

Abstract Submitted
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Optical pins for sub-nanosecond resolution of detonation breakout MICHAEL SHINAS, MATTHEW BRIGGS, MICHAEL ARCHULETA, Los Alamos National Laboratory — We report on the design and tests of optical pins that we have shown to resolve the arrival of a detonation front with a resolution of $<1\text{ns}$. We coat the end of single-mode fiber with a 1000 Ångström layer of aluminum and butt it against a detonator in various locations. Using an IR interferometer with the reference leg shifted in frequency (the type used for Photon Doppler Velocimetry), the disappearance of the fringes allows a measurement of the arrival of the detonation front to $<200\text{ ps}$. The detonation arrival time measured with the optical pin and IR interferometer agree within the resolution of the measurement. A more fieldable and affordable alternative using APDs Avalanche photodiodes to measure the disappearance of the light reflected from the aluminum coating yields a resolution of 1ns . We present the design details and performance proof tests. LA-UR-13-21216

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