

Abstract Submitted
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Fundamental limits of time-resolved velocimetry¹ DAN DOLAN, Sandia National Laboratories, DARRELL RAMSEY, Mission Support and Test Services, LLC — Time-resolved velocimetry—VISAR, PDV, and so forth—are core diagnostics in almost every dynamic compression experiment. Each diagnostic maps terahertz optical frequencies (which cannot be measured directly) to electrical signal phase, frequency, or amplitude. All three mappings have benefits and shortcomings. For example, VISAR can handle an arbitrary velocity so long as the corresponding signal phase does not change too rapidly. PDV can manage slowly evolving velocity distributions but struggles with sub-nanosecond time resolution. These limitations stem from how velocity maps to the measured signal(s), random noise effects, and a characteristic time scale. Measurement performance (time/velocity resolution, etc.) ultimately links to the diagnostic time scale.

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