

Quantum Sensing Workshop

Report of Contributions

Contribution ID: 1

Type: **not specified**

**Welcome, and introductory remarks, Natalie Roe
(Berkeley Lab), John Valentine (Berkeley Lab), tbd
(Sandia), tbd (AWE), Craig Sloan (NNSA), Summer
Stares (DNO)**

Tuesday 14 February 2023 08:30 (30 minutes)

Contribution ID: 2

Type: **not specified**

NNSA / AWE / Sandia / LBNL Introductions

Contribution ID: 3

Type: **not specified**

Atom based quantum sensors

Tuesday 14 February 2023 09:10 (40 minutes)

Presenter: BONGS, UNIVERSITY OF BIRMINGHAM, Kai (University of Birmingham)

Session Classification: Session I

Contribution ID: 4

Type: **not specified**

Talk

Contribution ID: 5

Type: **not specified**

Novel Quantum Sensors with Hyperpolarized Nuclei

Tuesday 14 February 2023 09:50 (40 minutes)

Presenter: AJOY, UNIVERSITY OF CALIFORNIA BERKELEY, Ashok (University of California Berkeley; Lawrence Berkeley National Laboratory)

Session Classification: Session I

Contribution ID: 6

Type: **not specified**

Compressive sensing in spectroscopy: can less be more?

Tuesday 14 February 2023 10:30 (40 minutes)

Presenter: PADGETT, UNIVERSITY OF GLASGOW, Miles (University of Glasgow)

Session Classification: Session I

Contribution ID: 7

Type: **not specified**

Panel Discussion

Tuesday 14 February 2023 12:05 (25 minutes)

Session Classification: Session I

Contribution ID: 8

Type: **not specified**

Lunch

Contribution ID: 9

Type: **not specified**

Quantum sensing and applications to nonproliferation

Tuesday 14 February 2023 11:25 (40 minutes)

Presenter: FARLEY, SANDIA NATIONAL LABORATORY, David (Sandia National Laboratory)

Session Classification: Session I

Contribution ID: **10**

Type: **not specified**

Atom interferometry 1.0 and 2.0 for inertial sensing

Tuesday 14 February 2023 13:30 (20 minutes)

Presenter: KRZYZANOWSKA, LOS ALAMOS NATIONAL LABORATORY, Katarzyna (Los Alamos National Laboratory)

Session Classification: Session II

Contribution ID: 11

Type: **not specified**

Cold Atom Interferometry applied to near field gravity tomography

Tuesday 14 February 2023 13:50 (20 minutes)

Presenter: LIBBY, LAWRENCE LIVERMORE NATIONAL LABORATORY, Stephen (Lawrence Livermore National Laboratory)

Session Classification: Session II

Contribution ID: 12

Type: **not specified**

Realization of a guided matter wave gradiometer for gravity sensing applications

Tuesday 14 February 2023 14:10 (20 minutes)

Presenter: RYU, LOS ALAMOS NATIONAL LABORATORY, Changhyun (Los Alamos National Laboratory)

Session Classification: Session II

Contribution ID: 13

Type: **not specified**

Enrichment quantification of UF6 using low-field nuclear magnetic resonance with atomic magnetometer detection

Tuesday 14 February 2023 14:50 (20 minutes)

Presenter: MAGNELIND, LOS ALAMOS NATIONAL LABORATORY, Per (Los Alamos National Laboratory)

Session Classification: Session II

Contribution ID: 14

Type: **not specified**

Optically pumped magnetometers - the journey out of the lab

Tuesday 14 February 2023 15:25 (20 minutes)

Presenter: RIIS, UNIVERSITY OF STRATHCLYDE, Erling (University of Strathclyde)

Session Classification: Session II

Contribution ID: 15

Type: **not specified**

Magnetic sensing and other laser-based applications

Tuesday 14 February 2023 15:45 (20 minutes)

Presenter: SAVUKOV, LOS ALAMOS NATIONAL LABORATORY, Igor (Los Alamos National Laboratory)

Session Classification: Session II

Contribution ID: **16**

Type: **not specified**

Announcements

Wednesday 15 February 2023 08:30 (10 minutes)

Contribution ID: 17

Type: **not specified**

Magnetic Quantum Sensors for NNSA Programs

Wednesday 15 February 2023 08:40 (20 minutes)

Presenter: KIM, LAWRENCE LIVERMORE NATIONAL LABORATORY, Geon-Bo (Lawrence Livermore National Laboratory)

Session Classification: Session III

Contribution ID: **18**

Type: **not specified**

Quantum-Enabled Biochemical imaging at Rhizosphere

Wednesday 15 February 2023 09:00 (20 minutes)

Presenter: HAO, LAWRENCE BERKELEY NATIONAL LABORATORY, Zhao (Lawrence Berkeley National Laboratory)

Session Classification: Session III

Contribution ID: **19**

Type: **not specified**

Advanced electric field sensing/imaging technologies

Wednesday 15 February 2023 09:20 (20 minutes)

Presenter: JAU, SANDIA NATIONAL LABORATORY, Yaun-Yu (Sandia National Laboratory)

Session Classification: Session III

Contribution ID: 20

Type: **not specified**

Quantum Magnetic Imaging for Counterfeit Detection and Integrated-Circuit Interrogation

Wednesday 15 February 2023 09:40 (20 minutes)

Presenter: KEHAYIAS, SANDIA NATIONAL LABORATORY, Pauli (Sandia National Laboratory)

Session Classification: Session III

Contribution ID: 21

Type: **not specified**

Extending Quantum Spin Sensing to Large Areas/Volumes

Wednesday 15 February 2023 10:30 (20 minutes)

Presenter: LYON, PRINCETON UNIVERSITY, Stephen (Princeton University)

Session Classification: Session III

Contribution ID: 22

Type: **not specified**

Quantum defect dephasing times from first-principles

Wednesday 15 February 2023 10:50 (20 minutes)

Presenter: TAN, LAWRENCE BERKELEY NATIONAL LABORATORY, Liang (Lawrence Berkeley National Laboratory)

Session Classification: Session III

Contribution ID: 23

Type: **not specified**

Spin Session Discussion, report assignments

Wednesday 15 February 2023 11:10 (30 minutes)

Session Classification: Session III

Contribution ID: 24

Type: **not specified**

Coherent Quantum Sensing for Dark Matter Detection (axions, RF)

Wednesday 15 February 2023 11:40 (20 minutes)

Presenter: CAROSI, LAWRENCE LIVERMORE NATIONAL LABORATORY, Gianpaolo (Lawrence
Livermore National Laboratory)

Session Classification: Session IV

Contribution ID: 25

Type: **not specified**

Distributed Sensing in the Long Island Quantum Network

Wednesday 15 February 2023 12:00 (20 minutes)

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

Session Classification: Session IV

Contribution ID: 26

Type: **not specified**

Quantum ghost imaging with non-degenerate photon pairs

Wednesday 15 February 2023 13:20 (20 minutes)

Presenter: DUNCAN, LOS ALAMOS NATIONAL LABORATORY, Ryan (Los Alamos National Laboratory)

Session Classification: Session IV

Contribution ID: 27

Type: **not specified**

Quantum sensing applications using entangled squeezed light

Wednesday 15 February 2023 13:40 (20 minutes)

Presenter: SOH, LOS ALAMOS NATIONAL LABORATORY, Daniel (Los Alamos National Laboratory)

Session Classification: Session IV

Contribution ID: 28

Type: **not specified**

Qubit-based athermal-phonon sensors for use in coherent neutrino scattering for reactor monitoring and other applications

Presenter: FINK, LOS ALAMOS NATIONAL LABORATORY, Caleb (Los Alamos National Laboratory)

Session Classification: Session V

Contribution ID: 29

Type: **not specified**

The third day of the quantum sensing workshop is at Sandia, Livermore, by invitation. Please contact Lauren Betzen (lkbetze@sandia.gov), Scott Bisson (sebisso@sandia.gov), or Peter Schwindt (pschwin@sandia.gov) for more information.

Thursday 16 February 2023 08:30 (30 minutes)

Contribution ID: **30**

Type: **not specified**

Talk

Contribution ID: **31**

Type: **not specified**

Talk

Contribution ID: **32**

Type: **not specified**

Talk

Contribution ID: **33**

Type: **not specified**

Talk

Contribution ID: **34**

Type: **not specified**

Talk

Contribution ID: 35

Type: **not specified**

Talk

Contribution ID: **36**

Type: **not specified**

Talk

Contribution ID: 37

Type: **not specified**

Talk

Contribution ID: **38**

Type: **not specified**

Talk

Contribution ID: 39

Type: **not specified**

Talk

Contribution ID: **40**

Type: **not specified**

Talk

Contribution ID: **41**

Type: **not specified**

Closeout

Contribution ID: 42

Type: **not specified**

Welcome - ATAP and Lab Management

Contribution ID: 43

Type: **not specified**

Workshop Goals; workshop chairs

Tuesday 14 February 2023 09:00 (10 minutes)

Session Classification: Session I

Contribution ID: 44

Type: **not specified**

Developing compact atom interferometer devices

Tuesday 14 February 2023 14:30 (20 minutes)

Presenter: SCHWINDT, SANDIA NATIONAL LABORATORY, Peter (Sandia National Laboratory)

Session Classification: Session II

Contribution ID: 45

Type: **not specified**

Magnetic field nulling and shaping for quantum technologies

Tuesday 14 February 2023 16:05 (20 minutes)

Presenter: FROMHOLD, UNIVERSITY OF NOTTINGHAM, Mark (University of Nottingham)

Session Classification: Session II

Contribution ID: 46

Type: **not specified**

LANL MPA-Q (Quantum) capability overview

Tuesday 14 February 2023 16:25 (20 minutes)

Presenter: MARTIN, LOS ALAMOS NATIONAL LABORATORY, Michael (Los Alamos National Laboratory)

Session Classification: Session II

Contribution ID: 47

Type: **not specified**

Atom Session Panel Discussion, report assignments

Tuesday 14 February 2023 16:45 (30 minutes)

Session Classification: Session II

Contribution ID: 48

Type: **not specified**

Tuesday Wrap Up Discussion

Tuesday 14 February 2023 17:15 (30 minutes)

Session Classification: Session II

Contribution ID: 49

Type: **not specified**

Entangled photons for tamper indication

Wednesday 15 February 2023 14:00 (20 minutes)

Presenter: KING, ATOMIC WEAPONS ESTABLISHMENT, Adrian (Atomic Weapons Establishment)

Session Classification: Session IV

Contribution ID: 50

Type: **not specified**

Compressive spectroscopy

Wednesday 15 February 2023 14:20 (20 minutes)

Presenter: KING, ATOMIC WEAPONS ESTABLISHMENT, Adrian (Atomic Weapons Establishment)

Session Classification: Session IV

Contribution ID: 51

Type: **not specified**

Photons Session Discussion, report assignments

Wednesday 15 February 2023 14:40 (30 minutes)

Session Classification: Session IV

Contribution ID: 52

Type: **not specified**

TBD

Wednesday 15 February 2023 16:25 (20 minutes)

Session Classification: Session V

Contribution ID: 53

Type: **not specified**

Quantum Enhanced Sensing of Isotopes (QESI)

Wednesday 15 February 2023 15:45 (20 minutes)

Presenter: MCCASLIN, SANDIA NATIONAL LABORATORY, Laura (Sandia National Laboratory)

Session Classification: Session V

Contribution ID: 54

Type: **not specified**

Wednesday Wrap Up Discussion, report assignments

Wednesday 15 February 2023 17:15 (45 minutes)

Contribution ID: 55

Type: **not specified**

Quantum Networking

Wednesday 15 February 2023 16:05 (20 minutes)

Presenter: SCHENKEL, LAWRENCE BERKELEY NATIONAL LABORATORY, Thomas (Lawrence Berkeley National Laboratory)

Session Classification: Session V

Contribution ID: 56

Type: **not specified**

Cavity-based atom interferometry with long coherence time

Wednesday 15 February 2023 18:30 (30 minutes)

Presenter: MULLER, UNIVERSITY OF CALIFORNIA BERKELEY, Holger (University of California Berkeley)

Contribution ID: 57

Type: **not specified**

Qubit-based athermal-photon sensors for use in coherent neutrino scattering for reactor monitoring and other applications

Wednesday 15 February 2023 15:25 (20 minutes)

Presenter: FINK, LOS ALAMOS NATIONAL LABORATORY, Caleb (Los Alamos National Laboratory)

Session Classification: Session V

Contribution ID: 58

Type: **not specified**

Panel Discussion

Wednesday 15 February 2023 16:45 (30 minutes)

Session Classification: Session V