

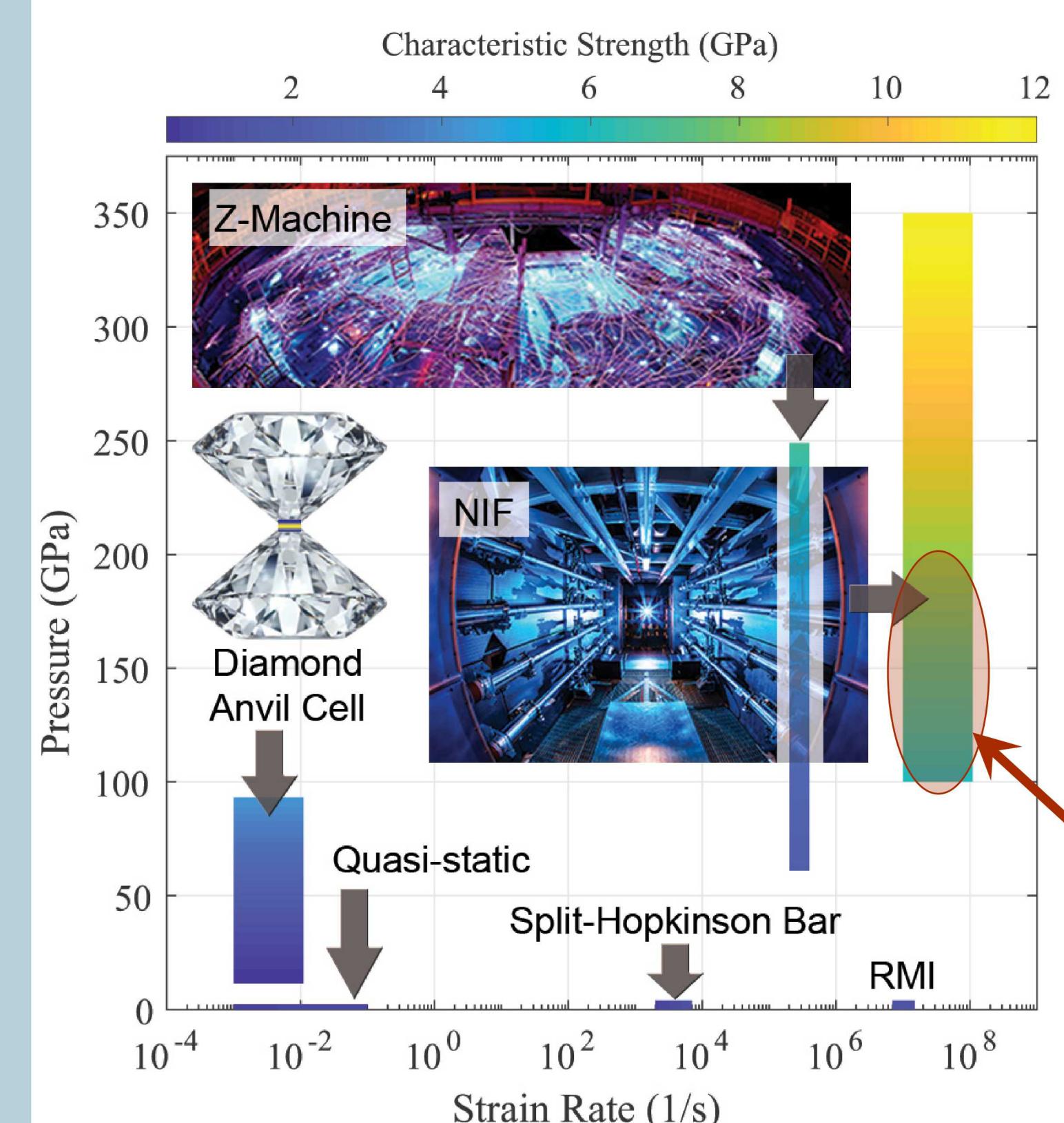


# Ta Strength at Ultrahigh Pressures and Strain Rates Using Thin Film Graded Density Impactors

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# Introduction

A comprehensive understanding of Ta strength across a broad range of conditions requires cross-platform validation.



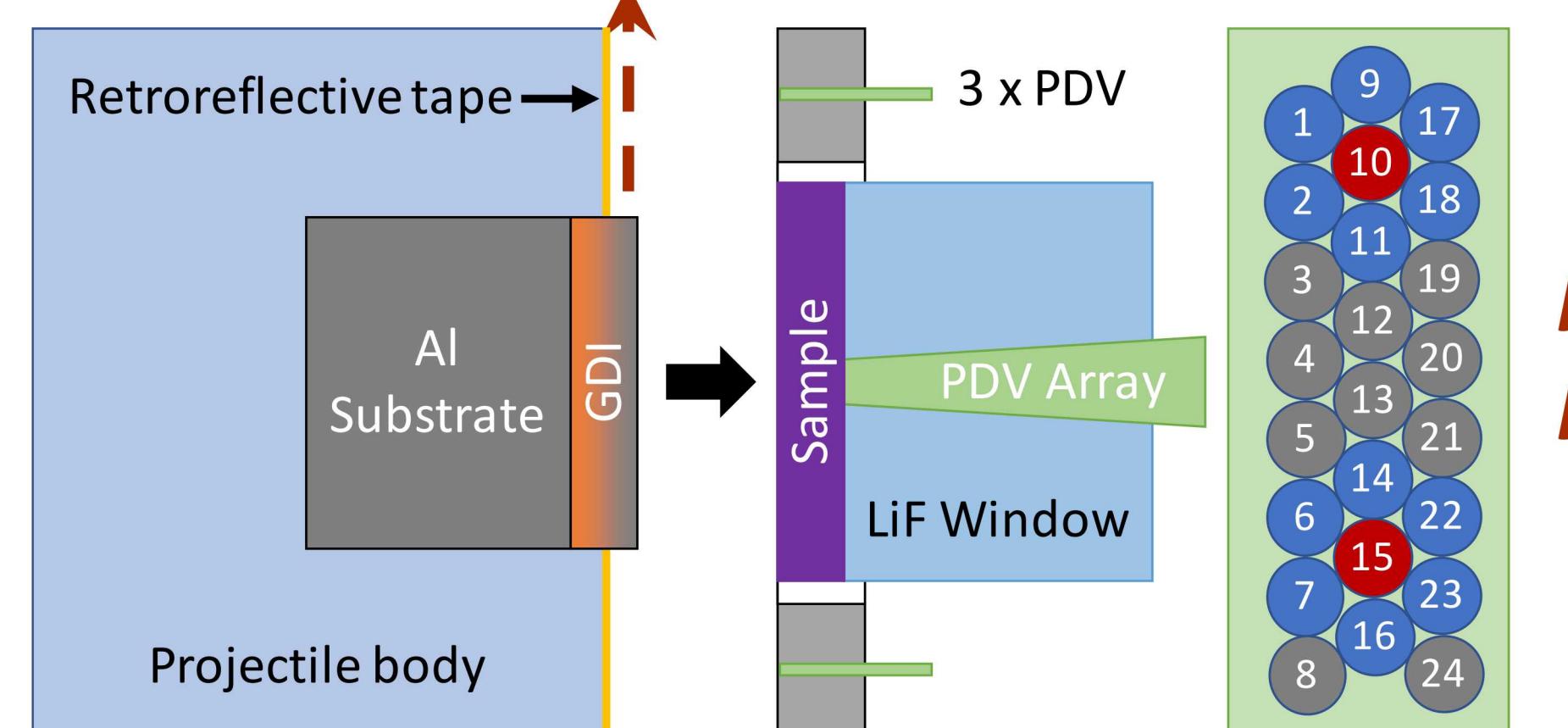
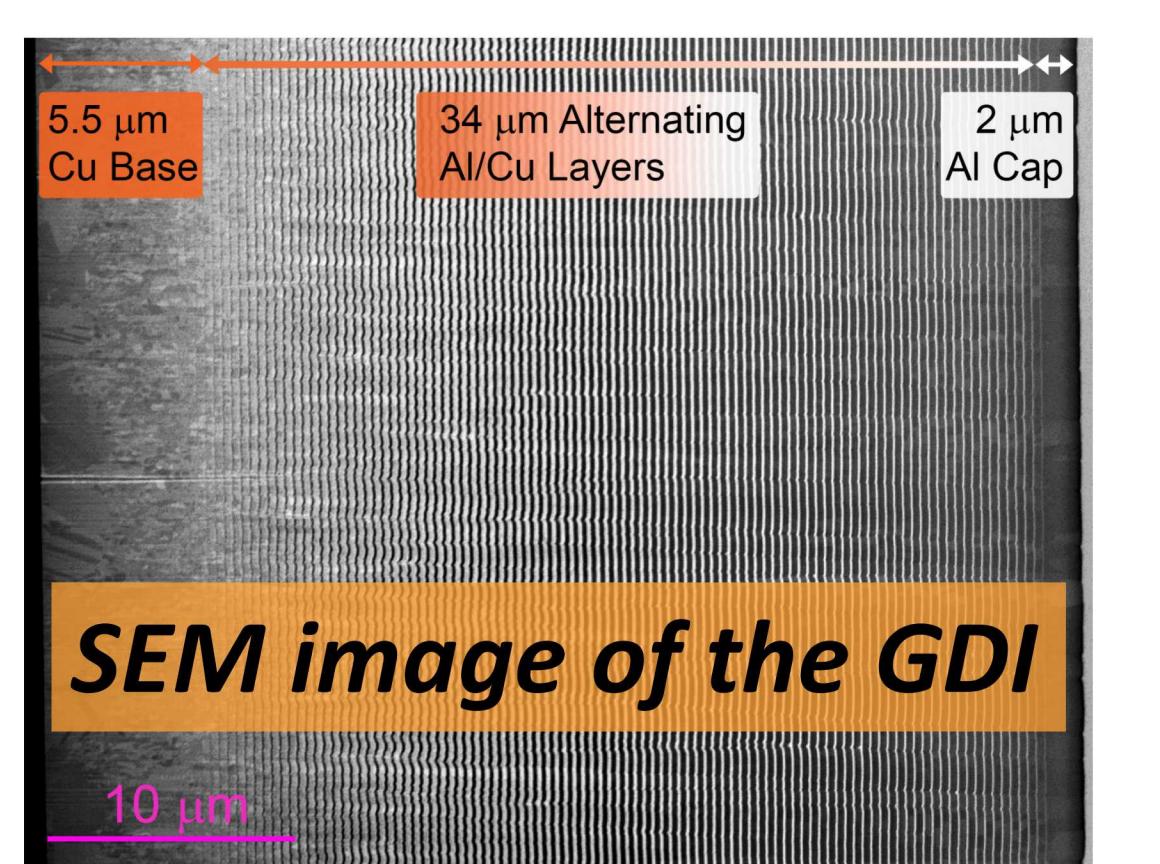
We have developed a novel technique to investigate material strength at high pressures and high strain rates.

→ *Target regime for these experiments*

# Approach

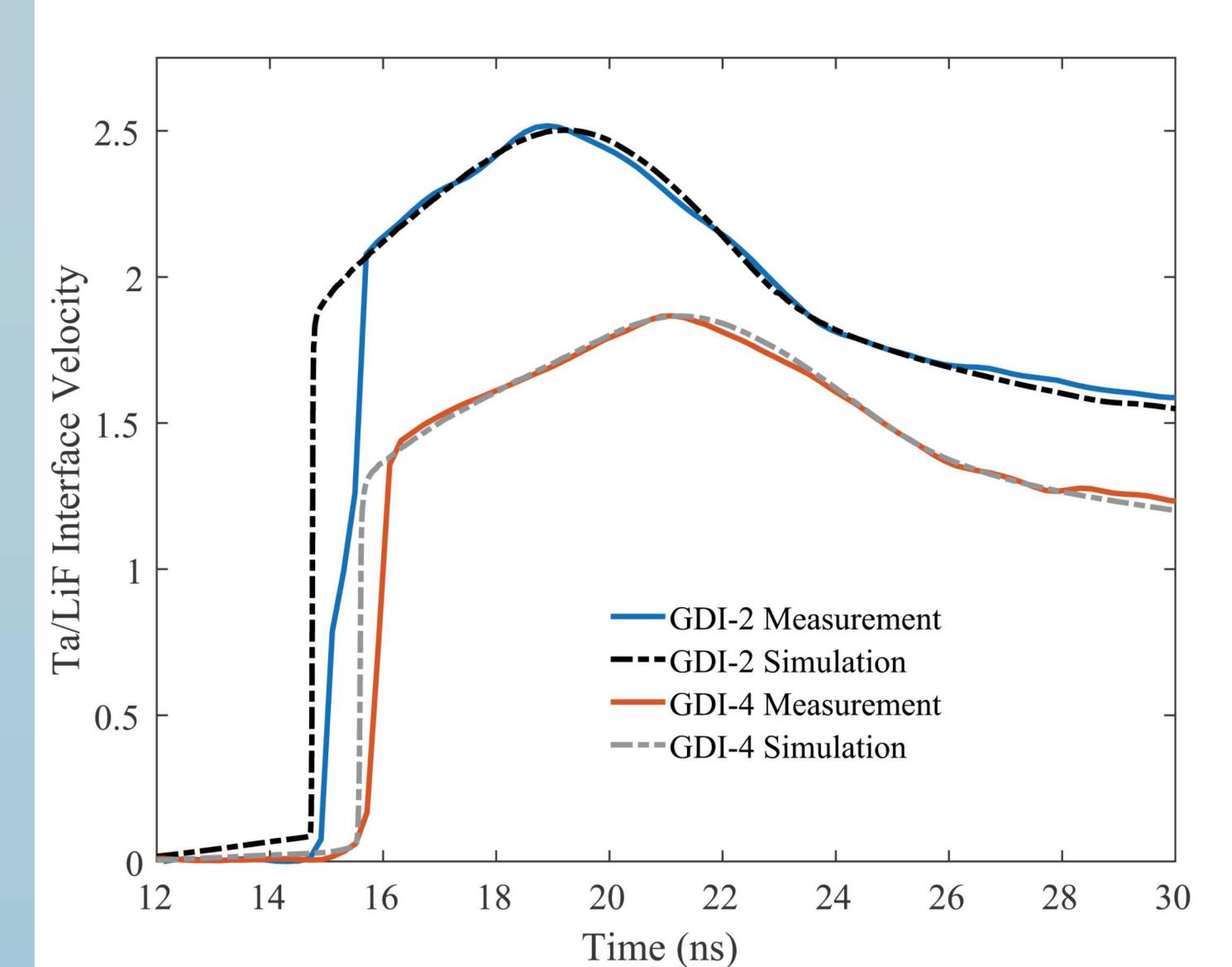
Sputter deposition is used to apply nm thick layers of alternating Al and Cu to provide an effective density gradient. This film is then used as an impactor in a plate-impact experiment to generate a shock-ramp-release loading profile.

# Experimental Configuration



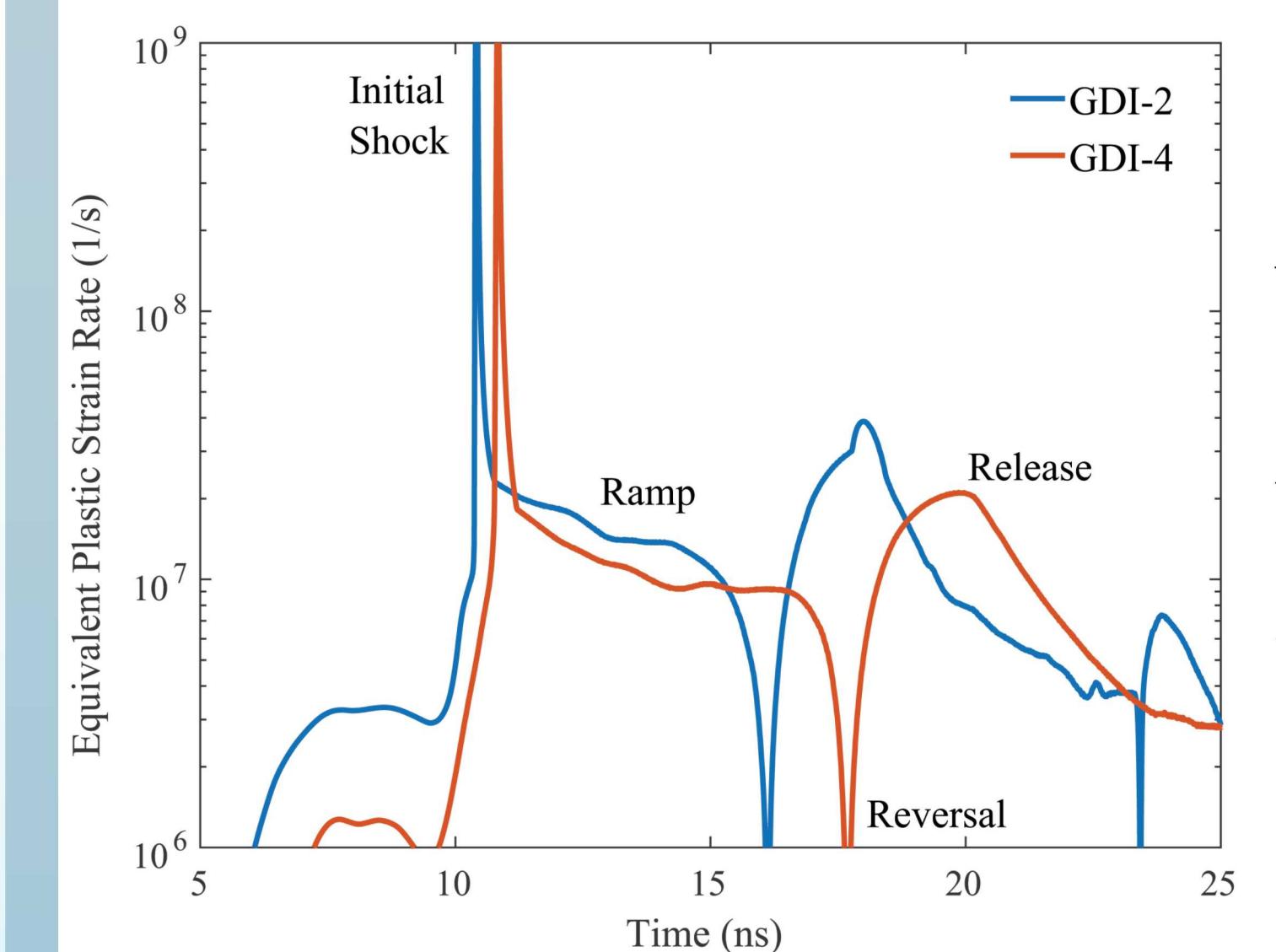
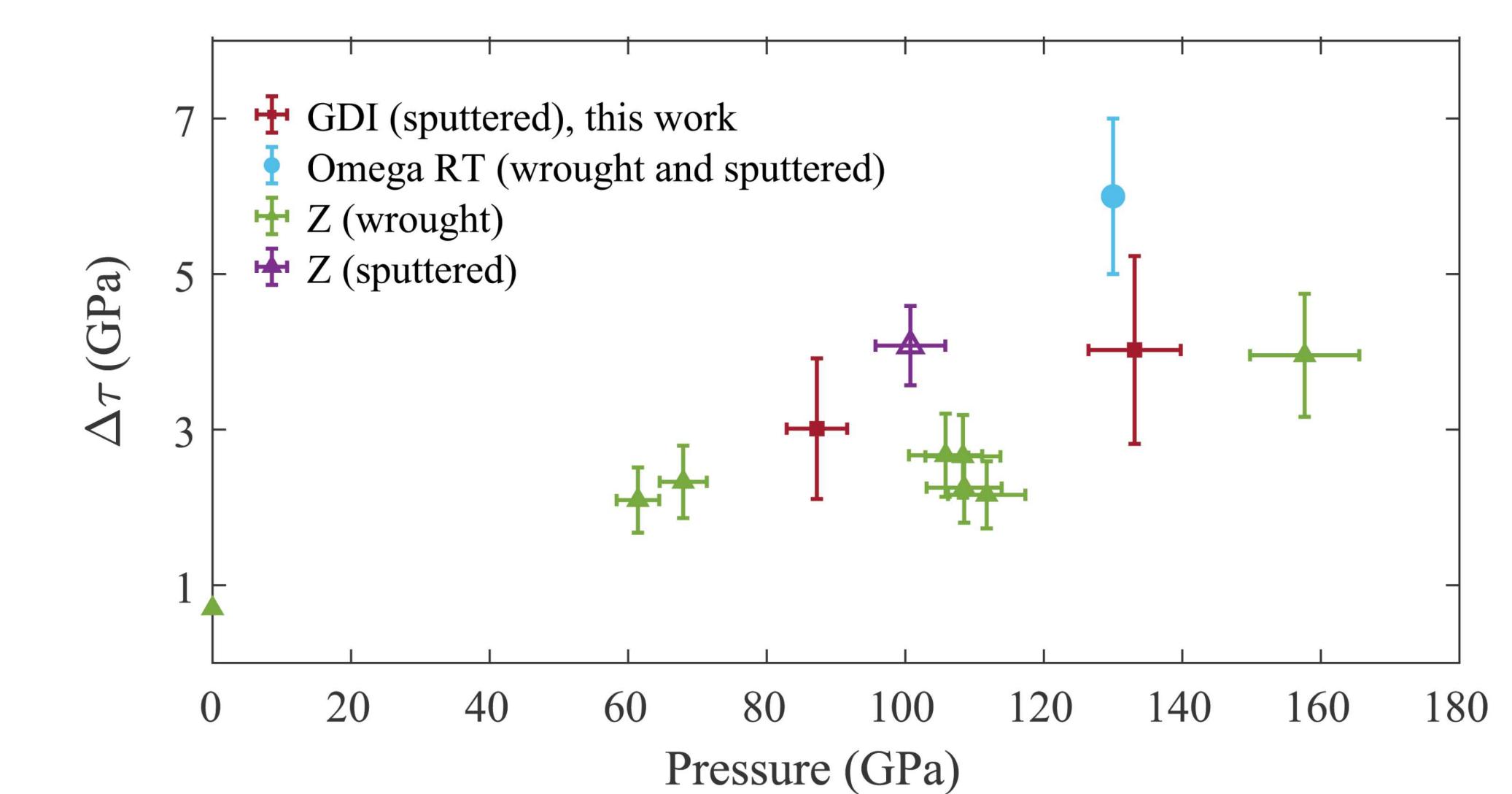
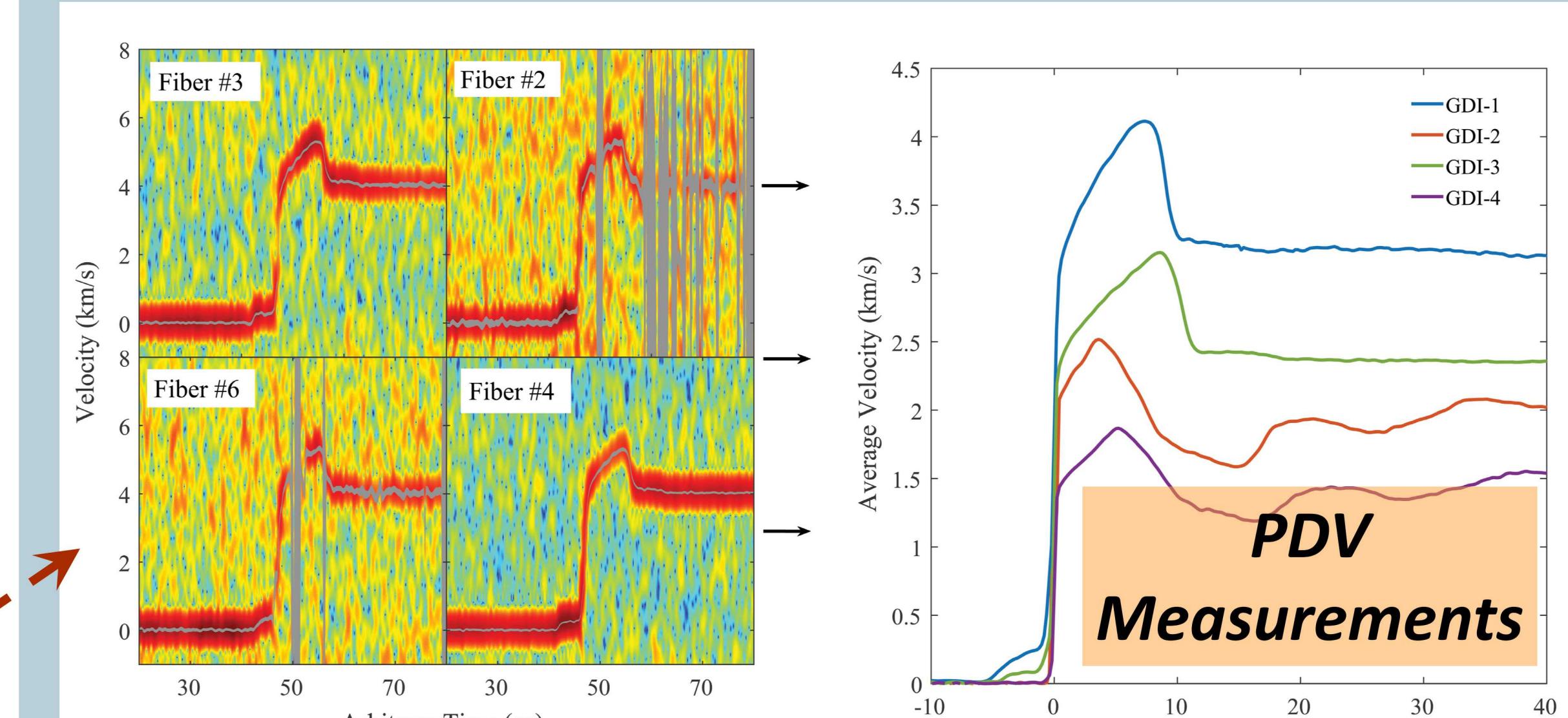
A 2-stage light gas gun was used to launch the GDIs into a thin (40  $\mu\text{m}$ ) Ta sample.

# Simulations



The GDI build was imported directly into Alegra, resulting in a predictive mesoscale simulation capability.

# Results



Strength estimates were extracted from the measured velocities and are in good agreement with other platforms.