



## Shanhui Fan

Joseph and Hon Mai Goodman Professor of the School of Engineering and, Professor, by courtesy, of Applied Physics  
Electrical Engineering

### Bio

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#### BIO

Fan's research involves the theory and simulations of photonic and solid-state materials and devices; photonic crystals; nano-scale photonic devices and plasmonics; quantum optics; computational electromagnetics; parallel scientific computing.

#### ACADEMIC APPOINTMENTS

- Professor, Electrical Engineering
- Professor (By courtesy), Applied Physics
- Member, Bio-X
- Affiliate, Precourt Institute for Energy

#### ADMINISTRATIVE APPOINTMENTS

- Director, the Edward L. Ginzton Laboratory, Stanford University, (2014-2021)

#### HONORS AND AWARDS

- R. W. Wood Prize, Optica (Formerly the Optical Society of America) (2022)
- Simons Investigator in Physics, Simons Foundation (2021)
- Vannevar Bush Faculty Fellowship, Department of Defense (2017)
- Fellow, IEEE (2010)
- Fellow, SPIE (2009)
- Fellow, American Physical Society (2008)
- Adolph Lomb Medal, Optical Society of America (2007)
- Award for Initiatives in Research, National Academy of Sciences (2007)
- Fellow, Optical Society of America (2007)
- David and Lucile Packard Fellowship in Science and Engineering, David and Lucile Packard Foundation (2003)
- Career Award, National Science Foundation (2002)

#### BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Advisory board, Photonics and Nanostructures: Fundamentals and Applications (2005 - present)
- Associate Editor, Applied Physics Letters (2013 - 2019)

## PROFESSIONAL EDUCATION

- PhD, MIT , Physics (1997)

## LINKS

- <https://web.stanford.edu/~shanhui>: <https://web.stanford.edu/~shanhui>
- Shanhui Fan's Google Scholar Page: <https://scholar.google.com/citations?user=BECu7wYAAAAJ&hl=en>

## Teaching

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### COURSES

#### 2021-22

- Nanophotonics: EE 336, MATSCI 346 (Aut)

#### 2020-21

- Guided Waves: EE 236B (Win)
- Nanophotonics: EE 336, MATSCI 346 (Aut)

#### 2019-20

- Guided Waves: EE 236B (Win)
- Nanophotonics: EE 336, MATSCI 346 (Aut)

#### 2018-19

- Guided Waves: EE 236B (Win)
- Nanophotonics: EE 336, MATSCI 346 (Aut)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Mingkun Chen, Yi-Shiou Duh, Jiho Hong, Anqi Ji, Nathan Lee, Nayeun Lee, Yan Joe Lee, Qitong Li, Chenkai Mao, Lars Neustock, Taha Rajabzadeh

#### Postdoctoral Faculty Sponsor

Sid Assawaworrarit, Mohammed Benzaouia, Guangwei Hu, Eran Lustig, Yoichiro Tsurimaki, Kai Wang, Renwen Yu, Ming Zhou

#### Doctoral Dissertation Advisor (AC)

Ben Bartlett, Lingling Fan, Cheng Guo, Yubin Park, Haiwen Wang, Jiahui Wang, Casey Wojcik

#### Doctoral (Program)

Aivar Abrashuly, Geun Ho Ahn, Dali Cheng, Lingling Fan, Anand Lalwani, Zheng Lyu, Yubin Park, Taha Rajabzadeh, Yixuan Shao, Jinhie Skarda, Mo Wu, Qingqing Zhao

## Publications

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### PUBLICATIONS

- **Trajectory tracking through the control of non-equilibrium Casimir force** *JOURNAL OF QUANTITATIVE SPECTROSCOPY & RADIATIVE TRANSFER*  
Iizuka, H., Fan, S.  
2022; 289
- **A tandem radiative/evaporative cooler for weather-insensitive and high-performance daytime passive cooling.** *Science advances*  
Li, J., Wang, X., Liang, D., Xu, N., Zhu, B., Li, W., Yao, P., Jiang, Y., Min, X., Huang, Z., Zhu, S., Fan, S., Zhu, et al  
2022; 8 (32): eabq0411

- **Effect of choices of boundary conditions on the numerical efficiency of direct solutions of finite difference frequency domain systems with perfectly matched layers** *OPTICS EXPRESS*  
Zhao, N. Z., Fan, S.  
2022; 30 (15): 26794-26806
- **Mirror symmetric on-chip frequency circulation of light** *NATURE PHOTONICS*  
Herrmann, J. F., Ansari, V., Wang, J., Witmer, J. D., Fan, S., Safavi-Naeini, A. H.  
2022
- **Roadmap on topological photonics** *JOURNAL OF PHYSICS-PHOTONICS*  
Price, H., Chong, Y., Khanikaev, A., Schomerus, H., Maczewsky, L. J., Kremer, M., Heinrich, M., Szameit, A., Zilberberg, O., Yang, Y., Zhang, B., Alu, A., Thomale, et al  
2022; 4 (3)
- **Reciprocity Constraints on Reflection.** *Physical review letters*  
Guo, C., Fan, S.  
2022; 128 (25): 256101
- **Creating boundaries along a synthetic frequency dimension.** *Nature communications*  
Dutt, A., Yuan, L., Yang, K. Y., Wang, K., Buddhiraju, S., Vuckovic, J., Fan, S.  
2022; 13 (1): 3377
- **Temporal modulation brings metamaterials into new era.** *Light, science & applications*  
Yuan, L., Fan, S.  
2022; 11 (1): 173
- **Nonreciprocal infrared absorption via resonant magneto-optical coupling to InAs.** *Science advances*  
Shayegan, K. J., Zhao, B., Kim, Y., Fan, S., Atwater, H. A.  
2022; 8 (18): eabm4308
- **Truncation-dependent PT phase transition for the edge states of a two-dimensional non-Hermitian system** *PHYSICAL REVIEW B*  
Cheng, D., Peng, B., Xiao, M., Chen, X., Yuan, L., Fan, S.  
2022; 105 (20)
- **Adjoint Kirchhoff's Law and General Symmetry Implications for All Thermal Emitters** *PHYSICAL REVIEW X*  
Guo, C., Zhao, B., Fan, S.  
2022; 12 (2)
- **Low-overhead distribution strategy for simulation and optimization of large-area metasurfaces** *NPJ COMPUTATIONAL MATERIALS*  
Skarda, J., Trivedi, R., Su, L., Ahmad-Stein, D., Kwon, H., Han, S., Fan, S., Vuckovic, J.  
2022; 8 (1)
- **Violation of Kirchhoff's Law of Thermal Radiation with Space-Time Modulated Grating** *ACS PHOTONICS*  
Ghanekar, A., Wang, J., Fan, S., Povinelli, M. L.  
2022; 9 (4): 1157-1164
- **Design of Compact Meta-Crystal Slab for General Optical Convolution** *ACS PHOTONICS*  
Wang, H., Jin, W., Guo, C., Zhao, N., Rodrigues, S. P., Fan, S.  
2022; 9 (4): 1358-1365
- **Few-particle scattering from localized quantum systems in spatially structured bosonic baths** *QUANTUM*  
Trivedi, R., Fischer, K., Fan, S., Vuckovic, J.  
2022; 6
- **Observation of Weyl exceptional rings in thermal diffusion.** *Proceedings of the National Academy of Sciences of the United States of America*  
Xu, G., Li, W., Zhou, X., Li, H., Li, Y., Fan, S., Zhang, S., Christodoulides, D. N., Qiu, C. W.  
2022; 119 (15): e2110018119
- **Nighttime electric power generation at a density of 50 mW/m<sup>2</sup> via radiative cooling of a photovoltaic cell** *APPLIED PHYSICS LETTERS*  
Assaworrorarit, S., Omair, Z., Fan, S.

2022; 120 (14)

- **Subwavelength Bayer RGB color routers with perfect optical efficiency** *NANOPHOTONICS*  
Catrysse, P. B., Zhao, N., Jin, W., Fan, S.  
2022
- **Tunable Frequency Filter Based on Twisted Bilayer Photonic Crystal Slabs** *ACS PHOTONICS*  
Lou, B., Fan, S.  
2022; 9 (3): 800-805
- **Spectral emissivity modeling in multi-resonant systems using coupled-mode theory** *OPTICS EXPRESS*  
Audhkhasi, R., Zhao, B., Fan, S., Yu, Z., Povinelli, M. L.  
2022; 30 (6): 9463-9472
- **Topological Materials for Functional Optoelectronic Devices** *ADVANCED FUNCTIONAL MATERIALS*  
Chorsi, H., Cheng, B., Zhao, B., Toudert, J., Asadchy, V., Shoron, O. F., Fan, S., Matsunaga, R.  
2022
- **Topological dissipation in a time-multiplexed photonic resonator network** *NATURE PHYSICS*  
Leefmans, C., Dutt, A., Williams, J., Yuan, L., Porto, M., Nori, F., Fan, S., Marandi, A.  
2022
- **Efficient method for accelerating line searches in adjoint optimization of photonic devices by combining Schur complement domain decomposition and Born series expansions** *OPTICS EXPRESS*  
Zhao, N. Z., Boutami, S., Fan, S.  
2022; 30 (4): 6413-6424
- **Lineshape study of optical force spectra on resonant structures** *OPTICS EXPRESS*  
Fan, L., Zhao, Z., Rituraj, Jin, W., Orenstein, M., Fan, S.  
2022; 30 (4): 6142-6160
- **Internal transformations and internal symmetries in linear photonic systems** *PHYSICAL REVIEW A*  
Guo, C., Zhao, Z., Fan, S.  
2022; 105 (2)
- **Polarization-Independent Isotropic Nonlocal Metasurfaces with Wavelength-Controlled Functionality** *PHYSICAL REVIEW APPLIED*  
Long, O. Y., Guo, C., Jin, W., Fan, S.  
2022; 17 (2)
- **Photonics and thermodynamics concepts in radiative cooling** *NATURE PHOTONICS*  
Fan, S., Li, W.  
2022
- **Concentrated radiative cooling and its constraint from reciprocity** *OPTICS EXPRESS*  
Dong, M., Zhu, L., Jiang, B., Fan, S., Chen, Z.  
2022; 30 (1): 275-285
- **Flashing light with nanophotonics.** *Science (New York, N.Y.)*  
Yu, R., Fan, S.  
2022; 375 (6583): 822-823
- **Prospects and applications of photonic neural networks** *ADVANCES IN PHYSICS-X*  
Huang, C., Sorger, V. J., Miscuglio, M., Al-Qadasi, M., Mukherjee, A., Lampe, L., Nichols, M., Tait, A. N., Ferreira de Lima, T., Marquez, B. A., Wang, J., Chrostowski, L., Fok, et al  
2022; 7 (1)
- **Protecting ice from melting under sunlight via radiative cooling.** *Science advances*  
Li, J., Liang, Y., Li, W., Xu, N., Zhu, B., Wu, Z., Wang, X., Fan, S., Wang, M., Zhu, J.  
2022; 8 (6): eabj9756
- **Universal Behavior of the Scattering Matrix Near Thresholds in Photonics.** *Physical review letters*

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- Wojcik, C. C., Wang, H., Orenstein, M., Fan, S.  
1800; 127 (27): 277401
- **Thermodynamics of Light Management in Near-Field Thermophotovoltaics** *PHYSICAL REVIEW APPLIED*  
Papadakis, G. T., Orenstein, M., Yablonovitch, E., Fan, S.  
2021; 16 (6)
  - **Nonequilibrium lateral force and torque by thermally excited nonreciprocal surface electromagnetic waves** *PHYSICAL REVIEW B*  
Khandekar, C., Buddhiraju, S., Wilkinson, P. R., Gimzewski, J. K., Rodriguez, A. W., Chase, C., Fan, S.  
2021; 104 (24)
  - **Coloured low-emissivity films for building envelopes for year-round energy savings** *NATURE SUSTAINABILITY*  
Peng, Y., Fan, L., Jin, W., Ye, Y., Huang, Z., Zhai, S., Luo, X., Ma, Y., Tang, J., Zhou, J., Greenburg, L. C., Majumdar, A., Fan, et al  
2021
  - **Reaching the Ultimate Efficiency of Solar Energy Harvesting with a Nonreciprocal Multijunction Solar Cell.** *Nano letters*  
Park, Y., Zhao, B., Fan, S.  
1800
  - **Deterministic photonic quantum computation in a synthetic time dimension** *OPTICA*  
Bartlett, B., Dutt, A., Fan, S.  
2021; 8 (12): 1515-1523
  - **Nonreciprocal Thermal Emitters Using Metasurfaces with Multiple Diffraction Channels** *PHYSICAL REVIEW APPLIED*  
Zhao, B., Wang, J., Zhao, Z., Guo, C., Yu, Z., Fan, S.  
2021; 16 (6)
  - **Shockley-Queisser analysis of the temperature-efficiency correlation of solar cells in the presence of non-radiative heat transfer (vol 29, pg 27554, 2021)** *OPTICS EXPRESS*  
Zhang, Z., Chen, K., Fan, S., Chen, Z.  
2021; 29 (24): 39173
  - **Phonon-induced anomalous gauge potential for photonic isolation in frequency space** *OPTICA*  
Yang, J., Yuan, L., Qin, T., Zhang, F., Chen, Y., Jiang, X., Chen, X., Fan, S., Wan, W.  
2021; 8 (11): 1448-1457
  - **A perspective on the pathway toward full wave simulation of large area metalenses (vol 119, 150502, 2021)** *APPLIED PHYSICS LETTERS*  
Hughes, T. W., Minkov, M., Liu, V., Yu, Z., Fan, S.  
2021; 119 (20)
  - **Subambient daytime radiative cooling textile based on nanoprocessed silk** *NATURE NANOTECHNOLOGY*  
Zhu, B., Li, W., Zhang, Q., Li, D., Liu, X., Wang, Y., Xu, N., Wu, Z., Li, J., Li, X., Catrysse, P. B., Xu, W., Fan, et al  
2021
  - **Long-Range Directional Routing and Spatial Selection of High-Spin-Purity Valley Trion Emission in Monolayer WS<sub>2</sub>.** *ACS nano*  
Chen, P., Li, Z., Qi, Y., Lo, T. W., Wang, S., Jin, W., Wong, K., Fan, S., Zayats, A. V., Lei, D.  
2021
  - **Adaptive four-level modeling of laser cooling of solids** *APPLIED PHYSICS LETTERS*  
Jin, W., Guo, C., Orenstein, M., Fan, S.  
2021; 119 (18)
  - **Integrated cooling (i-Cool) textile of heat conduction and sweat transportation for personal perspiration management.** *Nature communications*  
Peng, Y., Li, W., Liu, B., Jin, W., Schaadt, J., Tang, J., Zhou, G., Wang, G., Zhou, J., Zhang, C., Zhu, Y., Huang, W., Wu, et al  
2021; 12 (1): 6122
  - **Space-Time Metasurfaces for Power Combining of Waves** *ACS PHOTONICS*  
Wang, X., Asadchy, V. S., Fan, S., Tretyakov, S. A.  
2021; 8 (10): 3034-3041

- **Editorial: Introducing the Collection on Photovoltaic Energy Conversion** *PHYSICAL REVIEW APPLIED*  
Fan, S., Mi, Z.  
2021; 16 (4)
- **Electron Pulse Compression with Optical Beat Note.** *Physical review letters*  
Zhao, Z., Leedle, K. J., Black, D. S., Solgaard, O., Byer, R. L., Fan, S.  
2021; 127 (16): 164802
- **Electron Pulse Compression with Optical Beat Note** *PHYSICAL REVIEW LETTERS*  
Zhao, Z., Leedle, K. J., Black, D. S., Solgaard, O., Byer, R. L., Fan, S.  
2021; 127 (16)
- **A perspective on the pathway toward full wave simulation of large area metalenses** *APPLIED PHYSICS LETTERS*  
Hughes, T. W., Minkov, M., Liu, V., Yu, Z., Fan, S.  
2021; 119 (15)
- **Nontrivial point-gap topology and non-Hermitian skin effect in photonic crystals** *PHYSICAL REVIEW B*  
Zhong, J., Wang, K., Park, Y., Asadchy, V., Wojcik, C. C., Dutt, A., Fan, S.  
2021; 104 (12)
- **Configurable Phase Transitions in a Topological Thermal Material.** *Physical review letters*  
Xu, G., Li, Y., Li, W., Fan, S., Qiu, C.  
2021; 127 (10): 105901
- **Inverse Design of Metasurfaces Based on Coupled-Mode Theory and Adjoint Optimization** *ACS PHOTONICS*  
Zhou, M., Liu, D., Belling, S. W., Cheng, H., Kats, M. A., Fan, S., Povinelli, M. L., Yu, Z.  
2021; 8 (8): 2265-2273
- **Violating Kirchhoff's Law of Thermal Radiation in Semitransparent Structures** *ACS PHOTONICS*  
Park, Y., Asadchy, V. S., Zhao, B., Guo, C., Wang, J., Fan, S.  
2021; 8 (8): 2417-2424
- **Generation of guided space-time wave packets using multilevel indirect photonic transitions in integrated photonics** *PHYSICAL REVIEW RESEARCH*  
Guo, C., Fan, S.  
2021; 3 (3)
- **Shockley-Queisser analysis of the temperature-efficiency correlation of solar cells in the presence of non-radiative heat transfer** *OPTICS EXPRESS*  
Zhang, Z., Chen, K., Fan, S., Chen, Z.  
2021; 29 (17): 27554-27561
- **High-performance photonic transformers for DC voltage conversion.** *Nature communications*  
Zhao, B., Assaworarith, S., Santhanam, P., Orenstein, M., Fan, S.  
2021; 12 (1): 4684
- **Structured 3D linear space-time light bullets by nonlocal nanophotonics.** *Light, science & applications*  
Guo, C., Xiao, M., Orenstein, M., Fan, S.  
2021; 10 (1): 160
- **Engineering arbitrarily oriented spatiotemporal optical vortices using transmission nodal lines** *OPTICA*  
Wang, H., Guo, C., Jin, W., Song, A. Y., Fan, S.  
2021; 8 (7): 966-971
- **Controllable finite ultra-narrow quality-factor peak in a perturbed Dirac-cone band structure of a photonic-crystal slab** *APPLIED PHYSICS LETTERS*  
Song, A. Y., Kalapala, A., Gibson, R., Reilly, K., Rotter, T., Addamane, S., Wang, H., Guo, C., Balakrishnan, G., Bedford, R., Zhou, W., Fan, S.  
2021; 119 (3)
- **Arbitrary synthetic dimensions via multiboson dynamics on a one-dimensional lattice** *PHYSICAL REVIEW RESEARCH*  
Cheng, D., Peng, B., Wang, D., Chen, X., Yuan, L., Fan, S.  
2021; 3 (3)

- **Inverse Design of Plasma Metamaterial Devices for Optical Computing** *PHYSICAL REVIEW APPLIED*  
Rodriguez, J. A., Abdalla, A. I., Wang, B., Lou, B., Fan, S., Cappelli, M. A.  
2021; 16 (1)
- **Optimal two-photon excitation of bound states in non-Markovian waveguide QED** *PHYSICAL REVIEW A*  
Trivedi, R., Malz, D., Sun, S., Fan, S., Vuckovic, J.  
2021; 104 (1)
- **Isotropic topological second-order spatial differentiator operating in transmission mode** *OPTICS LETTERS*  
Long, O. Y., Guo, C., Wang, H., Fan, S.  
2021; 46 (13): 3247-3250
- **Synthetic frequency dimensions in dynamically modulated ring resonators** *APL PHOTONICS*  
Yuan, L., Dutt, A., Fan, S.  
2021; 6 (7)
- **Single Gyrotropic Particle as a Heat Engine** *ACS PHOTONICS*  
Guo, Y., Fan, S.  
2021; 8 (6): 1623-1629
- **Quantum Entanglement and Modulation Enhancement of Free-Electron-Bound-Electron Interaction** *PHYSICAL REVIEW LETTERS*  
Zhao, Z., Sun, X., Fan, S.  
2021; 126 (23)
- **Quantum Entanglement and Modulation Enhancement of Free-Electron-Bound-Electron Interaction.** *Physical review letters*  
Zhao, Z., Sun, X. Q., Fan, S.  
2021; 126 (23): 233402
- **Adjoint Method and Inverse Design for Nonlinear Nanophotonic Devices (vol 5, pg 4781, 2018)** *ACS PHOTONICS*  
Hughes, T. W., Minkov, M., Williamson, I. D., Fan, S.  
2021; 8 (5): 1505
- **Deep-Subwavelength Thermal Switch via Resonant Coupling in Monolayer Hexagonal Boron Nitride** *PHYSICAL REVIEW APPLIED*  
Papadakis, G. T., Ciccarino, C. J., Fan, L., Orenstein, M., Narang, P., Fan, S.  
2021; 15 (5)
- **Arbitrary linear transformations for photons in the frequency synthetic dimension.** *Nature communications*  
Buddhiraju, S., Dutt, A., Minkov, M., Williamson, I. A., Fan, S.  
2021; 12 (1): 2401
- **Publisher Correction: Topological optical differentiator.** *Nature communications*  
Zhu, T., Guo, C., Huang, J., Wang, H., Orenstein, M., Ruan, Z., Fan, S.  
2021; 12 (1): 2209
- **Control of non-equilibrium Casimir force** *APPLIED PHYSICS LETTERS*  
Iizuka, H., Fan, S.  
2021; 118 (14)
- **Effect of Coulomb interaction on the transient optical response of electrons in field-coupled quantum dots** *PHYSICAL REVIEW A*  
Lu, X., Huang, D., Fan, S.  
2021; 103 (4)
- **Theory for Twisted Bilayer Photonic Crystal Slabs.** *Physical review letters*  
Lou, B., Zhao, N., Minkov, M., Guo, C., Orenstein, M., Fan, S.  
2021; 126 (13): 136101
- **Wide wavelength-tunable narrow-band thermal radiation from moire patterns** *APPLIED PHYSICS LETTERS*  
Guo, C., Guo, Y., Lou, B., Fan, S.  
2021; 118 (13)

- **Photonic Chern insulators from two-dimensional atomic lattices interacting with a single surface plasmon polariton** *PHYSICAL REVIEW B*  
Rituraj, Orenstein, M., Fan, S.  
2021; 103 (12)
- **Nondissipative non-Hermitian dynamics and exceptional points in coupled optical parametric oscillators** *OPTICA*  
Roy, A., Jahani, S., Guo, Q., Dutt, A., Fan, S., Miri, M., Marandi, A.  
2021; 8 (3): 415–21
- **Atomic-Scale Control of Coherent Thermal Radiation** *ACS PHOTONICS*  
Zhao, B., Song, J., Brongersma, M., Fan, S.  
2021; 8 (3): 872–78
- **Transforming heat transfer with thermal metamaterials and devices** *NATURE REVIEWS MATERIALS*  
Li, Y., Li, W., Han, T., Zheng, X., Li, J., Li, B., Fan, S., Qiu, C.  
2021
- **Doubly-Resonant Photonic Crystal Cavities for Efficient Second-Harmonic Generation in III-V Semiconductors.** *Nanomaterials (Basel, Switzerland)*  
Zanotti, S., Minkov, M., Fan, S., Andreani, L. C., Gerace, D.  
2021; 11 (3)
- **Interaction of two-dimensional atomic lattices with a single surface plasmon polariton** *PHYSICAL REVIEW A*  
Rituraj, Orenstein, M., Fan, S.  
2021; 103 (2)
- **Self-Focused Thermal Emission and Holography Realized by Mesoscopic Thermal Emitters** *ACS PHOTONICS*  
Zhou, M., Khoram, E., Liu, D., Liu, B., Fan, S., Povinelli, M. L., Yu, Z.  
2021; 8 (2): 497–504
- **Topological optical differentiator.** *Nature communications*  
Zhu, T., Guo, C., Huang, J., Wang, H., Orenstein, M., Ruan, Z., Fan, S.  
2021; 12 (1): 680
- **Nighttime Radiative Cooling for Water Harvesting from Solar Panels** *ACS PHOTONICS*  
Li, W., Dong, M., Fan, L., John, J., Chen, Z., Fan, S.  
2021; 8 (1): 269–75
- **Scattering of a single plasmon polariton by multiple atoms for in-plane control of light** *NANOPHOTONICS*  
Rituraj, Orenstein, M., Fan, S.  
2021; 10 (1): 579–87
- **Topological complex-energy braiding of non-Hermitian bands.** *Nature*  
Wang, K., Dutt, A., Wojcik, C. C., Fan, S.  
2021; 598 (7879): 59–64
- **Photonic Modal Circulator Using Temporal Refractive-Index Modulation with Spatial Inversion Symmetry.** *Physical review letters*  
Wang, J., Herrmann, J. F., Witmer, J. D., Safavi-Naeini, A. H., Fan, S.  
2021; 126 (19): 193901
- **Generating arbitrary topological windings of a non-Hermitian band.** *Science (New York, N.Y.)*  
Wang, K., Dutt, A., Yang, K. Y., Wojcik, C. C., Vuckovic, J., Fan, S.  
2021; 371 (6535): 1240–45
- **Dynamic band structure measurement in the synthetic space** *SCIENCE ADVANCES*  
Li, G., Zheng, Y., Dutt, A., Yu, D., Shan, Q., Liu, S., Yuan, L., Fan, S., Chen, X.  
2021; 7 (2)
- **Three-Dimensional Printable Nanoporous Polymer Matrix Composites for Daytime Radiative Cooling.** *Nano letters*  
Zhou, K. n., Li, W. n., Patel, B. B., Tao, R. n., Chang, Y. n., Fan, S. n., Diao, Y. n., Cai, L. n.  
2021



- **Exterior tuning and switching of non-equilibrium Casimir force** *JOURNAL OF THE OPTICAL SOCIETY OF AMERICA B-OPTICAL PHYSICS*  
Iizuka, H., Fan, S.  
2021; 38 (1): 151–58
- **Nonreciprocity in Bianisotropic Systems with Uniform Time Modulation.** *Physical review letters*  
Wang, X., Ptitsyn, G., Asadchy, V. S., Díaz-Rubio, A., Mirmoosa, M. S., Fan, S., Tretyakov, S. A.  
2020; 125 (26): 266102
- **Nonreciprocity in Bianisotropic Systems with Uniform Time Modulation** *PHYSICAL REVIEW LETTERS*  
Wang, X., Ptitsyn, G., Asadchy, V. S., Diaz-Rubio, A., Mirmoosa, M. S., Fan, S., Tretyakov, S. A.  
2020; 125 (26)
- **Inference in artificial intelligence with deep optics and photonics.** *Nature*  
Wetzstein, G., Ozcan, A., Gigan, S., Fan, S., Englund, D., Soljacic, M., Denz, C., Miller, D. A., Psaltis, D.  
2020; 588 (7836): 39–47
- **Radiative Thermal Router Based on Tunable Magnetic Weyl Semimetals** *ACS PHOTONICS*  
Guo, C., Zhao, B., Huang, D., Fan, S.  
2020; 7 (11): 3257–63
- **Scalable and hierarchically designed polymer film as a selective thermal emitter for high-performance all-day radiative cooling.** *Nature nanotechnology*  
Li, D., Liu, X., Li, W., Lin, Z., Zhu, B., Li, Z., Li, J., Li, B., Fan, S., Xie, J., Zhu, J.  
2020
- **Operating modes of dual-grating dielectric laser accelerators** *PHYSICAL REVIEW ACCELERATORS AND BEAMS*  
Black, D. S., Zhao, Z., Leedle, K. J., Miao, Y., Byer, R. L., Fan, S., Solgaard, O.  
2020; 23 (11)
- **Beating absorption in solid-state high harmonics** *COMMUNICATIONS PHYSICS*  
Liu, H., Vampa, G., Zhang, J., Shi, Y., Buddhiraju, S., Fan, S., Vuckovic, J., Bucksbaum, P. H., Reis, D. A.  
2020; 3 (1)
- **Tutorial on Electromagnetic Nonreciprocity and its Origins** *PROCEEDINGS OF THE IEEE*  
Asadchy, V. S., Mirmoosa, M., Diaz-Rubio, A., Fan, S., Tretyakov, S. A.  
2020; 108 (10): 1684–1727
- **Design of a multichannel photonic crystal dielectric laser accelerator** *PHOTONICS RESEARCH*  
Zhao, Z., Black, D. S., England, R., Hughes, T. W., Miao, Y., Solgaard, O., Byer, R. L., Fan, S.  
2020; 8 (10): 1586–98
- **Integrated Nonreciprocal Photonic Devices With Dynamic Modulation** *PROCEEDINGS OF THE IEEE*  
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