Abstract Submitted
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Line-RALF Doppler Velocimetry MARIO FAJARDO, AFRL/RWME, Energetic Materials Branch, Ordnance Division, U.S. Air Force Research Lab, 2306 Perimeter Rd., Eglin AFB, FL 32542-5910. — We report the successful proof-of-concept demonstration of a 1D spatially-dependent variant of our Rubidium Atomic Line Filtered (RALF) Doppler velocimetry technique,[1] using streak camera detection of laser light reflected from 1-mm-diameter laser-driven flyers traveling at 1 km/s. RALF employs the frequency-dependent near-resonant optical absorption of a heated Rb/N_2 gas cell to convert the Doppler shift of reflected 780.24 nm light directly into transmitted light intensity. This approach results in each individual pixel in a RALF image constituting an independent velocity measurement. RALF advantages over conventional interferometric Doppler velocimetry methods include: a time response limited only by the optoelectronic detection system, and facile adaptation for 1D, and even 2D, imaging velocimetry applications. RALF disadvantages include: the direct conversion of image intensity noise into calculated velocity noise, extreme sensitivity to loss of signal upon shock breakout, and poor tolerance of parasitic reflections of unshifted illumination laser light. 1. M.E. Fajardo, C.D. Molek, and A.L. Vesely, AIP Conf. Proc. **1793**, 160011 (2017). "Rubidium Atomic Line Filtered (RALF) Doppler Velocimetry."

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