



Diverse Portfolio of Scientific Instrumentation Initiatives of the Deep Carbon Observatory

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Advances in scientific instrumentation are important drivers of scientific discovery. The Deep Carbon Observatory (DCO) supports a diverse portfolio of scientific instrumentation initiatives worldwide as part of its ten-year quest to achieve a transformational understanding of the quantities, movements, origins, and forms of Earth's deep carbon. Substantial progress has been made in the development of a wide range of instruments, including:

- Quantum cascade laser-infrared absorption spectrometer for clumped methane isotope thermometry (Shuhei Ono)
- Large-radius high-mass-resolution multiple-collector isotope ratio mass spectrometer for analysis of rare isotopologues of methane and other gases (Edward Young, Douglas Rumble)
- Volcanic field deployment of the laser isotope ratio-meter (Damien Weidmann)
- Novel large-volume diamond anvil cell for neutron scattering (Malcolm Guthrie, Reinhard Boehler)
- Novel synchrotron x-ray probes for deep carbon (Wendy Mao)
- Ultrafast laser instrument for in situ measurements of elastic, electronic, and transport properties of carbon-bearing fluids and crystalline materials (Alexander Goncharov)
- Combined instrument for molecular imaging in geochemistry (Andrew Steele)
- Pressurized Underwater Sample Handler (Isabelle Daniel, Karyn Rogers)

These and other DCO instrumentation projects are highly leveraged investments involving a large number of sponsors, partners, and collaborators.