OSA Incubator Defects by Design: Quantum Nanophotonics in Emerging Materials

28-30 October 2018
Washington, DC USA

HOSTED BY:
Audrius Alkauskas, *Center for Physical Sciences and Technology, Lithuania*
Lee Bassett, *University of Pennsylvania, United States*
Kai-Mei Fu, *University of Washington, United States*

AGENDA

Sunday 28 October 2018

Afternoon	Arrival/Hotel Check-in
18:00	Welcome Dinner Leziz, 2016 P Street NW

Monday 29 October 2018

8:00	Breakfast OSA Headquarters, 2010 Massachusetts Ave. NW
8:30	Welcome *Gregory Quarles, Chief Scientist, OSA, United States*
8:45	Program Overview and Goals *Lee Bassett, University of Pennsylvania, United States*

Session 1A: Why Defects?
Facilitator: Lee Bassett, University of Pennsylvania, United States

9:00	Overview & State of the Art *David Awschalom, University of Chicago, United States*
9:30	Applications to Quantum Sensing *Fedor Jelezko, Ulm University, Germany*
10:00	Coffee Break

10:30 Applications to Quantum Communication
Dirk Englund, MIT, United States

11:00 Discussion
What existing application areas are best suited to quantum defects (and which are not)?
What new areas are ripe for exploration?

12:00 Lunch, provided

Session 2A: Defect Discovery in New Materials
Facilitator: Kai-Mei Fu, University of Washington, United States

13:30 History of Defect Discovery
Chris Van de Walle, UC Santa Barbara, United States

13:50 Efficient Defect Creation and Control
Jörg Wrachtrup, University of Stuttgart, Germany

14:10: Studying Single Defects in New Materials
Gregory Fuchs, Cornell University, United States

14:30 Discussion
How can we efficiently create & identify new defects, particularly in emerging materials?
What opportunities are provided by materials beyond group IV?

15:20 Coffee Break

Session 2B: Defect Discovery in New Materials
Facilitator: Helena Knowles, University of Cambridge, United Kingdom

15:50 Imaging Defects with TEM
Eric Stach, University of Pennsylvania, United States

16:10 Imaging Defects with STM/AFM
Jay Gupta, Ohio State, United States

16:30 Device Fabrication at the Atomic Scale
Shashank Misra, Sandia National Laboratories, United States

Monday 29 October 2018

16:50 Discussion

How can we control defect creation, identification, and placement at the atomic scale?
How do we combine optical and structural imaging?

18:00 Dinner

La Tomate, 1701 Connecticut Ave, NW

Tuesday 30 October 2018

8:00 Breakfast

OSA Headquarters, 2010 Massachusetts Ave. NW

Session 3A: Defects by Design

Facilitator: Audrius Alkauskas, Center for Physical Sciences and Technology, Lithuania

8:30 Theoretical Tools for Predicting Defect Properties

Prineha Narang, Harvard University, United States

8:50 Capturing the Physics of Defect Qubits with First-Principles Theory

Ádám Gali, Hungarian Academy of Sciences, Hungary

9:10 Combining Experimental, Analytical, and Numerical Approaches

Rashid Zia, Brown University, United States

9:30 Discussion

How can we predict defect properties to guide discovery?
What new theoretical tools are needed to give a holistic treatment and prevent "convergence to experiments"?

10:20 Coffee Break

Session 3B: Defects by Design

Facilitator: Christoph Becher, Saarland University, Germany

10:40 New Applications of Quantum Defects

Sophia Economou, Virginia Tech University, United States

11:00 Device Engineering with Rare Earth Dopants

Andrei Faraon, California Institute of Technology, United States

11:20 Defect Device Engineering with 2D Materials

Mete Atatüre, University of Cambridge, United States

11:40	Discussion *How can we engineer desired defect properties, e.g., using nanophotonics, materials properties, device design, or active control schemes?*
12:30	Lunch, provided
13:30	**Wrap-up Discussion** *Identification of key opportunities and objectives.*
14:00	Adjourn