Abstract Submitted
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Cavity-enhanced detection of transient absorption signals[1] FERNANDA C. RODRIGUES-MACHADO, PAULINE PESTRE, LIAM SCANLON, SHIRIN A. ENGER, LILIAN I. CHILDRESS, JACK C. SANKEY, McGill Univ — We present a simple, high-duty-cycle, cavity-enhanced optical absorption measurement technique based on a delay-limited Pound-Drever-Hall sideband locking technique. The chosen circuit naturally provides real-time readout of the amplitude quadrature, which can be mapped onto the cavity's internal loss rate. Our proof-of-concept device comprises a 5-cm-long Fabry-Perot cavity with a 400 kHz bandwidth (finesse 7000, 400 ns power ringdown), and a feedback bandwidth of several MHz, limited primarily by the group delay of our electronics. This technique could readily be applied to other optical resonators such as fiber cavities, with potential applications in radiation dosimetry.

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