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VISAR fringe analysis under extreme spatially varying shock loading[1] DAVID ERSKINE, DAYNE FRATANDUONO, Lawrence Livermore Natl Lab — Many VISAR velocity interferometers employ a streak camera to record fringes along the spatial axis (Y) of a target, versus time. When the shock loading (thus velocity history) varies rapidly versus Y, the fringe analysis challenges traditional algorithms since the Y-spacing of fringes can vary strongly with Y, and be significantly different than the uniform pre-shock (bias) spacing. For traditional colum-by-column analysis the intensity signal shape would be a sinusoid with rapidly varying frequency (chirped), which can confuse a traditional algorithm expecting a monochromatic peak in Fourier space. And for a traditional push-pull row-by-row approach, the phase steps are irregular. We describe preliminary success in analyzing such data in simulation. We find it useful to (a) separate the nonfringing component from the data early; (b) maximize linearity of a plot of fringing magnitude versus nonfringing intensity to choose optimal weight values; (c) when using a row-by-row approach sampling 0, 90, 180, and 270 degrees phase we add a fifth sample at 360 degrees, which is averaged with the 0 degree sample and replaces it. This increases the robustness to variable phase step (following P. Hariharan). The pre-shock and post-shock regions are separately processed/concatenated.

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