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Dynamic Measurements of High Explosive Velocity Fields using Particle Image Velocimetry BRANDON WILSON, WM. M. WOOD, RUSS OLSON, Los Alamos Natl Lab — A non-invasive technique for measuring dynamic particle velocities using pRad images ahead and behind an HE detonation burn front is presented. The technique uses proven principles from particle image velocimetry (PIV). Time-resolved radiographs of detonated HE (PBX 9501 and 9502) doped with tungsten particles ($\leq 10\mu$m) are captured at pRad at Los Alamos National Laboratory. From sequential radiographs, resolved velocity fields are measured by local cross-correlations of tungsten tracer positions. With this technique, we resolve the Taylor wave and can measure the particle velocity directly behind the detonation front. Results for single detonation waves and colliding detonation waves are presented. We also discuss the capabilities, limitations, applications, and future of this technique.

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