Abstract Submitted
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High-Speed Velocimetry Using Dispersive Frequency Modulation Interferometry JASON MANCE, NSTech — A new velocimetry technique was developed for measuring velocities that are typically outside of the range available using standard PDV techniques. Current oscilloscopes can record as fast as ˜70 GHz limiting measurement velocities to ˜50 km/s using standard PDV methods. The new technique encodes the PDV signal onto a chirped pulse then optically stretches the PDV signal in dispersive fiber. The stretch reduces the beat frequency, effectively bypassing the bandwidth limitations imposed by the detectors and oscilloscopes. Measurements presented using laser driven foils demonstrate PDV signals recorded onto a 180 ns pulse, stretched by factor of 3.6, with an effective record time of 110 ns. PDV signals with stretch factors up to 10 times have been recorded, which would theoretically increase the maximum measurable velocity to ˜500 km/s. Further optimization of the system may result in a larger record times and stretch factors. This work was done by National Security Technologies, LLC, under Contract No. DE-AC52-06NA25946 with the U.S. Department of Energy and supported by the Site-Directed Research and Development Program. DOE/NV/25946—3136.

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