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Tilt Correction of High Explosive Test Data with Examples LARRY HILL, ELIZABETH FRANCOIS, JOHN MORRIS, Los Alamos National Laboratory — Many high-explosive experiments view a nominally-axially-symmetric detonation wave breaking through a charge surface. Emerging waves virtually always exhibit a degree of tilt, which one generally wants to excise from the data whilst quantifying its direction and magnitude. In some cases, such as front-curvature rate sticks and Onionskin (OS)-type tests, the diagnostic is a single-slit streak camera (1D correction). In other cases, such as a Plane-Wave Lens characterization test or a Furball test, multiple slits or fibers provide sparse data over a surface (2D correction). We demonstrate both 1D and 2D corrections, the latter of which is the more challenging. In 2D, we represent the breakout time as the sum of a symmetric component and an asymmetric component (a tilted plane). The two tilt angle components are found that minimize the data scatter associated with the symmetric component. The most compelling example is the Furball test, an OS-variant for which the breakout time over the hemispherical observation surface is measured at many points using optical fibers. Unlike the OS test that looks in one (random) direction, we are able to construct OS-type data in the direction of maximum tilt, even though there are generally no fibers at that direction.

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