Quantum and Thermal Photonics

Both PhD and Post-Doctoral Openings

ELECTRODYNAMICS.ORG

Projects available in nanofabrication, photonics, machine learning, computer vision computational imaging, topological photonics, nanophotonics, image processing, phase imaging, quantum optics

www.electrodynamics.org

Please send your full CV
and three representative publications to: zjacob@purdue.edu

Prof. Zubin Jacob
Birck Nanotechnology Center
School of Electrical and Computer Engineering
Purdue University, U.S.A.

PURDUE UNIVERSITY

About the group

Google Scholar Page: https://scholar.google.ca/citations?user=8FXvN_EAAAAJ&hl=en

Main Research Areas: Casimir forces, quantum nanophotonics, plasmonics, metamaterials, Vacuum fluctuations, open quantum systems

Weblink: www.electrodynamics.org
Twitter: twitter.com/zjacob_group

Major Breakthrough Papers:

Science (2012)
Optica (2014)
Nature Nanotechnology (2016)
Nature Communications (2016)
Optica (2016)
Nature Communications (2017)

Theory and Experiment

- Opportunity to closely interact with theorists and experimentalists within the group
- Opportunity to travel to conferences, workshops and collaborate with various groups around the world

Regular one-on-one meetings with group leader and team meetings

Current laboratory is fully built and has over $1M USD optical equipment

Research Projects: Zubin Jacob Research Group (Purdue)

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Quantum Interactions

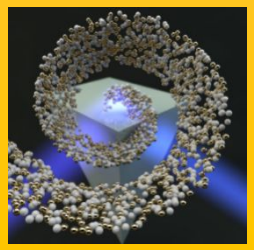
- **Vacuum fluctuations**
- **Entanglement**
- **Single photon detectors**

Selected Publications

- Nature Communications 8, 14144 (2017)
- Optics express 22 (21), 26193-26202 (2014)

Spin and Topology

- **Spin-photonic interfaces**
- **Topological photonics**

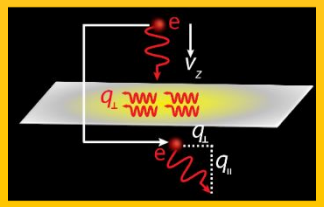


Selected Publications

- Optica 3 (2), 118-126 (2016)
- Appl. Phys. Lett. 108 (6) 061102 2016

Optical and Electron Imaging

- **EELS**
- **TIRF**



Selected Publications

- ACS Photonics, *4* (4), 1009–1014 (2017)
- Optics Letters 41 (23), 5499-5502 (2016)

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Thermal Engineering

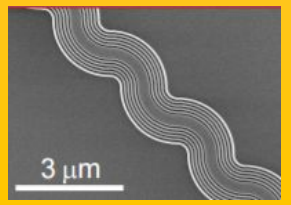
- **Nanoscale radiative heat transfer**
- **High temperature thermal emission**
- **Thermal management**

Selected Publications

- Nature Communications 7, 11809 (2016)
- Optics express 21 (101), A96-A110 (2013)

Devices/Fabrication

- **On-chip photonic devices**
- **Large area nanofabrication**



Selected Publications

- Nature nanotechnology 11 (1), 23-36 (2016)
- Optica 1 (2), 96-100 (2014)

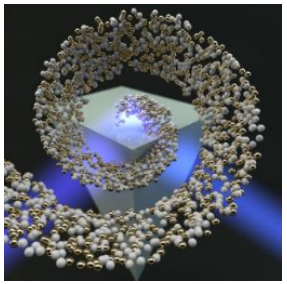
Research projects funded by DOD, NSF, DOE (close interactions with program managers and international collaborators)

Research Highlights

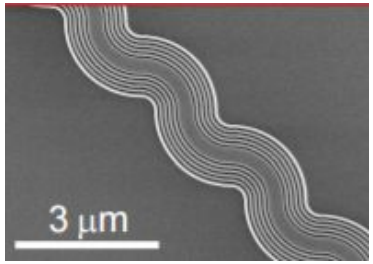
Subtle mix of theory, computational modeling, and experiment to advance fundamental knowledge on quantum/thermal light sources/detectors

5 Most Significant Contributions led by students and post-docs from the group

Showed existence of Giant Vacuum Friction

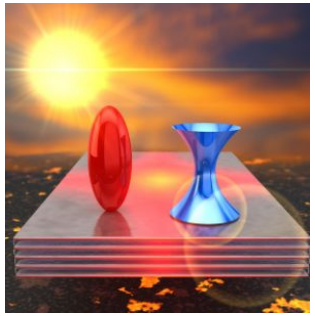


Discovered Universal Spin-Momentum Locking of Light



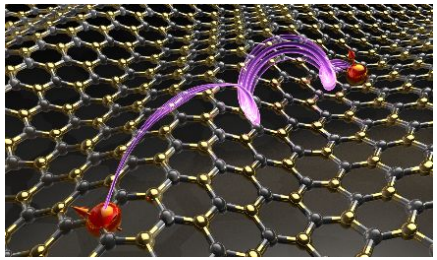
Proposed new Platform for Dense Photonic Integrated Circuits

Theory + Experiment



Foundational work on thermal metamaterials

Theory + Experiment



Introduced framework for engineering dipolar interactions

Theory + Experiment

PURDUE UNIVERSITY

Purdue University

- School of Electrical and Computer Engineering at Purdue University is consistently ranked among the top 10 in the U.S.
- Purdue Engineering combines the perfect mix of fundamental science and application and is one of the most prestigious engineering schools in the world

The post-doctoral scholar will have his/her office in **Birck Nanotechnology Center** and interact with world-leading groups in multiple fields of research. The vibrant, dynamic and intellectually stimulating environment is ideal for a balance between theory and experiment.

Living in West-Lafayette or Lafayette, Indiana is affordable and fun. Diverse, multi-cultural student body and 2 hours from Chicago