R. D. Meade, A. M. Rappe, K. D. Brommer, and J. D. Joannopoulos, "3-dimensional photonic band structure," *Optical and Quantum Electronics*, vol. 24, pp. S273–S283, December 1992. [bib | DOI | Abstract]

[5]

R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, "Existence of a photonic band gap in two dimensions," *Applied Physics Letters*, vol. 61, pp. 495–497, July 1992. [bib | http | Abstract]

[4]

W. M. Robertson, G. Arjavalingam, R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, "Measurement of photonic band structure in a two-dimensional periodic dielectric array," *Physical Review Letters*, vol. 68, pp. 2023–2026, March 1992. [bib | http | Abstract]

[3]

E. Yablonovitch, T. J. Gmitter, R. D. Meade, A. M. Rappe, K. D. Brommer, and J. D. Joannopoulos, "Donor and acceptor modes in photonic band structure," *Physical Review Letters*, vol. 67, pp. 3380–3383, December 1991. [bib | http | Abstract]

[2]

R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, "Photonic bound states in periodic dielectric materials," *Physical Review B*, vol. 44, pp. 13772–13774, December 1991. [bib | http | Abstract]

[1]

R. D. Meade, K. D. Brommer, A. M. Rappe, and J. D. Joannopoulos, "Electromagnetic Bloch waves at the surface of a photonic crystal," *Physical Review B*, vol. 44, pp. 10961–10964, November 1991. [bib | http | Abstract]

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The Joannopoulos Research Group at MIT

Welcome to the home page of our research group, headed by Professor John D. Joannopoulos of the MIT physics department.

As a part of the condensed matter theory division, we are actively researching a variety of complex systems from an *ab initio* standpoint. Most of our investigations fall into the broad categories of photonic crystals and optics (**photons**) or atomic systems and electronic structure (**atoms**).

We invite you to read about the members of our group, find out what papers we have written, and visit the pages describing our photonic crystal and atomic materials research.

Feedback about these web pages may be directed to jdjweb@ab-initio.mit.edu.

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Photonic Crystal Research

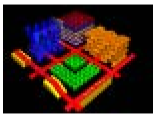
About half of our group is dedicated to working on problems related to a new kind of material, **photonic crystals** (also known as **photonic band-gap materials**). Photonic crystals are periodic dielectric structures that have a **band gap** that forbids propagation of a certain frequency range of light. This property enables one to control light with amazing facility and produce effects that are impossible with conventional optics.

Photonic crystals are described exactly by Maxwell's Equations, which we can (and do) solve by the application of massive computational power. Much of our research, however, is directed at achieving a higher level of understanding of these systems, so that we can predict and explain their behavior without resorting to brute force calculation.

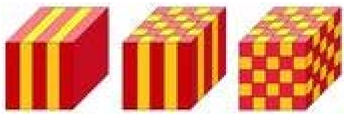
We are also interested in finding new phenomena and devices that are made possible by photonic crystals, and have already filed several patents for our discoveries.

Our group works closely with researchers in the Materials Science and Engineering department of MIT (CMSE) and elsewhere to actually fabricate our designs.

Tutorials and Software



Photonic Crystals: Molding the Flow of Light: The greatly revised second edition of our popular textbook on photonic crystals is now available, including a PDF of the entire book readable online at no cost.

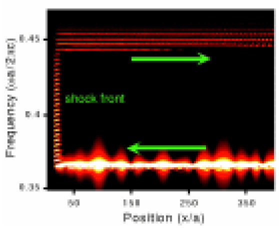


Photonic Crystals Tutorial: We have placed online the slides and other materials from various tutorials on photonic crystals and related subjects. This course introduced light propagation in periodic systems, photonic crystals and band gaps, localized defect states, 3d fabrication technology, hybrid structures and index guiding, and photonic-crystal fibers, among other topics.

MIT Photonic-Bands

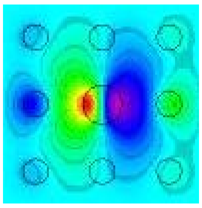
MIT Photonic-Bands: MPB is a free program to compute the band structures (dispersion relations) and electromagnetic modes of periodic dielectric structures; it is designed for studying the photonic-crystal systems that are the focus of our research. MPB's features include: fully-vectorial, 3D computations; a flexible user interface based upon the GNU Guile scripting language; output in HDF format; and iterative, "targeted" eigensolver methods to address very large problems by solving for only a few states near a specified frequency. It is portable to most Unix-like systems, and parallel support is forthcoming.

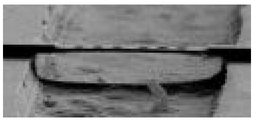
Research Projects and Results



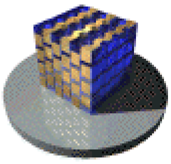
The Color of Shock Waves in Photonic Crystals: New physical effects occur when light interacts with a shock wave propagating through a one-dimensional photonic crystal. These new phenomena include frequency shifts across the photonic crystal bandgap and the bandwidth narrowing of an arbitrary input signal with 100% efficiency. Light can also be slowed down by orders of magnitude.

Resonant Cavities: By making point defects in a photonic crystal, light can be localized, trapped in the defect. The frequency, symmetry, and other properties of the defect mode can be easily tuned to anything desired.

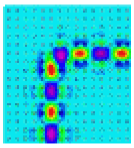




One-dimensionally Periodic Structures: By adding a periodic structure to a conventional waveguide, it is possible to create a one-dimensionally periodic photonic crystal. Such structures can be used as high-Q filters, and have been successfully fabricated and tested by our colleagues in CSME.

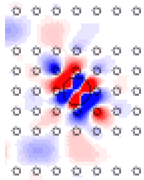


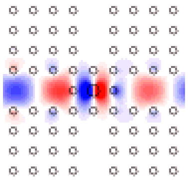
Three-dimensional Structures: We have proposed (in 1994 and 2000) structures with full three-dimensional band gaps which, we hope, will be amenable to fabrication.



Waveguide Bends: With photonic crystals, it is possible to create waveguides that permit 90 degree bends with 100% transmission. This phenomenon can be understood as the analogue of one-dimensional resonant tunnelling phenomena in quantum mechanics.

Channel-Drop Filters: Photonic crystals can be used to design a perfect channel-drop filter. This is a device which picks out a small range of frequencies from a waveguide and reroutes it in another direction, leaving the other frequencies unaffected.





Waveguide Crossings: We have proposed a novel design for intersecting optical waveguides with negligible crosstalk, using general symmetry considerations that can be applied *a priori* to diverse systems.

Photonic Micropolis: This is not a research project, but is simply a fanciful depiction of a "photonic micropolis" incorporating many elements of our research. Photonic crystal buildings house bundles of light, and highways and bridges guide light along narrow channels and around tight corners.

Members of the Ab-Initio Physics Research Group

We are located in building 6C of MIT, in the condensed matter theory division of the physics department. Our fax number is (617)253-2562.

John Joannopoulos

Our research group is headed by John D. Joannopoulos, the Francis Wright Davis Professor of Physics and Director of the Institute for Soldier Nanotechnologies at MIT.

He is a principal investigator for the *ab initio* physics group within the Research Laboratory for Electronics.

Professor Joannopoulos can be reached in his office, room 6C-343, at (617) 253-4806. You can find out more about him at his RLE web page. He is a member of the National Academy of Sciences, and is also listed as one of the ISI's "Most Highly Cited" scientists. The ISI listing includes his biography and publication list.

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Email us with your coordinates if we've inadvertantly left you out. Us young'uns don't know the past group roster very well. Step forward from the mists of antiquity!

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Prof. John D. Joannopoulos

Director, Institute for Soldier Nanotechnologies
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Prof. Joannopoulos' MIT Physics Page
Prof. Joannopoulos' Research Group Page

John D. Joannopoulos is the Director of the Institute for Soldier Nanotechnologies, a position he has held since 2006. He is a member of the National Academy of Sciences, and currently serves as its Chair of Applied Physical Sciences. He has been on the Faculty of Physics at the Massachusetts Institute of Technology as Assistant Professor of Physics (1974), Associate Professor of Physics (1978), Professor of Physics (1983) and was awarded the *Francis Wright Davis Professor of Physics Chair* in 1996. He has served as Divisional Associate Editor of *Physical Review Letters*, member of the Editorial Board of *Reviews of Modern Physics*, and was appointed as the Director of the *Institute for Soldier Nanotechnologies* in 2006. He received his B.A. and Ph.D. in Physics from the University of California, Berkeley in 1968 and 1974, respectively.

The research of Professor Joannopoulos spans two major directions. The first is devoted to creating a realistic and microscopic theoretical description of the properties of material systems. His approach is fundamental to predicting geometric, electronic and dynamical structure, ab-initio—that is, given only the atomic numbers of the constituent atoms as experimental input. Ab-initio investigations are invaluable because they can stand on their own, complement experimental observations, and probe into regimes inaccessible to experiment. The second major direction involves the development of a new class of materials called photonic crystals, which are designed to affect the properties of photons in much the same way that semiconductors affect the properties of electrons. These materials provide a new dimension in the ability to control and mold the flow of light.

He is the author or coauthor of over 590 refereed scientific journal articles, three textbooks on photonic crystals, and holds over 80 issued U.S. Patents. He is also co-founder of 4 startup companies: *OmniGuide, Inc.; Luminus Devices, Inc.; WiTricity Corporation;* and *Typhoon HIL, Inc.*

Professor Joannopoulos is a *Fellow of the American Physical Society* and a *Fellow of the American Association for the Advancement of Science*. He is recognized as one of Thomson Reuters's most *Highly Cited Researchers* and is the recipient of several prestigious awards, the 2015 *American Physical Society's Aneesur Rahman Prize for Computational Physics*, the world's top prize in its field, and the 2015 *Optical Society of America's Max Born Award*, bestowed for Prof. Joannopulos' "numerous contributions to nanophotonics, including pioneering the 'numerical experiments' approach for nanophotonics."