

Abstract Submitted
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One Tera Sample-per-Second Single-Shot Digitizer YAN HAN, University of Central Florida, CREOL, OZDAL BOYRAZ, BAHRAM JALALI, University of California, Los Angeles — The ability to digitize wideband electrical waveform is urgently needed in state-of-the-art instruments. The sampling rate of a state-of-the-art system is currently about 20 GSa/s with ~ 5 ENOB (Effective Number Of Bits). Here, we demonstrate a single-shot digitizer with a record 1 TSa/s sampling rate. This is accomplished by using a photonic time stretch preprocessor which slows down the electrical waveform before it is captured by an electronic digitizer. In the experiment, a 48 GHz tone is digitized in real time at 1 TSa/s. Over a 10 GHz bandwidth centered at 48 GHz, the average SNR within the 1.1 ns time aperture is 22.7 dB corresponding to 3.5 ENOB. Measurements at other input frequencies resulted in up to 4.2 ENOB. While the intrinsic bandwidth of digitizer is 200 GHz, it is presently limited to 80 GHz due to component limitations. To the best of our knowledge, this is by far, the fastest single-shot digitizer ever demonstrated.

Yan Han
University of Central Florida, CREOL

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