
NASA
National Aeronautics and
Space Administration
2025
NASA
SCIENCE
Quantum Technology in PSD
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Planetary Exploration Science Technology Office (PESTO)
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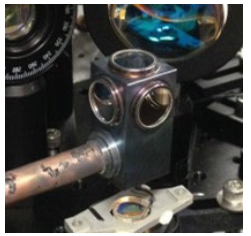
PESTO
Planetary Exploration Science
Technology Office

Quantum Sensing for Planetary Science

Atomic Lunar Seismometer

- Low measurement frequency (<10 mHz) cold atom interferometer to probe interior and structure by measuring seismic waves and long-period global normal modes and gravity measurements

PI: Nan Yu/Jet Propulsion Laboratory

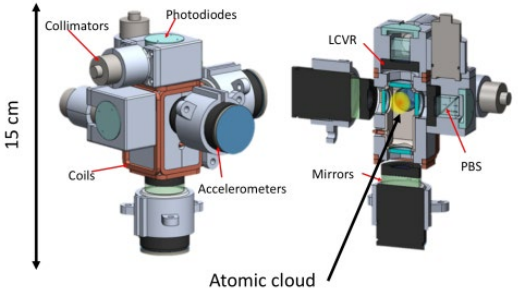


Atomic Lunar Seismometer

Atomic Drag-Free Accelerometer

- Compact 3-axis cold atom interferometer sensor for gravity measurements and/or non-gravitational force measurements on spacecraft
- Target sensitivity < 3x10^{-8} m/s^2/$\sqrt{Hz}$ at frequency <1 Hz

PI: Nan Yu/Jet Propulsion Laboratory

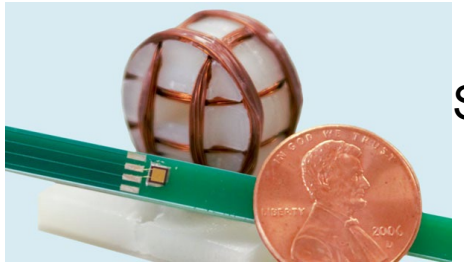


Atomic Drag-free Accelerometer

Optically Pumped Solid State Quantum Magnetometer

- 3-axis vector measurement using single color-center sensor with capability for self-calibration through atomic constants.
- Target sensitivity 10's $pT/\sqrt{Hz}$
- Understand formation, inner workings and compositions of planetary bodies, the interaction of geodynamos with atmospheres, and detection of large water bodies (magnetotellurics)

PI: Hanes Kraus JPL Co-Is: David Spry/GRC, Phil Neudeck/GRC, et al.

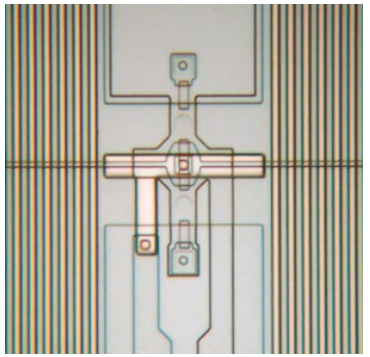


SiC Color Center Magnetometer

Hybrid Radio Frequency (RF) and Magneto-Inductive (MI) Transceiver for Europa Sub-Ice Communications

- Design and prototype an MI communications systems based on a superconducting quantum interference device (SQUID) and chip-scale atomic magnetometer (CSAM) for MI-to-RF bridge link

PI: Michael Cheng/JPL Co-I: Brian Vyhnalek/GRC



Magneto-Inductive Transceiver for Ocean Worlds