

Quantum Sensors for HEP

Report of Contributions

Contribution ID: 11

Type: **not specified**

Introduction, discussion of goals of workshop

Thursday, April 27, 2023 9:10 AM (20 minutes)

Presenters: CHOU, Aaron (Fermilab); IRWIN, Kent (Stanford University and SLAC); MARUYAMA, Reina (Yale University)

Session Classification: Introduction and organization

Contribution ID: 12

Type: **not specified**

Fundamental Physics with Quantum Sensors

Thursday, April 27, 2023 9:30 AM (30 minutes)

Presenter: RAJENDRAN, Surjeet (Johns Hopkins University)

Session Classification: Introduction and organization

Contribution ID: 13

Type: **not specified**

QIS for HEP 2025+: Theory Targets and Opportunities

Thursday, April 27, 2023 10:00 AM (30 minutes)

Presenter: ZUREK, Kathryn (Caltech)

Session Classification: Introduction and organization

Contribution ID: 14

Type: **not specified**

Discussion of working group logistics, goals

Thursday, April 27, 2023 11:00 AM (30 minutes)

Presenters: CHOU, Aaron (Fermilab); IRWIN, Kent (Stanford University and SLAC); MARUYAMA, Reina (Yale University)

Session Classification: Organize and mobilize

Contribution ID: 15

Type: **not specified**

Q&A, logistics

Thursday, April 27, 2023 10:30 AM (15 minutes)

Presenters: CHOU, Aaron (Fermilab); IRWIN, Kent (Stanford University and SLAC); MARUYAMA, Reina (Yale University)

Session Classification: Introduction and organization

Contribution ID: 16

Type: **not specified**

Breakout into separate working groups

Thursday, April 27, 2023 11:30 AM (1 hour)

Session Classification: Organize and mobilize

Contribution ID: 35

Type: **not specified**

The need for quantum sensors for HEP science

Thursday, April 27, 2023 2:00 PM (5 minutes)

Presenter: CHOU, Aaron (Fermilab)

Session Classification: Hybrid town hall 1

Contribution ID: 36

Type: **not specified**

Superconducting Nanowire Single Photon Detectors with Ultra-low energy threshold

Thursday, April 27, 2023 2:05 PM (5 minutes)

Presenter: SHAW, Matt (Jet Propulsion Laboratory)

Session Classification: Hybrid town hall 1

Contribution ID: 37

Type: **not specified**

Axion DM with low-threshold SNSPDs

Thursday, April 27, 2023 2:10 PM (5 minutes)

Presenter: PEÑA, Cristián (Fermilab)

Session Classification: Hybrid town hall 1

Contribution ID: **38**

Type: **not specified**

Improvements to the LAMPOST Experiment

Thursday, April 27, 2023 2:15 PM (5 minutes)

Presenter: KOPPELL, Stewart (Massachusetts Institute of Technology)

Session Classification: Hybrid town hall 1

Contribution ID: 39

Type: **not specified**

Precision Timing and Scalable Readout for low threshold SNSPDs

Thursday, April 27, 2023 2:20 PM (5 minutes)

Presenter: XIE, Si

Session Classification: Hybrid town hall 1

Contribution ID: 40

Type: **not specified**

Dielectric Powder as an Axion/Dark Photon Haloscope

Thursday, April 27, 2023 2:25 PM (5 minutes)

Presenter: KOPPELL, Stewart (Massachusetts Institute of Technology)

Session Classification: Hybrid town hall 1

Contribution ID: 41

Type: **not specified**

Quantum Capacitance Detectors for Terahertz Single Photon Counting

Thursday, April 27, 2023 2:30 PM (5 minutes)

Presenter: ECHTERNACH, Pierre (JPL)

Session Classification: Hybrid town hall 1

Contribution ID: 42

Type: **not specified**

Dark Matter detection with Quantum Capacitance Detectors

Thursday, April 27, 2023 2:35 PM (5 minutes)

Presenter: KHATIWADA, Rakshya

Session Classification: Hybrid town hall 1

Contribution ID: 43

Type: **not specified**

Kinetic Inductance Traveling-Wave Parametric Amplifiers

Thursday, April 27, 2023 2:40 PM (5 minutes)

Presenter: BASU THAKUR, Ritoban (California Institute of Technology)

Session Classification: Hybrid town hall 1

Contribution ID: 44

Type: **not specified**

Cavity Optomechanical Search for Axions

Thursday, April 27, 2023 2:45 PM (5 minutes)

Presenter: PATIL, Yogesh (Yale University)

Session Classification: Hybrid town hall 1

Contribution ID: 45

Type: **not specified**

Converting Interferometers into HEP detectors with high-isolation single-photon detection

Thursday, April 27, 2023 2:50 PM (5 minutes)

Presenter: MCCULLER, Lee (Caltech)

Session Classification: Hybrid town hall 1

Contribution ID: 46

Type: **not specified**

Testing the standard model and probing the dark sector by measuring the fine structure constant

Thursday, April 27, 2023 2:55 PM (5 minutes)

Presenter: MUELLER, Holger (UC Berkeley)

Session Classification: Hybrid town hall 1

Contribution ID: 47

Type: **not specified**

MAGIS: Extending High Energy Physics with Atom Interferometry

Thursday, April 27, 2023 3:00 PM (5 minutes)

Presenter: CHEONG, Sanha (Stanford / SLAC)

Session Classification: Hybrid town hall 1

Contribution ID: 48

Type: **not specified**

Distributed Atomic Sensing in the Long Island Quantum Network

Thursday, April 27, 2023 3:05 PM (5 minutes)

Presenter: MARTINEZ-RINCON, Julian (Brookhaven National Laboratory)

Session Classification: Hybrid town hall 1

Contribution ID: 49

Type: **not specified**

Direct detection of ultralight dark matter with space quantum sensors

Thursday, April 27, 2023 3:10 PM (5 minutes)

Presenter: TSAI, Yu-Dai (University of California, Irvine)

Session Classification: Hybrid town hall 1

Contribution ID: 50

Type: **not specified**

Quantum-Assisted Optical Interferometry for Precision Astrometry

Thursday, April 27, 2023 3:15 PM (5 minutes)

Presenter: STANKUS, Paul (Brookhaven National Laboratory)

Session Classification: Hybrid town hall 1

Contribution ID: 51

Type: **not specified**

Training chatGPT on quantum impedance networks of QED

Thursday, April 27, 2023 3:20 PM (5 minutes)

Presenter: CAMERON, Peter (Michigan/MIT/Brookhaven (retired))

Session Classification: Hybrid town hall 1

Contribution ID: 52

Type: **not specified**

Exploiting the Physics of the Field for Compute-in-Sensor

Thursday, April 27, 2023 3:50 PM (5 minutes)

Presenter: LEONARD, Francois (Sandia National Laboratories)

Session Classification: Hybrid town hall 2

Contribution ID: 53

Type: **not specified**

Understanding and Mitigating quasi-particle excess due to phonons and IR produced by stress relaxation

Thursday, April 27, 2023 3:55 PM (5 minutes)

Presenter: PYLE, matt (University of California Berkeley)

Session Classification: Hybrid town hall 2

Contribution ID: 54

Type: **not specified**

Material science of quantum sensors

Thursday, April 27, 2023 4:00 PM (5 minutes)

Presenter: PEREVERZEV, Sergey (LLNL)

Session Classification: Hybrid town hall 2

Contribution ID: 55

Type: **not specified**

Sapphire substrate qubits for low mass Dark Matter searches

Thursday, April 27, 2023 4:05 PM (5 minutes)

Presenter: KHATIWADA, Rakshya

Session Classification: Hybrid town hall 2

Contribution ID: 56

Type: **not specified**

Optical Strain Sensing for Particle Detection

Thursday, April 27, 2023 4:10 PM (5 minutes)

Presenter: TEMPLES, Dylan (Fermilab)

Session Classification: Hybrid town hall 2

Contribution ID: 57

Type: **not specified**

Closing the Loop on Quantum Research with Skipper-CCDs: DOE-OHEP's Contribution to Advancements in Quantum Sensing

Thursday, April 27, 2023 4:15 PM (5 minutes)

Presenter: TIFFENBERG, Javier (Fermilab)

Session Classification: Hybrid town hall 2

Contribution ID: 58

Type: **not specified**

Nuclear decays with mechanical quantum sensors

Thursday, April 27, 2023 4:20 PM (5 minutes)

Presenter: CARNEY, Daniel (Berkeley National Lab)

Session Classification: Hybrid town hall 2

Contribution ID: 59

Type: **not specified**

The Windchime Project

Thursday, April 27, 2023 4:25 PM (5 minutes)

Presenter: LANG, Rafael (Purdue University)

Session Classification: Hybrid town hall 2

Contribution ID: 60

Type: **not specified**

Back action evasion and quantum noise reduction in quantum magnetometers for particle and field detectors

Thursday, April 27, 2023 4:30 PM (5 minutes)

Presenter: MARVINNEY, Claire (Oak Ridge National Laboratory)

Session Classification: Hybrid town hall 2

Contribution ID: 61

Type: **not specified**

Quantum Enhanced Detection of Quantum Fields and Particles through Networked Entangled Sensors

Thursday, April 27, 2023 4:35 PM (5 minutes)

Presenter: MARINO, Alberto (Oak Ridge National Laboratory)

Session Classification: Hybrid town hall 2

Contribution ID: 62

Type: **not specified**

Entanglement-enhanced optomechanical dark matter detectors

Thursday, April 27, 2023 4:40 PM (5 minutes)

Presenter: WILSON, Dalziel (University of Arizona)

Session Classification: Hybrid town hall 2

Contribution ID: **63**

Type: **not specified**

Welcome to Yale

Thursday, April 27, 2023 9:00 AM (10 minutes)

Session Classification: Introduction and organization

Contribution ID: 64

Type: **not specified**

Rydberg atoms as single-photon detectors for axions

Thursday, April 27, 2023 4:45 PM (5 minutes)

Presenter: MARUYAMA, Reina (Yale University)

Session Classification: Hybrid town hall 2

Contribution ID: 65

Type: **not specified**

Noble and Alkali Spin Detectors for Ultralight Coherent dark matter (NASDUCK)

Thursday, April 27, 2023 4:50 PM (5 minutes)

Presenter: BLOCH, Itay (LBNL)

Session Classification: Hybrid town hall 2