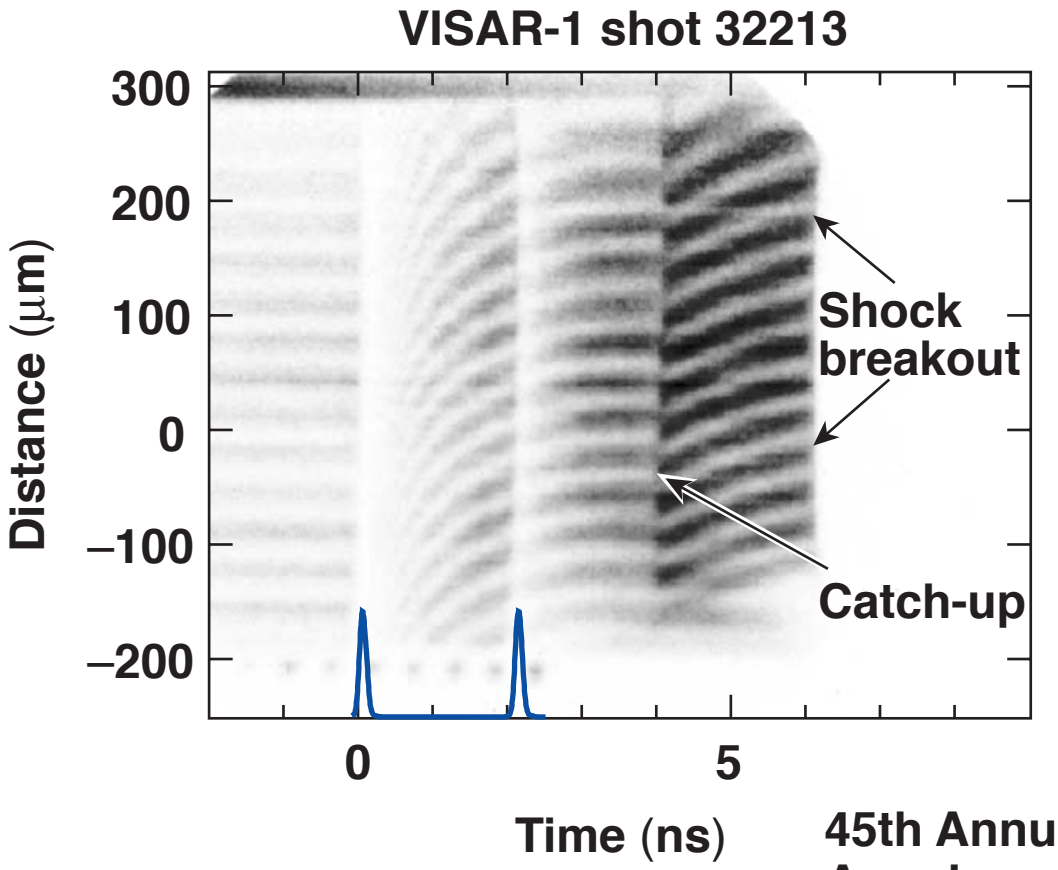
Timing of Multiple Shocks in Planar Direct-Drive Laser-Driven Targets



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Collaborators

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Summary

Double-pulse experiments are used to study shock timing relevant to direct-drive ICF targets

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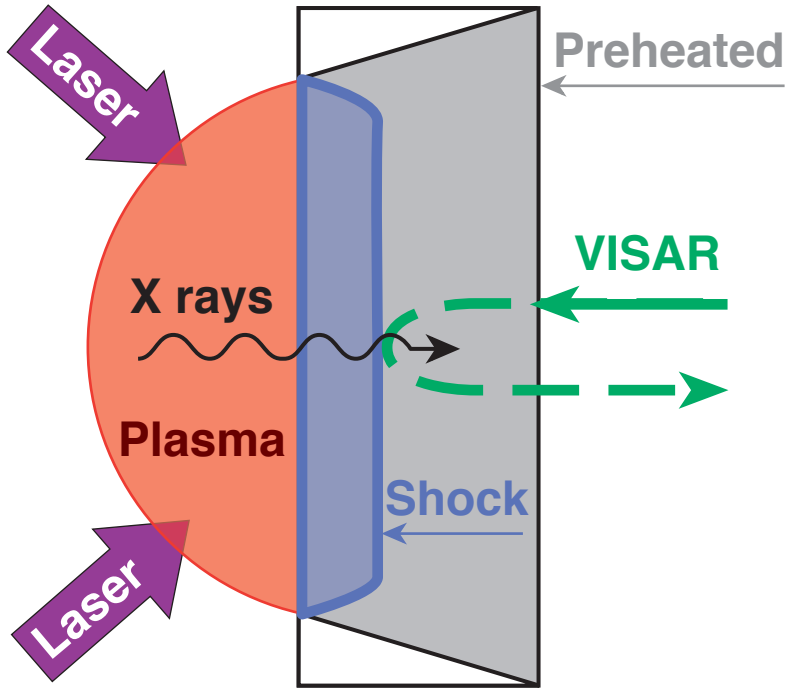
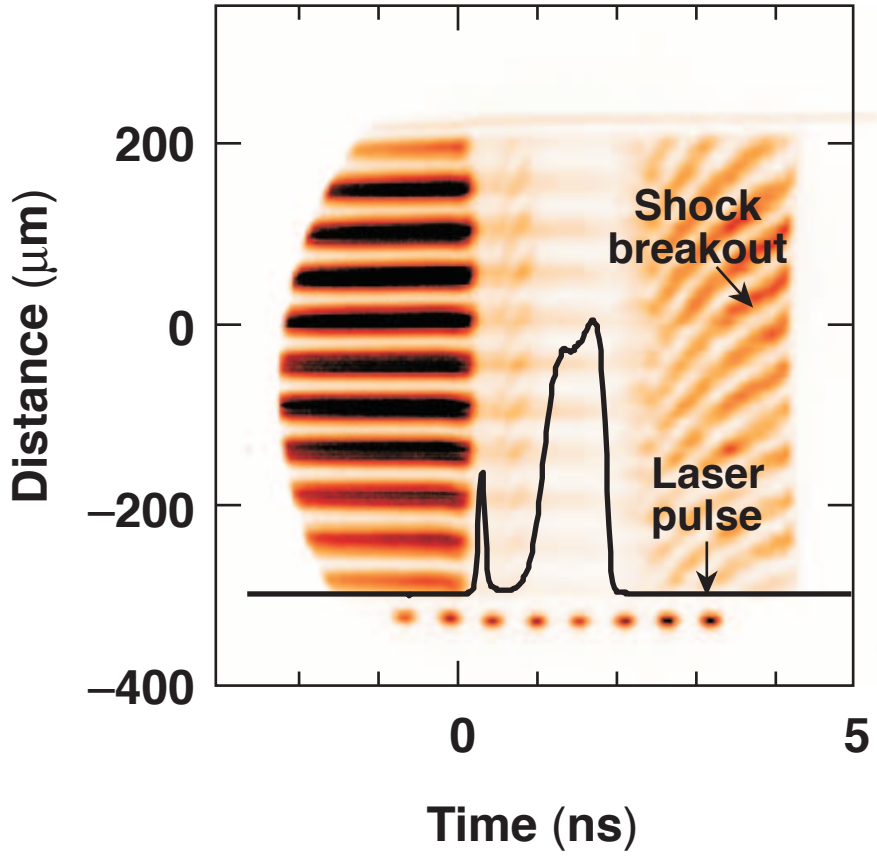
- Time-resolved shock velocity and self-emission are measured in planar CH targets at various conditions:
  - shock catch-up
  - shock breakout
  - two-dimensional effects
- One-dimensional simulations show good agreement with measured velocity profiles.
- Two-dimensional effects are observed; these and coupling efficiency will be studied further.

Preheat prevents diagnosis of shock velocity during the laser pulse

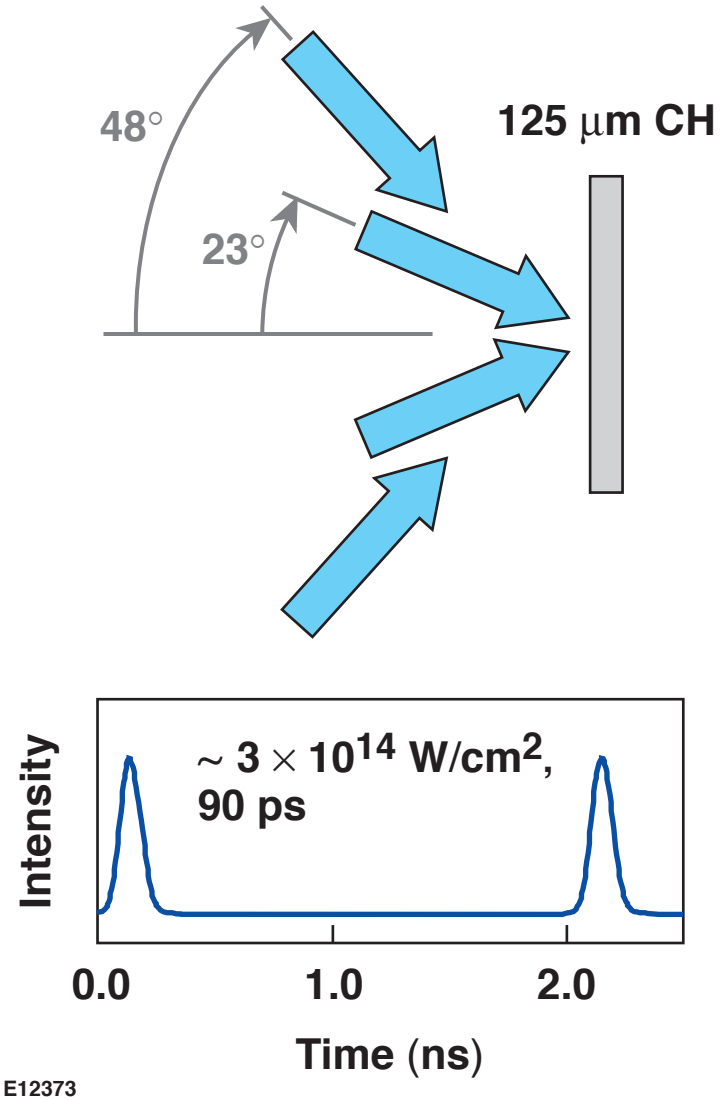


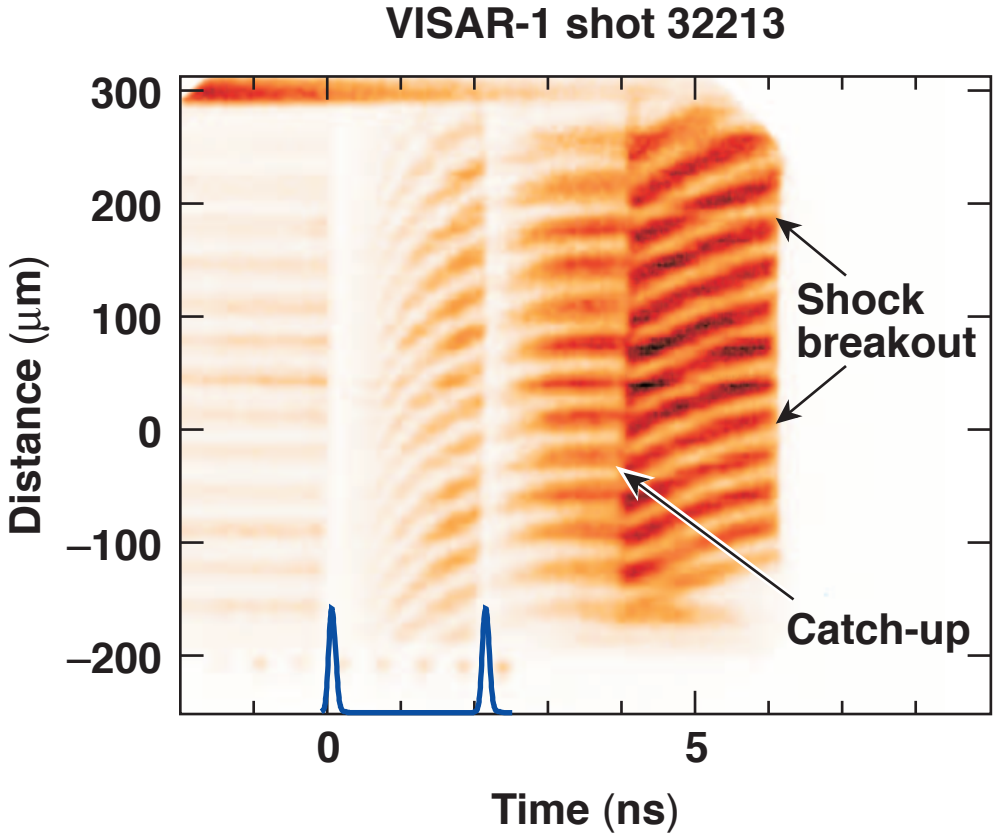


Use multiple short pulses to overcome this limitation.

E12366a

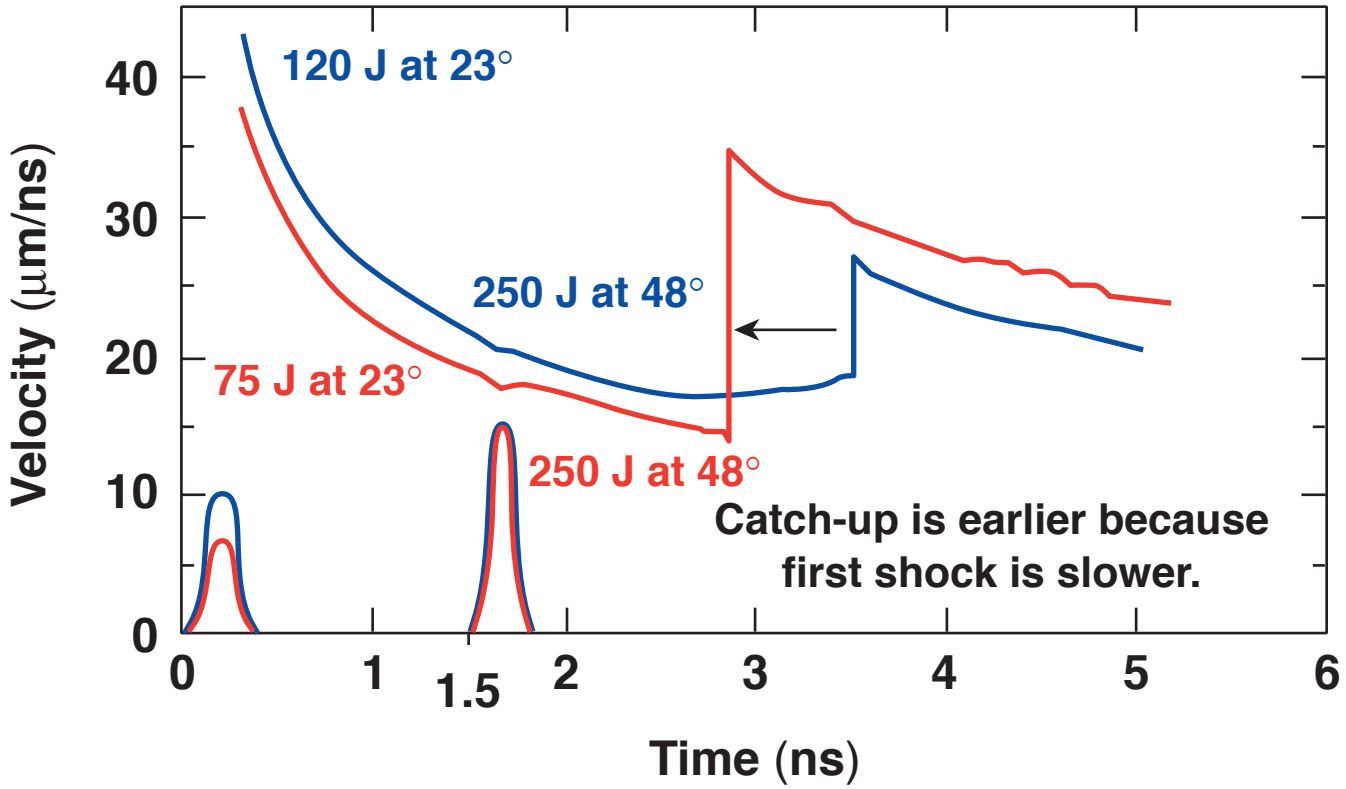
Shock timing and coupling efficiency are studied with two pulses and different angles





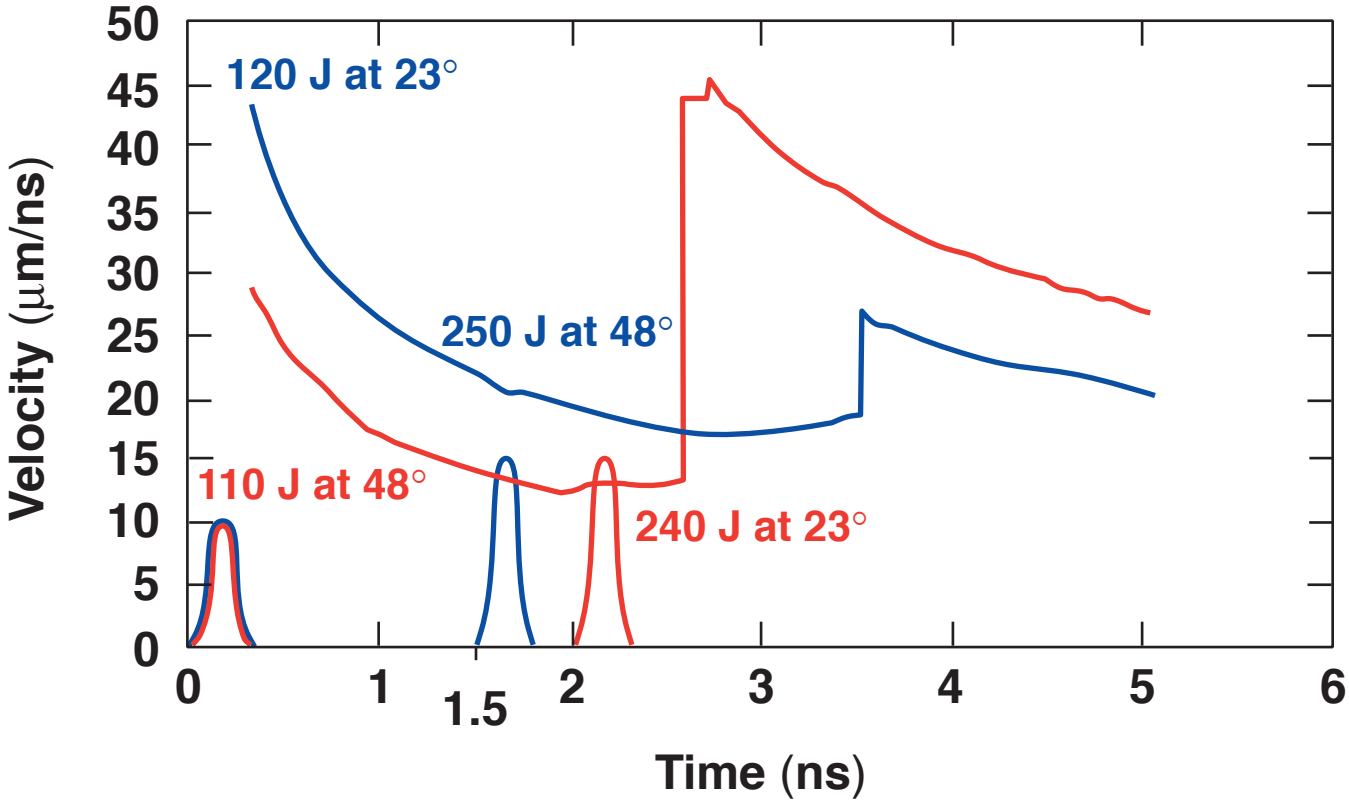
E12373

Catch-up occurs earlier for slower shocks produced by lower intensities



Shots: 32215 & 32216
E12534

Lower coupling efficiency at higher angles of incidence reduces observed shock speeds



Shots: 32214 & 32216
E12535

LILAC simulations of planar double-pulse experiments show good agreement with observed shock-velocity profiles

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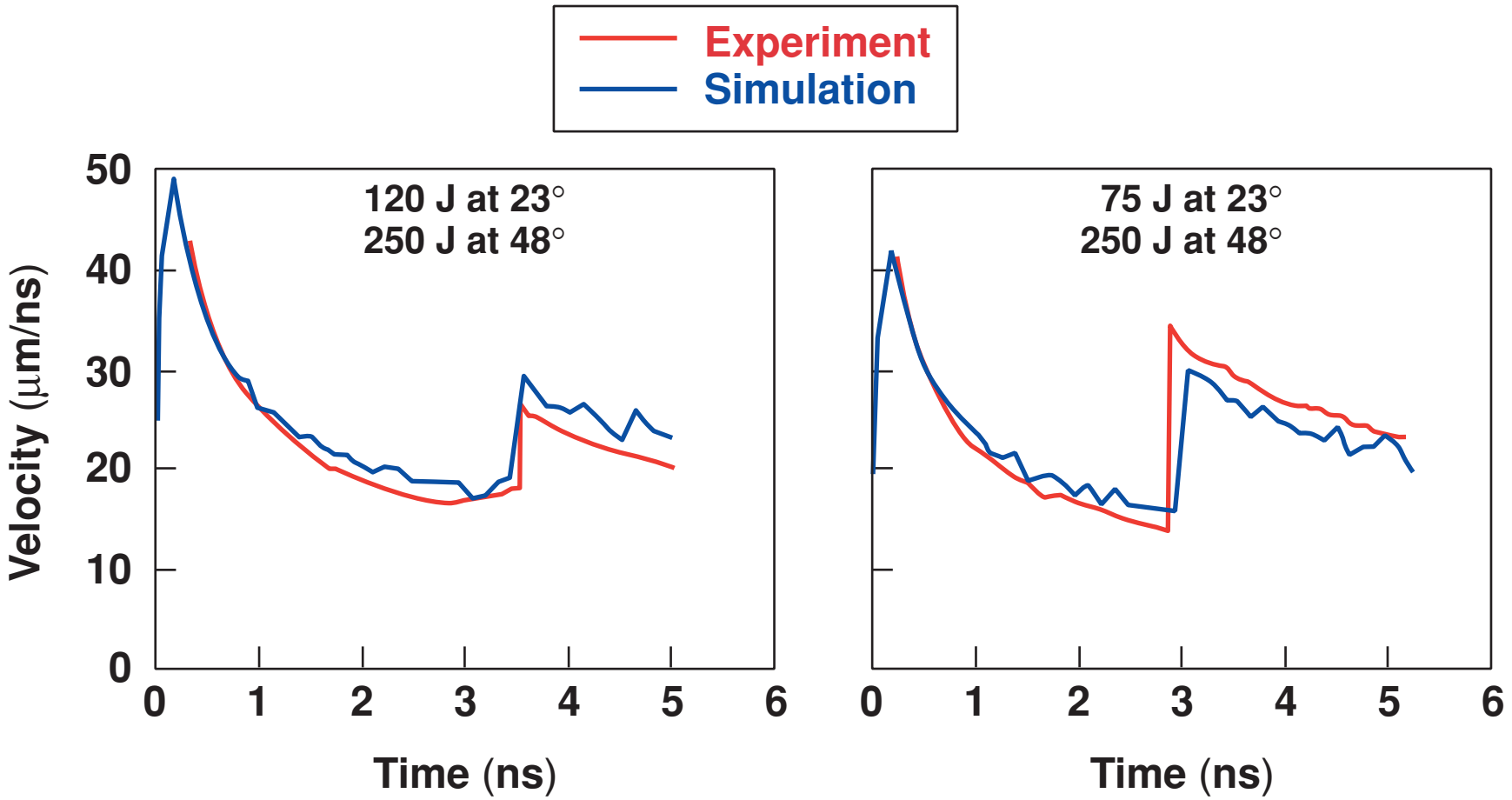
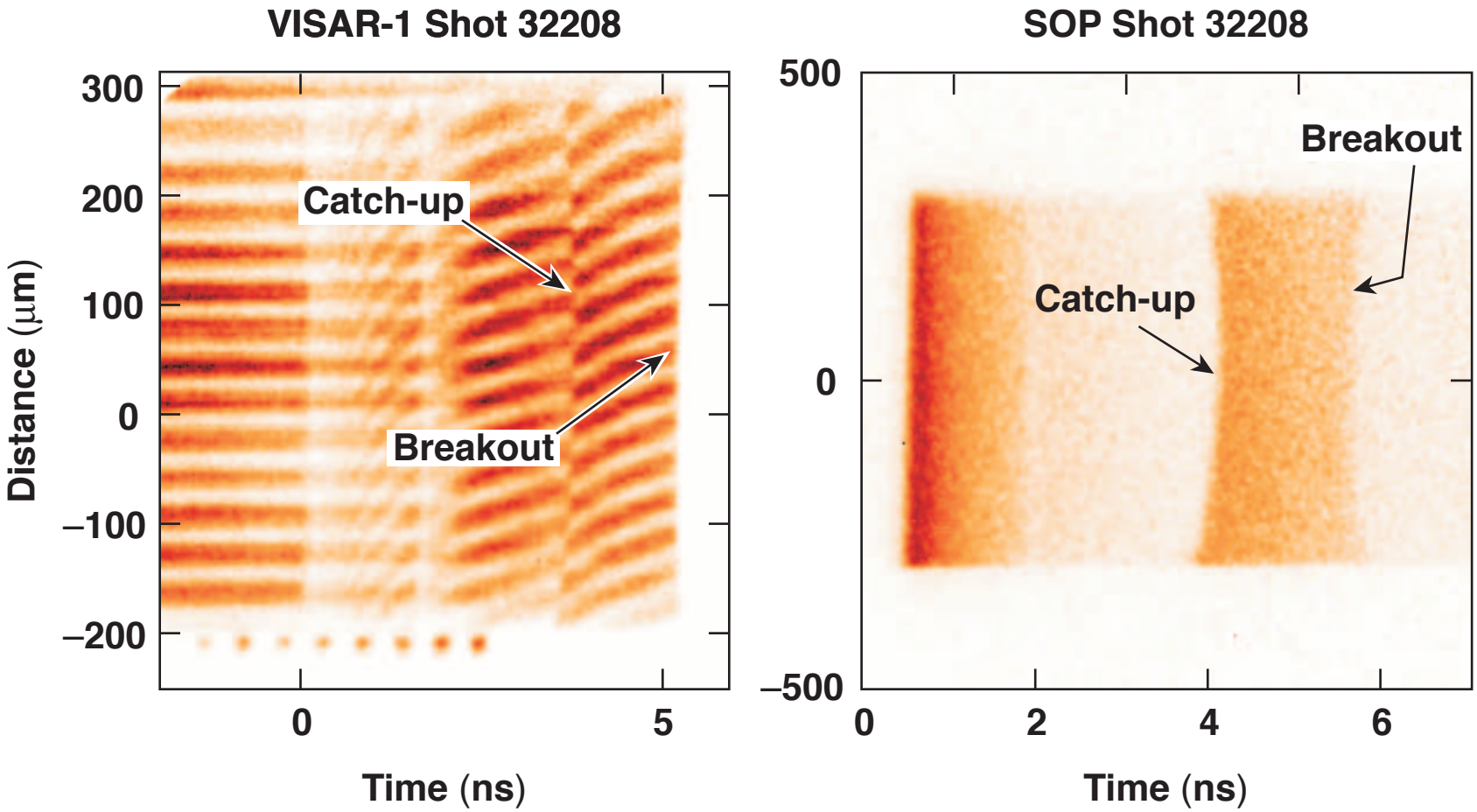


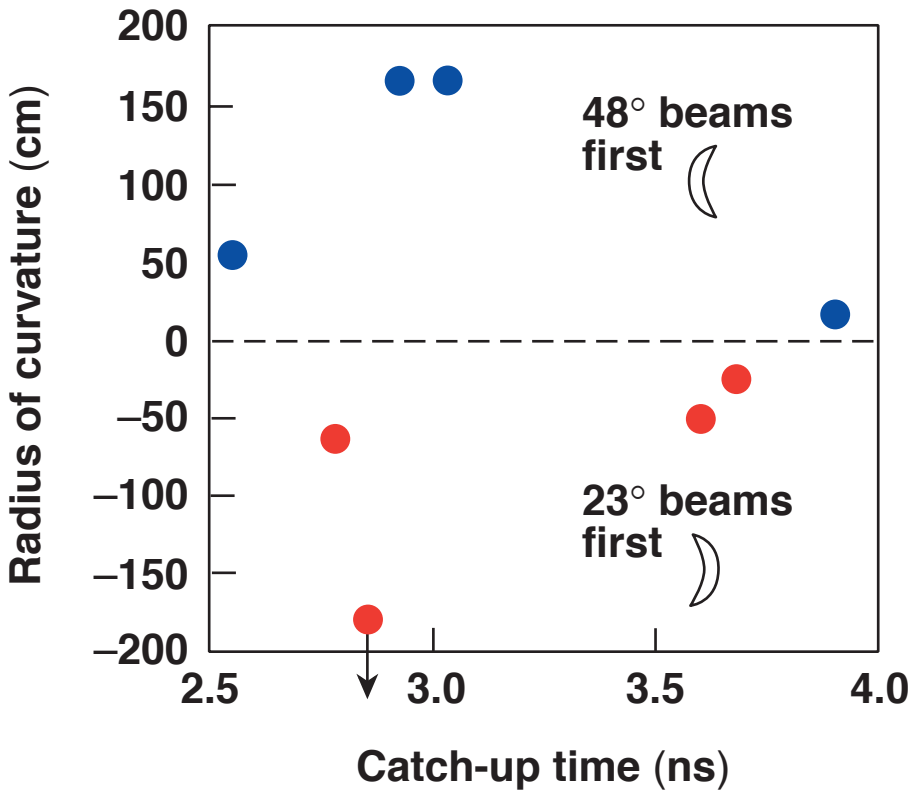
Shots: 32215 & 32216
E12536

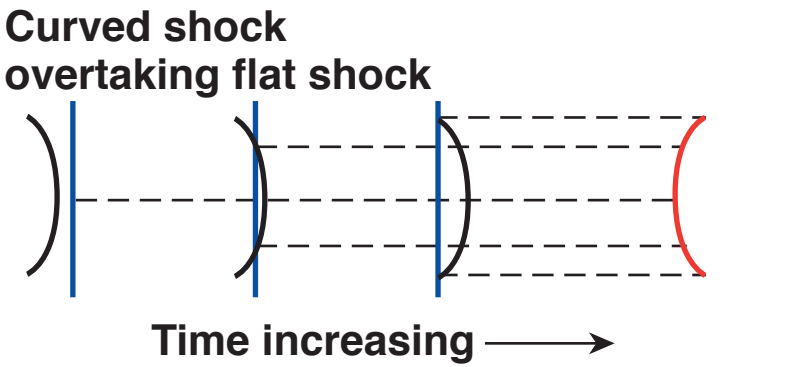
Simultaneous velocity and self-emission profiles provide data on two-dimensional behavior

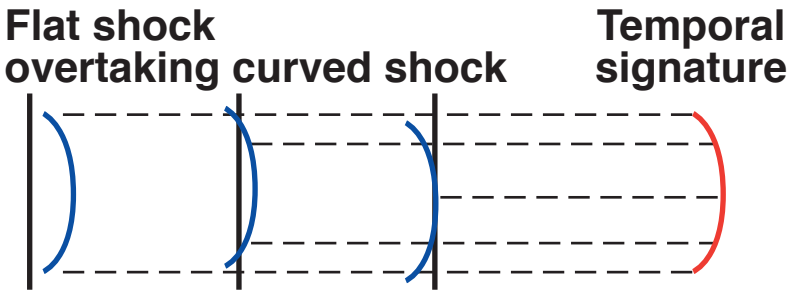


E12375

Curvature of catch-up feature depends on irradiation incidence angle

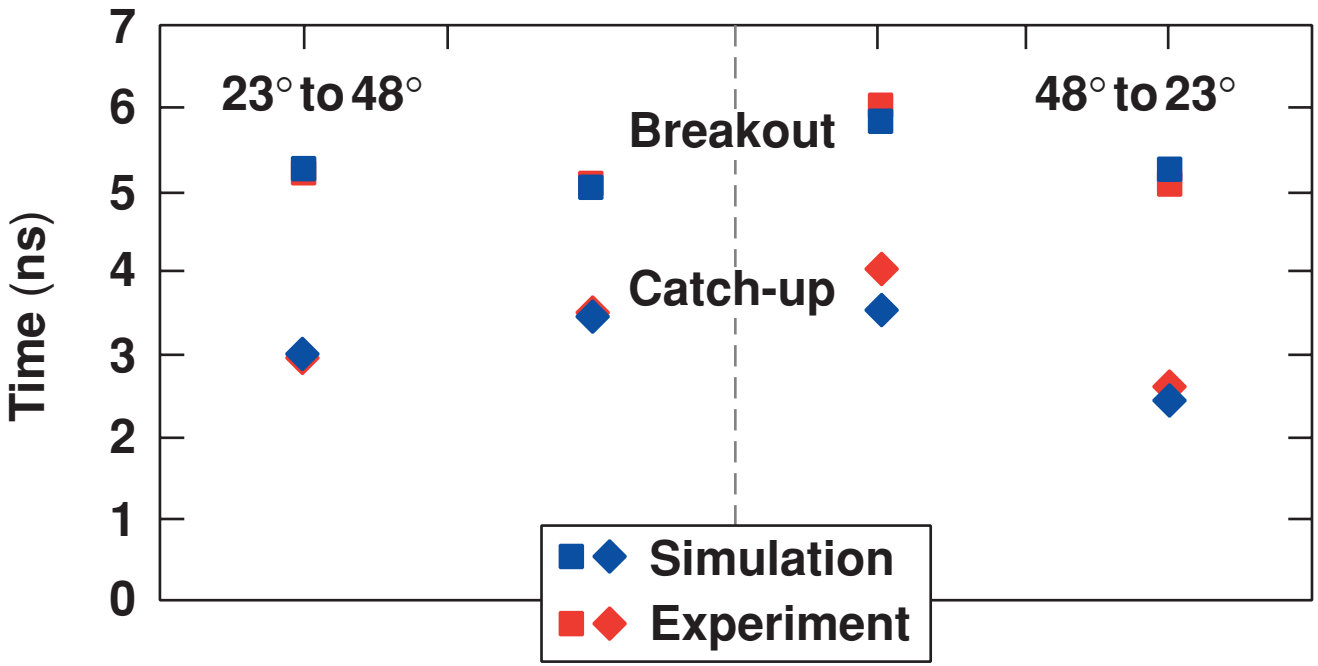






Shots: 32208, 32209, & 32212 – 32217
E12537

LILAC simulations of planar double-pulse experiments show good agreement with observed shock catch-up and breakout times



Shots: 32213 & 32216
E12681

Summary/Conclusions

Double-pulse experiments are used to study shock timing relevant to direct-drive ICF targets

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