

# A direct-sampling RF receiver for MOLLER beam charge measurement

*Thursday, May 27, 2021 5:12 AM (18 minutes)*

We demonstrate an RF receiver that achieves 25 ppm uncertainty in measuring the amplitude of a 1497 MHz sinusoidal signal in a 0.5 ms integration window. The receiver employs a direct digital sampling architecture. The signal comes from beam intensity monitoring cavities on the beamline of the Continuous Electron Beam Accelerator Facility (CEBAF) at Jefferson Lab. The signal strength, frequency, and integration window demonstrated are consistent with the requirements of the upcoming MOLLER experiment. It provides a new instrumentation that improves on the beam charge uncertainty in each helicity state by a large factor for the experiment.

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