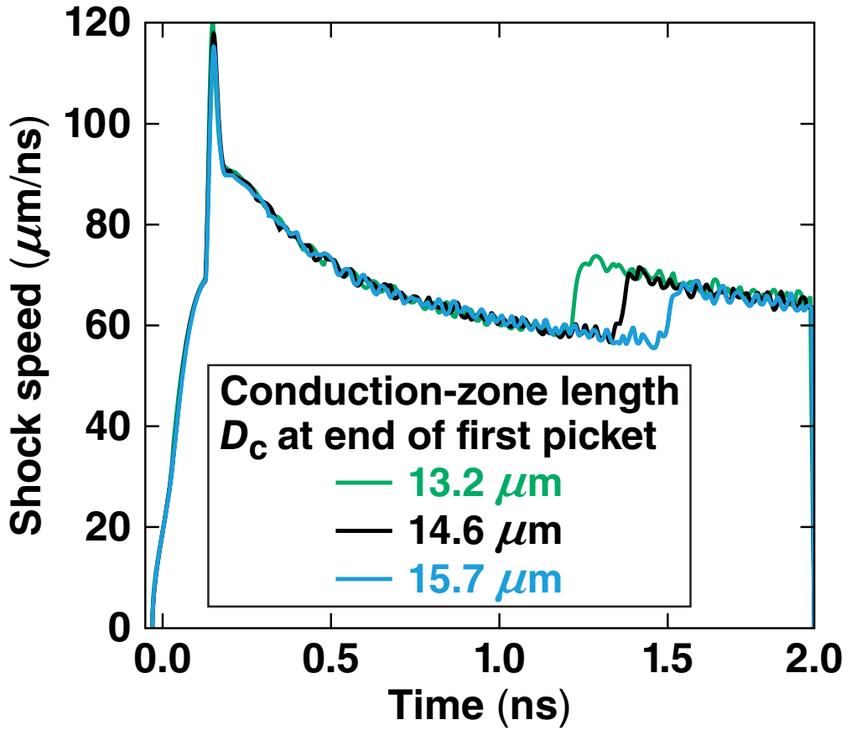
Dependence of Shock Timing on Coronal Parameters for OMEGA Direct-Drive Implosions



D. Cao
University of Rochester
Laboratory for Laser Energetics

59th Annual Meeting of the
American Physical Society
Division of Plasma Physics
Milwaukee, WI
23–27 October 2017

Summary

Shock-timing simulations show sensitivity to variations in conduction-zone length

- Shock-merger time predictions with mid-adiabat pulse shapes are reproducible in experiments, but agreement degrades for low-adiabat pulse shapes
- Shock-merger time is hypothesized to be dependent on laser deposition position
- Simulations reproduce dependence on laser deposition position, showing high correlation between shock timing and conduction-zone length
- Conduction-zone length prediction is correlated to observations of the corona x-ray self-emission profile, opening an avenue for validation experiments

Collaborators

T. R. Boehly, P. B. Radha, D. N. Polsin,
A. K. Davis, S. P. Regan, and V. N. Goncharov

University of Rochester
Laboratory for Laser Energetics

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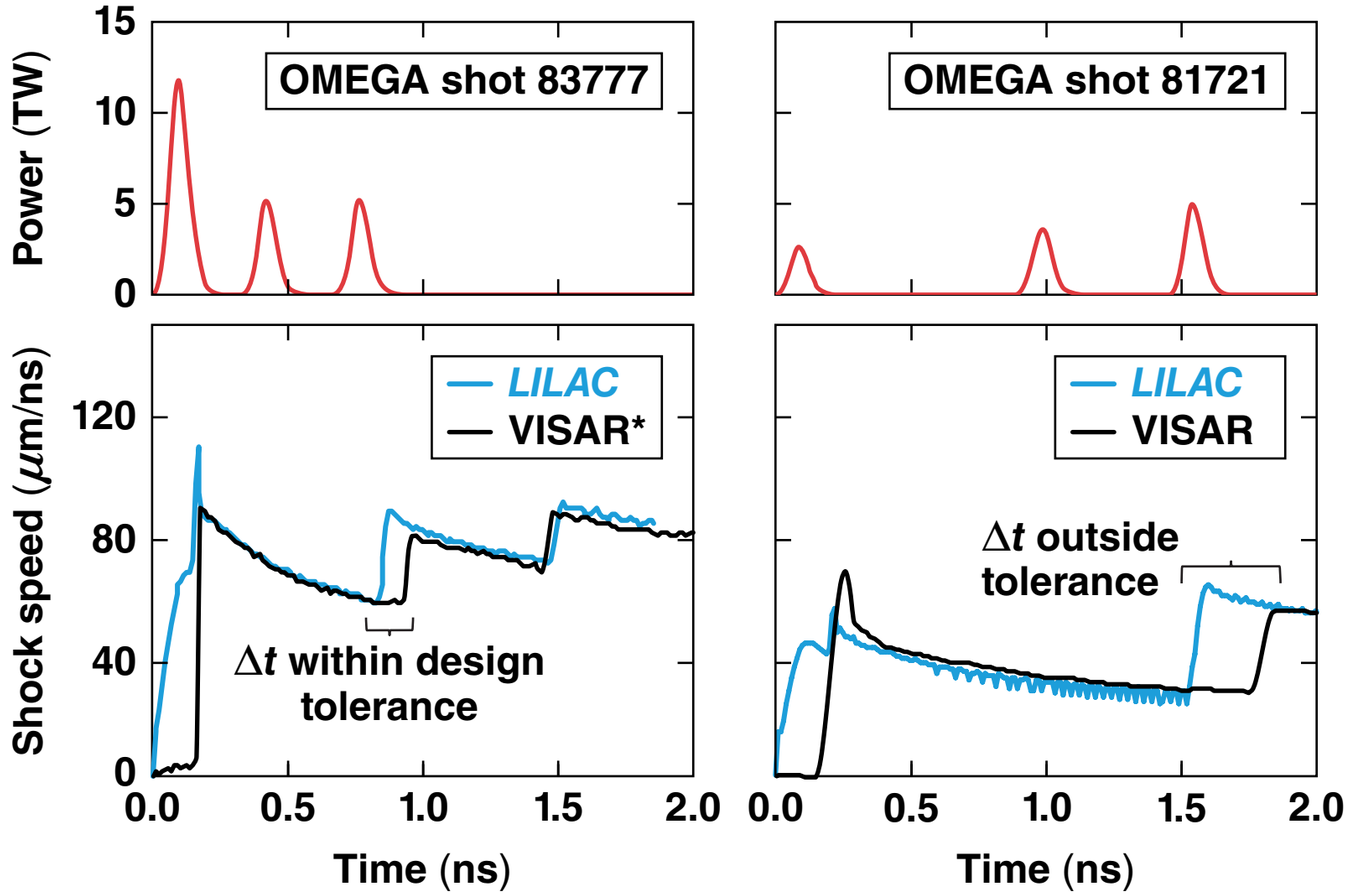
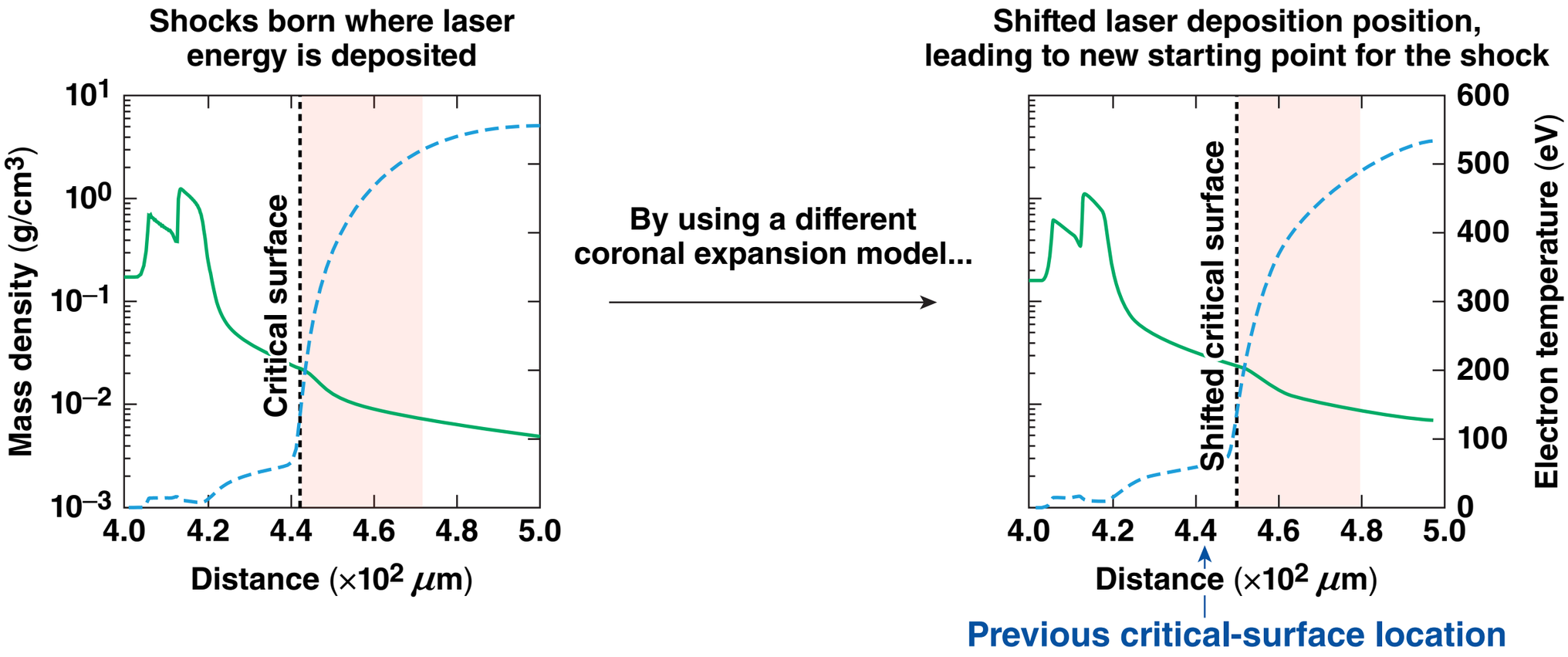


TC13804

*VISAR: velocity interferometer system for any reflector

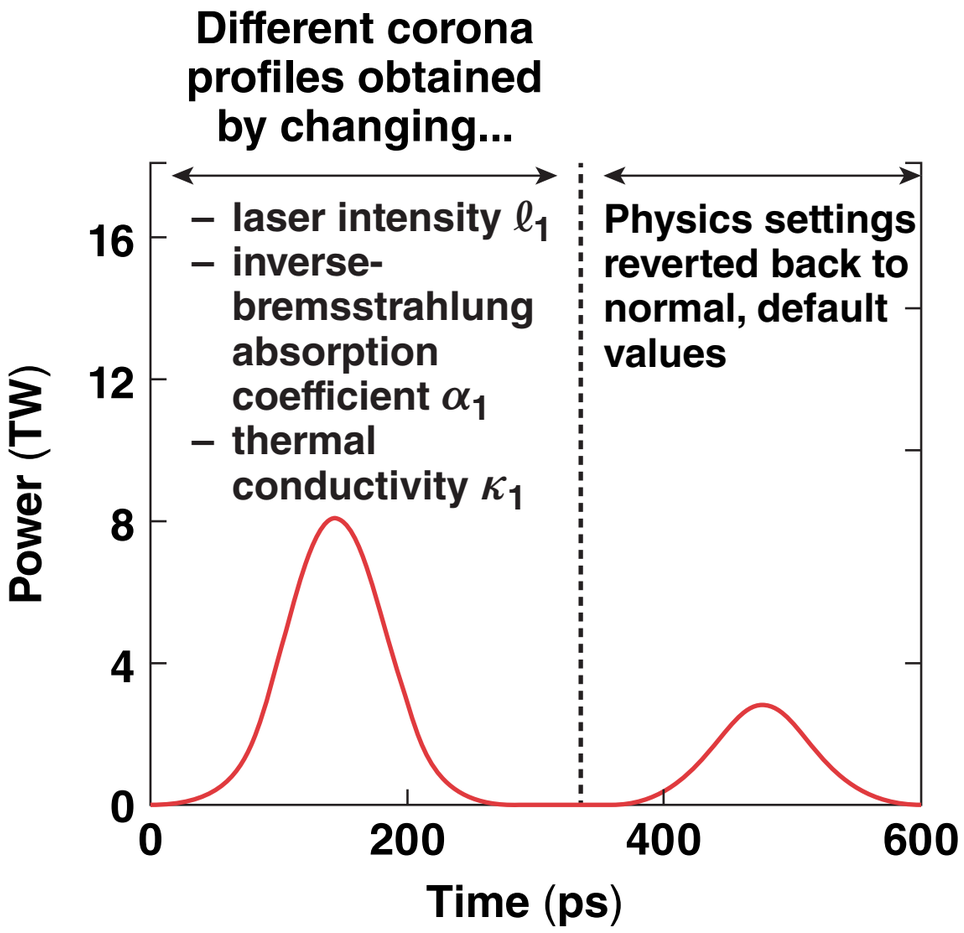
Shock-merger time prediction is influenced by coronal profiles and the latter affects the laser deposition position

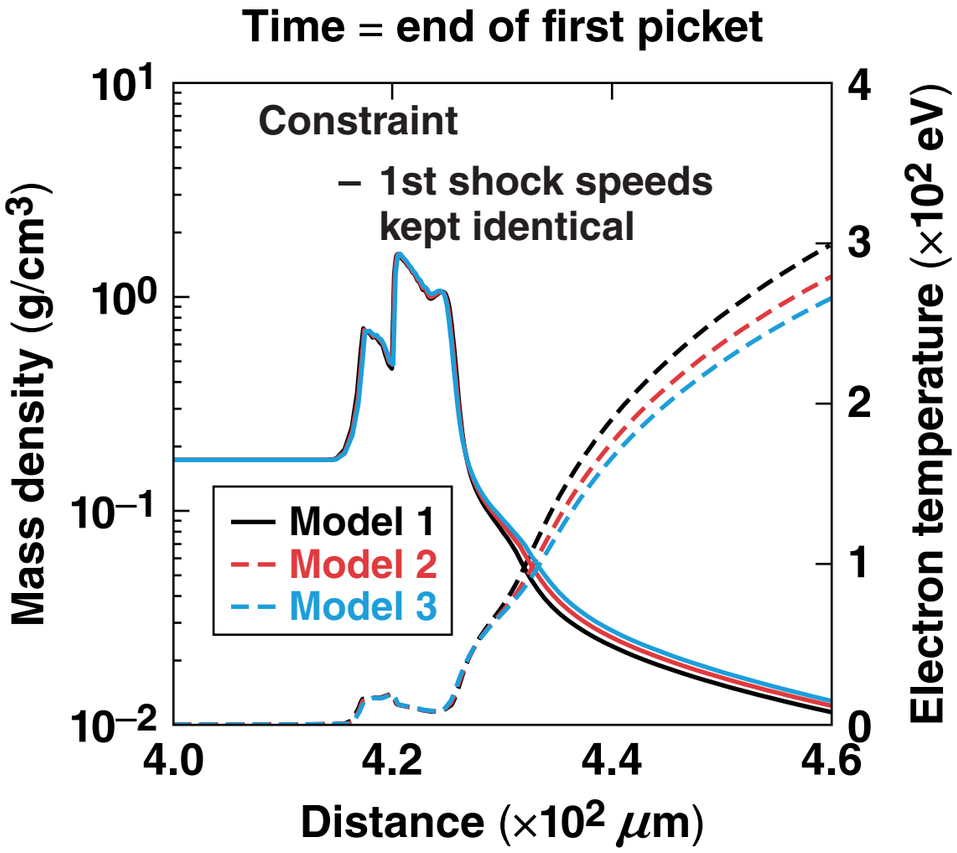


Simulations are used to quantify the effect of changing corona profiles on shock timing.

TC13803

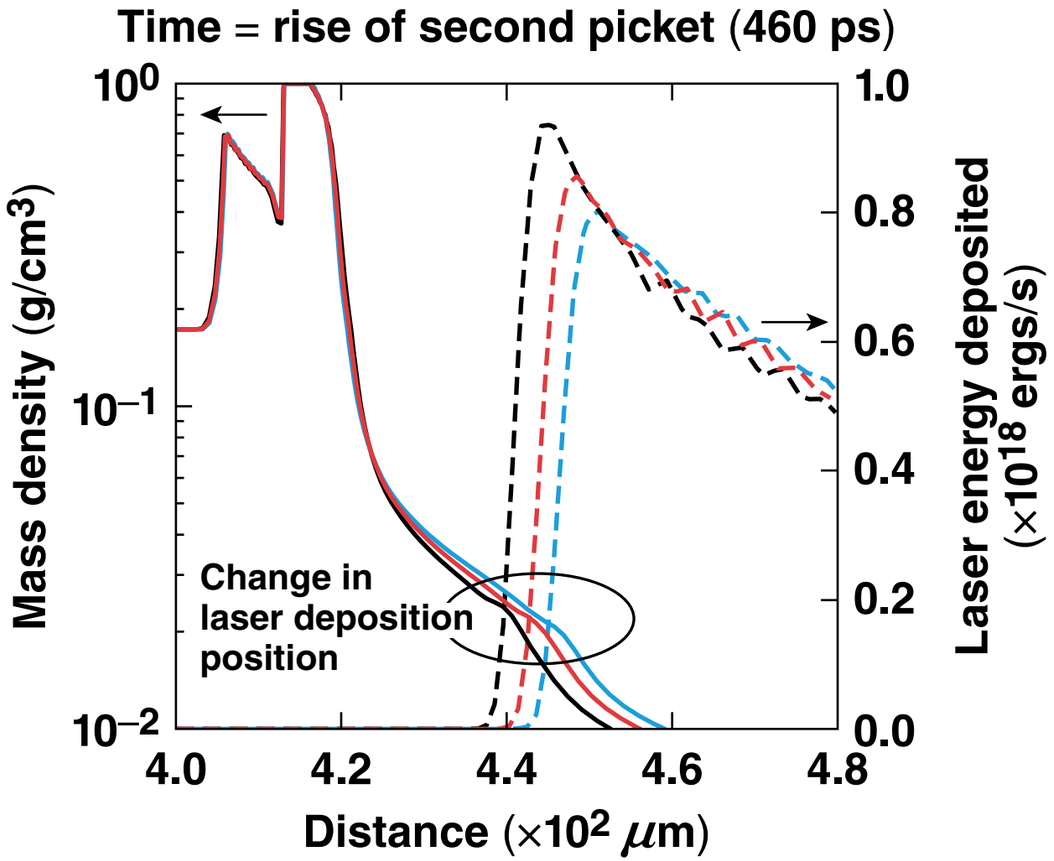
Two-picket *LILAC* simulations are used to quantify shock-timing sensitivity to the corona profiles

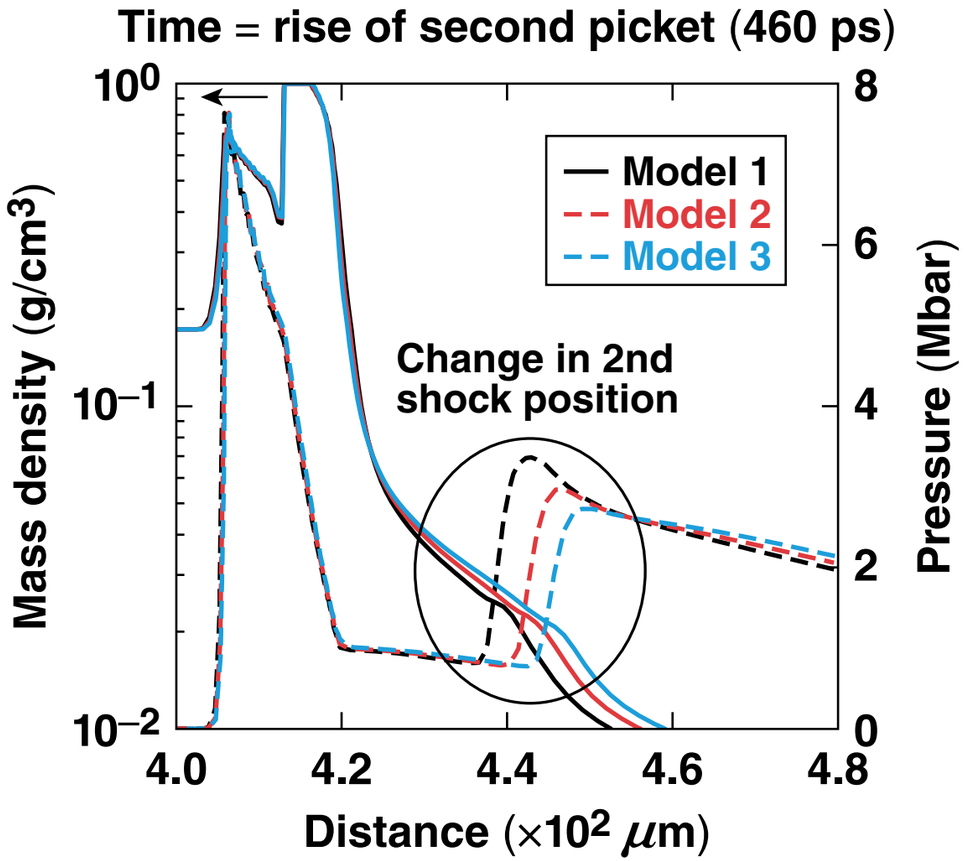




TC13805

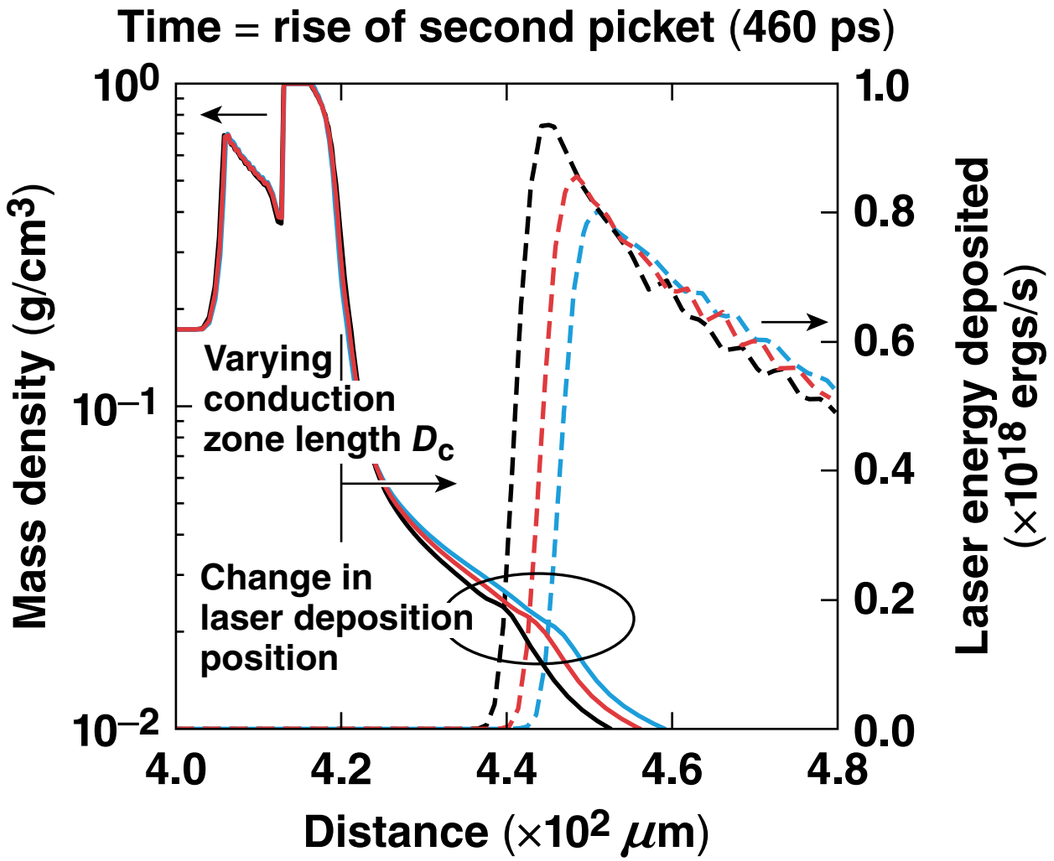
Simulations show that shifts in laser deposition position does reproduces changes in shock position

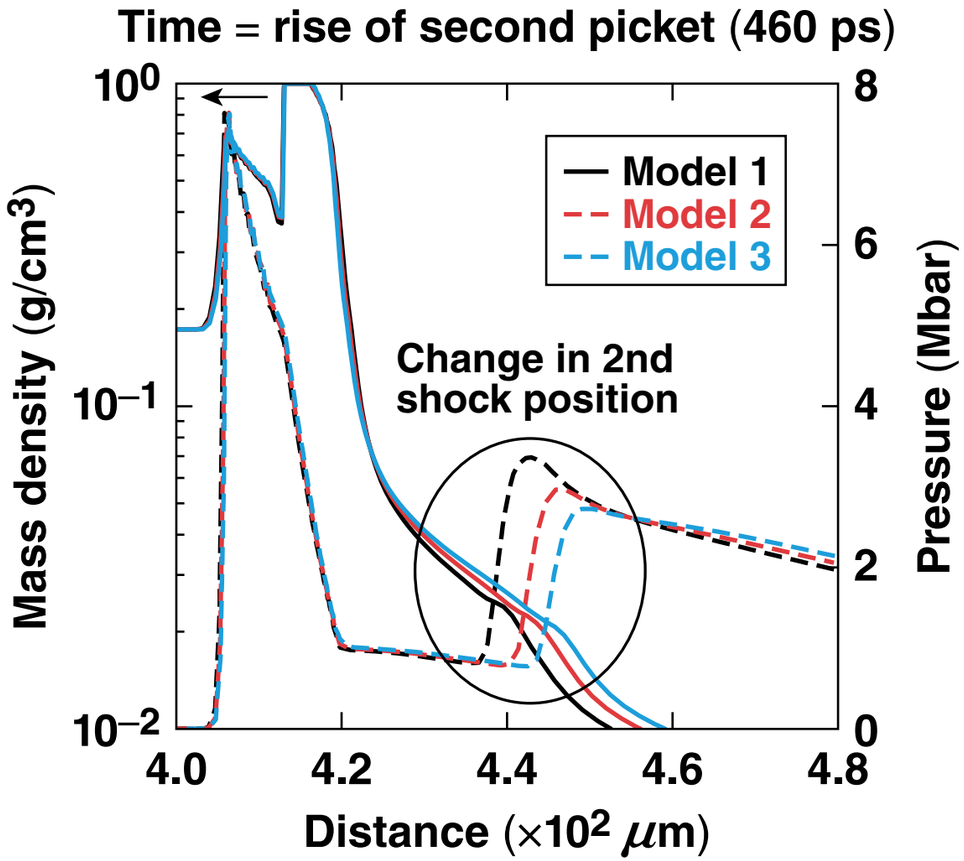




TC13806

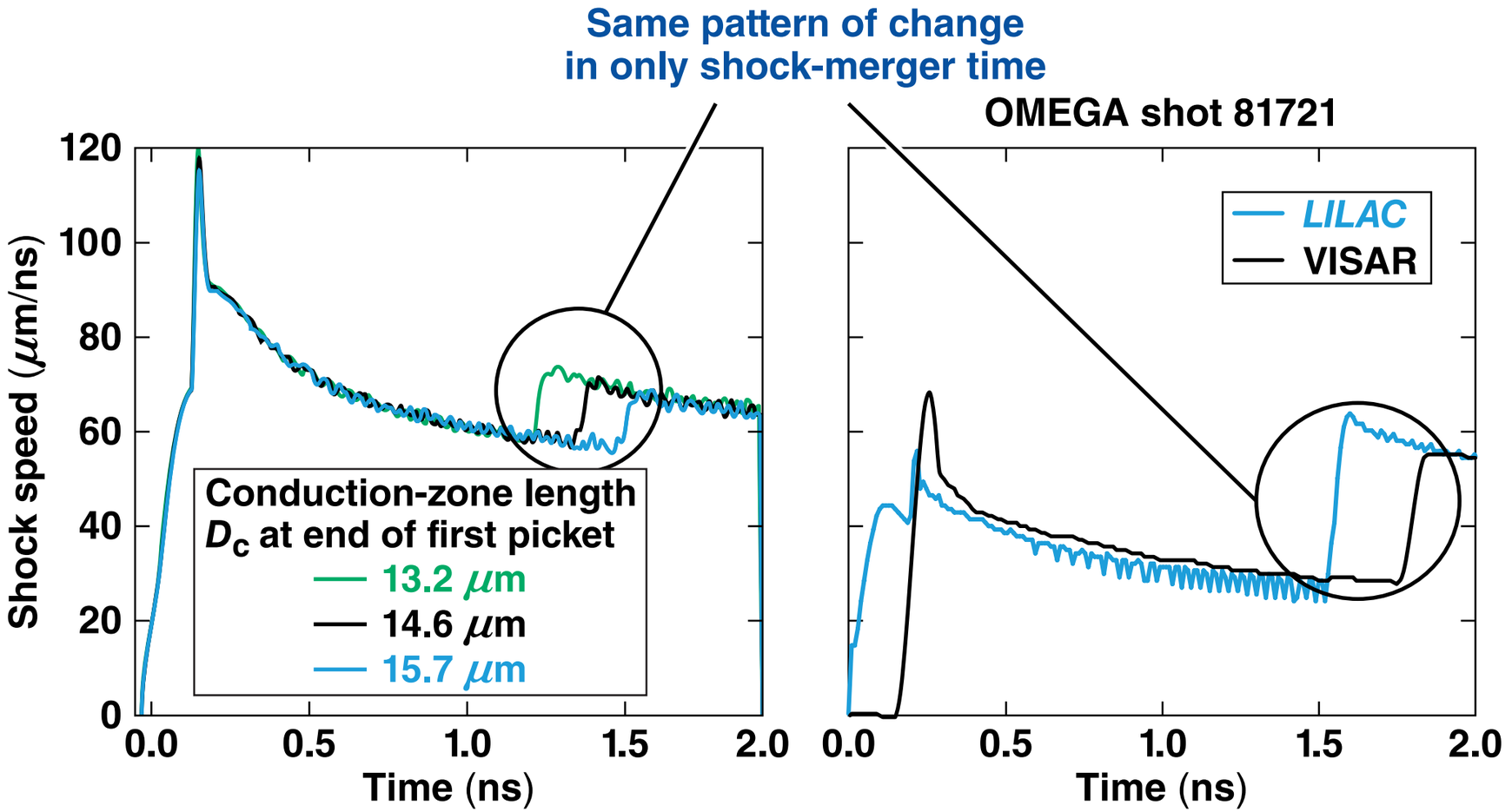
Simulations show that shifts in laser deposition position does reproduces changes in shock position





TC13806a

Simulations can reproduce observed trends from experiments by varying corona profiles, showing sensitivity to the conduction-zone length

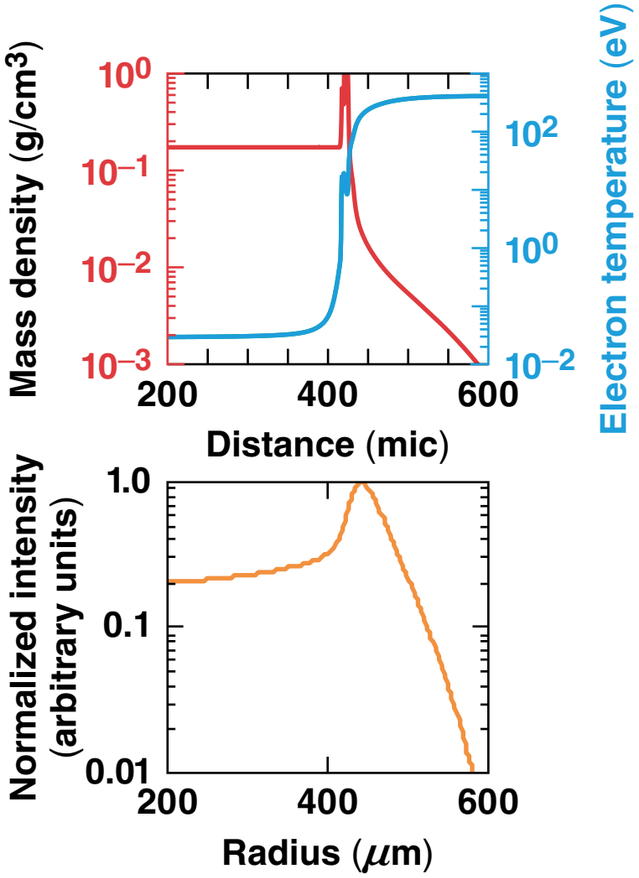


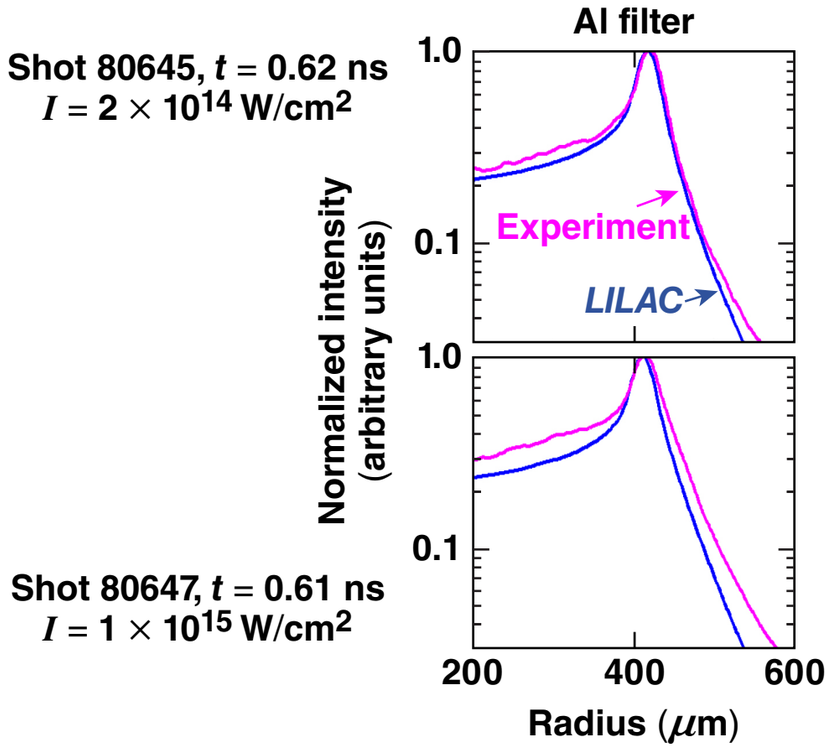
Other experiments can be used to cross-check corona profile predictions.

TC13807

Previous data* have shown evidence of differences between experiment and prediction of corona profiles by using x-ray self-emission images

A corona profile translates to...





- These measurements will be adapted to studies with picket pulses

*A. K. Davis *et al.*, NO8.00007, presented at the 58th Annual Meeting of the APS Division of Plasma Physics, San Jose, CA, 31 October–4 November 2016.

E25709b

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