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Recovering a Short Timescale Signal from a Pair of Long-delay VISARs[1] DAVID ERSKINE, LLNL — In the traditional use of a velocity interferometer system (VISAR) the detector is slow compared to the interferometer delay and there is no short timescale signal portion in the record. In this case the VISAR acts in a "derivative" mode to target displacement and the velocity output is treated as proportional to the fringe phase. With modern detectors however, one can now measure signals as fast or faster than the interferometer delay. The VISAR behaves in a "difference" mode (which is the more fundamental mode), and the velocity is no longer simply proportional to the fringe phase– a different mathematics for extracting the signal is required, which we have explored. We find that rather than use iterative equations, it is more fruitful to model the VISAR as a linear filter and analyze in the Fourier domain. In particular, by simultaneously using two VISARs with different delays, we demonstrate on simulated data that we can accurately recover the short timescale behavior of a target, shorter than the interferometer delay.

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