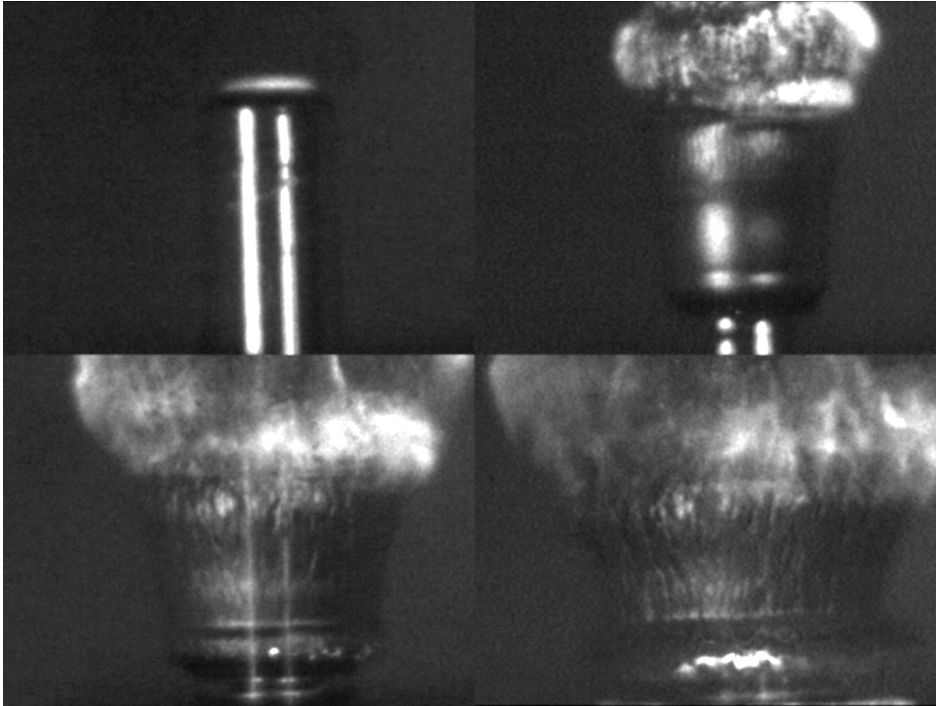




Specialised Imaging

Application Note 4

Ultra-high speed recording of a detonator expansion



IMAGING PARAMETERS

The SIMD4 Framing Camera with a 180 mm lens and 1 m working distance gave us a 30 mm field of view looking through a polycarbonate window. Trigger timing was accomplished using the camera's internal delay options. A 1 msec flash was used for lighting along with self luminosity of the event.

EQUIPMENT PARAMETERS

The SIMD4 Camera was programmed to take a 4 frame sequence with initial delay set for 159 usec and 2 usec interframe times, 500 ,000 fps, with 50 nsec exposure times and Gain set to Gain 7 out of 10, to give full motion free coverage of the event that lasted 6 usec. Both external flash illumination and self illumination provided light.

OVERVIEW OF EXPERIMENT

The 10 mm diameter Detonator was positioned into the field of view and critical alignment was done. The focusing was done through live focus mode in the camera on the computer screen. The camera and lens were protected by a 30 mm polycarbonate window. Triggering of the detonation was done externally and a synch pulse from the fire box was sent to the camera. Appropriate delay was set in the camera so the frames occurred to cover the expansion of the detonator casing. Timing of the framing sequence was verified using a calibrated oscilloscope.

These images were taken with the first SIMD4 frame camera. Since then both hardware and software changes in the camera have completely eliminated the slight phosphor lag ghosting that is in frame 3 caused by saturated phosphor image in frame 1 which are produced by the same ICCD.