Contribution ID: **107** Type: **Parallel session talk**

Towards long-distance phase coherence for large-area quantum sensors.

Thursday 9 October 2025 17:00 (15 minutes)

Quantum sensors connected with optical fiber can effectively cover large areas and provide phase coherence between distant experiments by transmitting entangled photons through phase stable links. These sensors have applications in gravitational wave detection and km-long wavelength axion detection. Optical phase stability presents experimental challenges in deployed fibers where vibrations and temperature fluctuations are present and difficult to suppress. In this work, we present our recent efforts on phase instability analysis and phase stabilization through FPGA-run feedback loops across Fermilab campus.

Authors: CAMERON, Andrew (Fermi National Accelerator Laboratory); Ms ELLISON, Claire (Caltech); Mr UMESH, Prathwiraj (Caltech); Dr VALIVARTHI, Raju (Caltech); Mr BREGAR, Michael (Caltech); XIE, Si (Fermi National Accelerator Lab. (US)); PENA, Cristian (Fermi National Accelerator Lab. (US))

Presenter: CAMERON, Andrew (Fermi National Accelerator Laboratory)

Session Classification: RDC 8 Quantum & Superconducting Sensors

Track Classification: RDC 8 Quantum & Superconducting Sensors