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**Hanna E. Makaruk\*** (hanna\_m@lanl.gov), E-548, P-22, Los Alamos National Laboratory, Los Alamos, NM 87545. *Analysis of Proton Radiography Images.*

Proton radiography (PRAD) technique has unique qualities allowing for investigating explosion type experiments with high density materials, but it also presents unique challenges. For example, gradient based contour detection methods commonly applied in analysis of photography and X-ray radiography images lead to significant difficulties in this case, due to PRAD specific artifacts. A precise level-set-like shape detection method specifically for PRAD images is proposed. This method allows for accurate detection of many contour details and produces continuous contours. Velocities of surfaces of major fragments are subsequently calculated from these contours, from series of images derived from each individual experiment. This velocity calculation method is validated by independent measurements. Pairs of experiments were repeated in identical conditions, to establish repeatability vs. stochasticity of the physical processes. Pairs of images from the same phase of identical experiments are subtracted from each other and compared both qualitatively and by measuring distances in a measure proposed. The measure introduced here gives good account of what physicists would call "similarity" of PRAD images, and it additionally allows for quantitative data analysis. (Received January 30, 2006)