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Improved data processing for frequency domain interferogram
ZHICHENG ZHONG, HAO JIANG, SHIYUAN LIU, Huazhong University of Science and Technology — Frequency domain interferometer is a common method to detect the dynamic response in laser-induced shock wave loading experiments. When the FFT method is used to extract the phase and amplitude of the frequency domain interferogram (FDI), the data truncation of the fringes and the window profile that used to cut out the 1st order alternating item can greatly influence the accuracy and precision of the data processing. In order to improve the performance of FDI interpretation, we first carry out an error analysis on the conventional method and propose an improved procedure by introducing a Gaussian envelope to the fringes as well as using a self-designed flat-top cap window to isolate the 1st order alternating item. Results of a series simulated experiments demonstrate that the proposed approach can significantly and effectively reduce the data processing error in FDI interpretation.

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