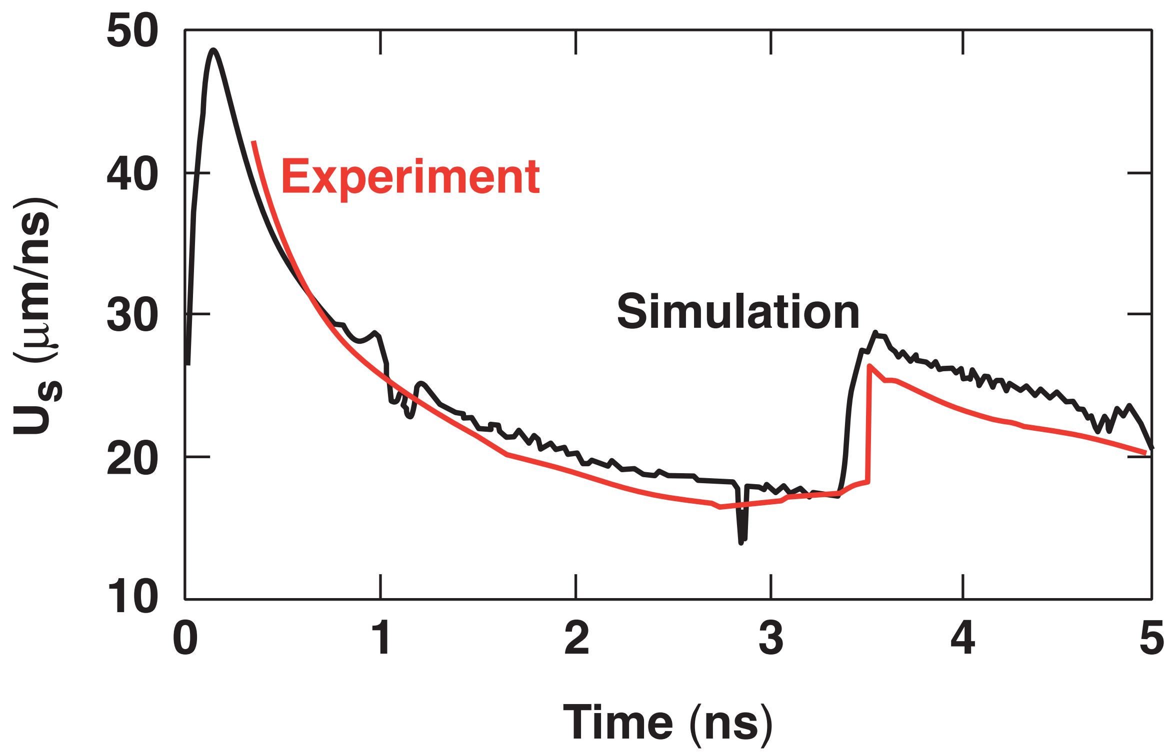
Validation of Numerical Modeling Using Planar Direct-Drive Experiments Performed on OMEGA



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45th Annual Meeting of the
American Physical Society
Division of Plasma Physics
Albuquerque, NM
27–31 October 2003

Collaborators

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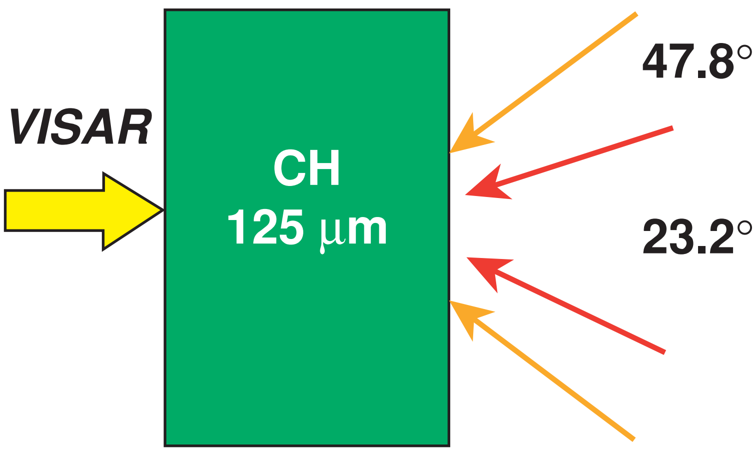
Summary

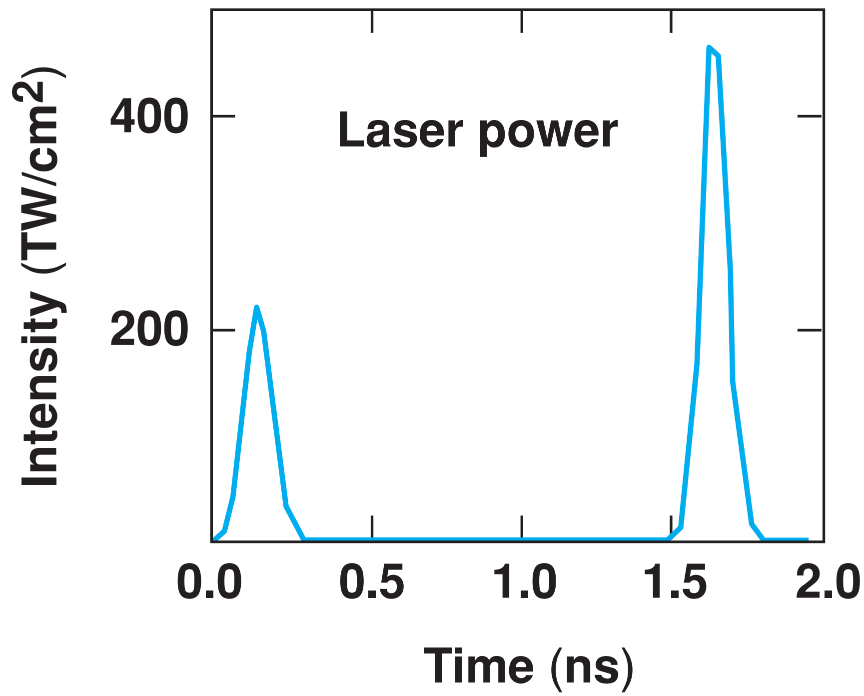
The flux-limited thermal transport with f = 0.06 adequately models the shock formation and the early nonuniformity growth

- Designing a robust direct-drive-ignition target requires experimentally validated modeling of
  - hydrodynamic efficiency and laser coupling (shock timing experiments[1], line emission from microdot[2])
  - EOS (shock timing)
  - nonuniformity growth (RM growth[3])

[1]E. Vianello, next talk, L02.002
[2]H. Sawada, L02.003
[3]O. Gotchev, this conference, Q03.002

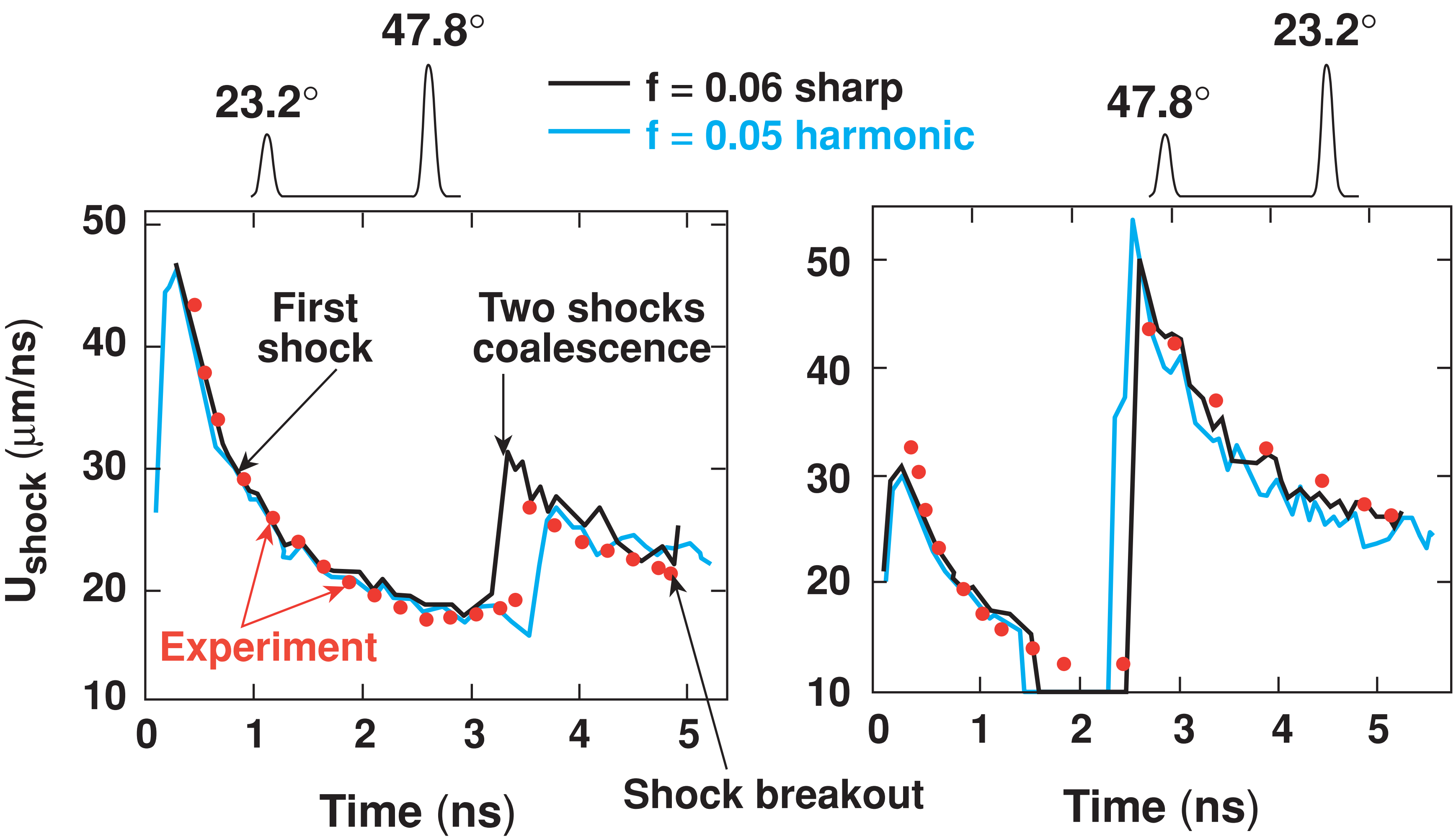
Series of single- and double-shock experiments have been conducted to study early-time shock propagation[1]





[1]E. Vianello, next talk LO2.002

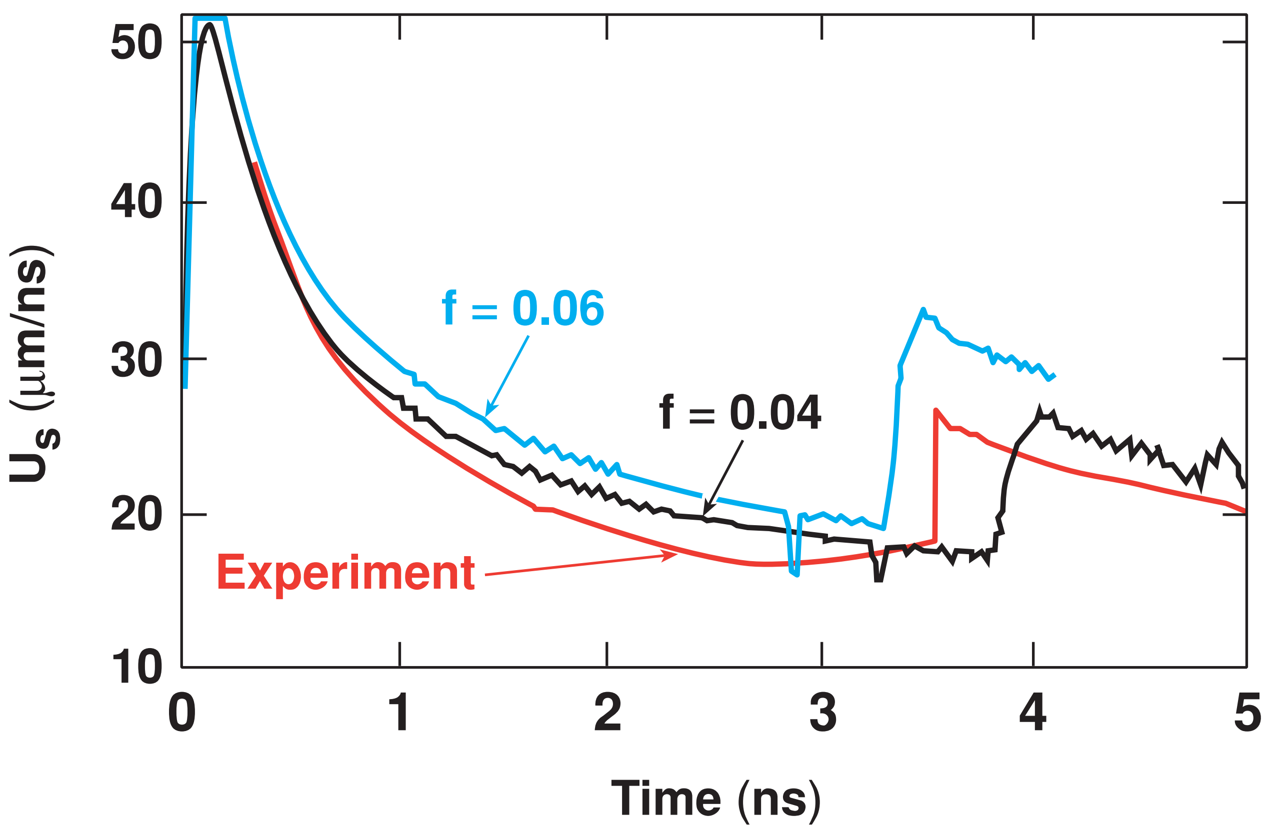
The flux-limited heat conduction model is consistent with the experimental data



Calculations use *SESAME* EOS

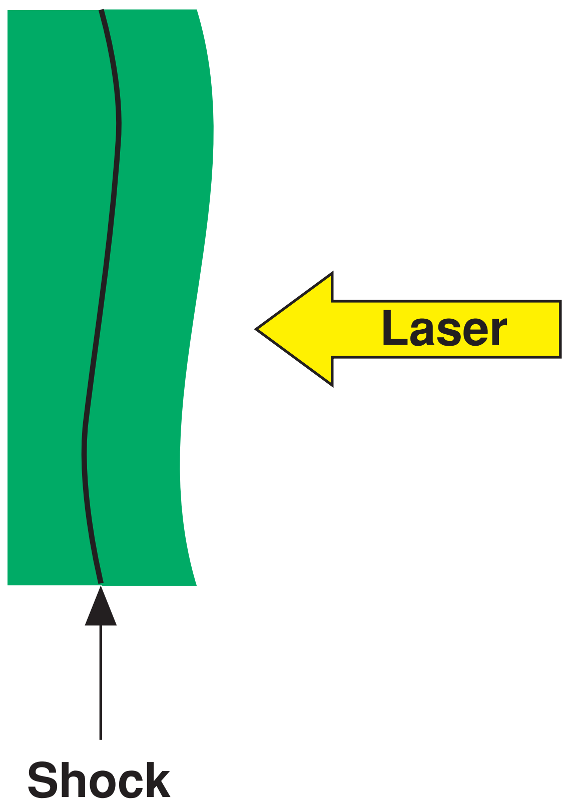
TC6401

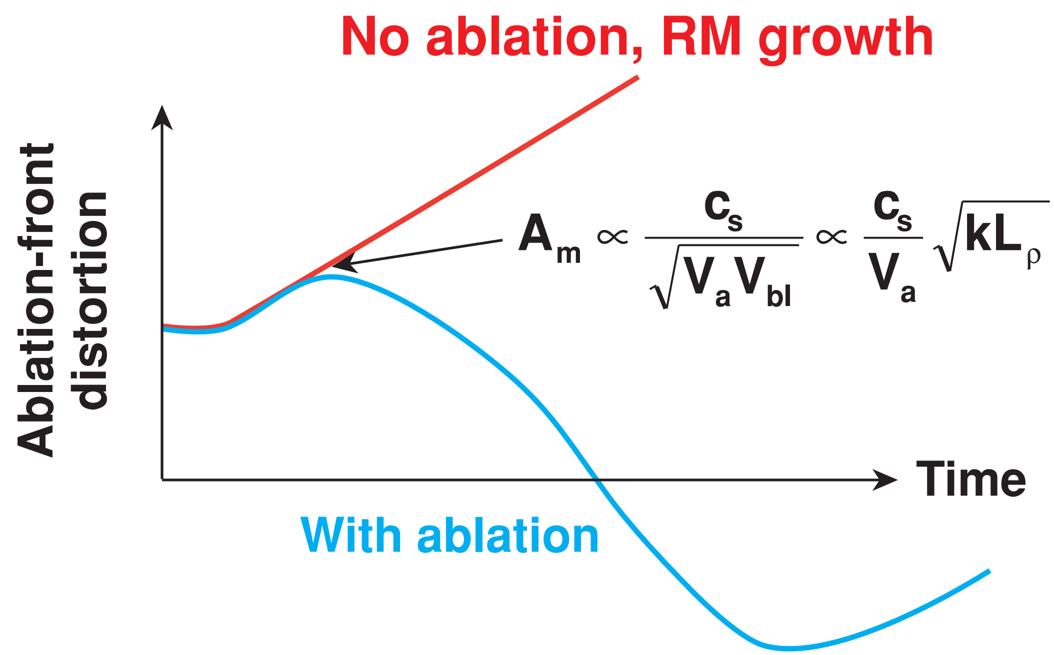
Problems in matching the experimental shock data and *LILAC* simulations triggered revisions in absorption and heat transport packages



TC6403

Early perturbation evolution is sensitive to conditions within the corona[1,2]





V_a - ablation velocity
V_{bl} - blowoff velocity
L_ρ - density scale length
C_s - sound speed
k - perturbation wave number

[1] V. N. Goncharov, Phys. Rev. Lett. 82, 2091 (1999).
[2] Y. Aglitsky *et al.*, Phys. Rev. Lett. 87, 265001 (2001).

TC6405

First, corrections to heat transport and momentum equations were considered

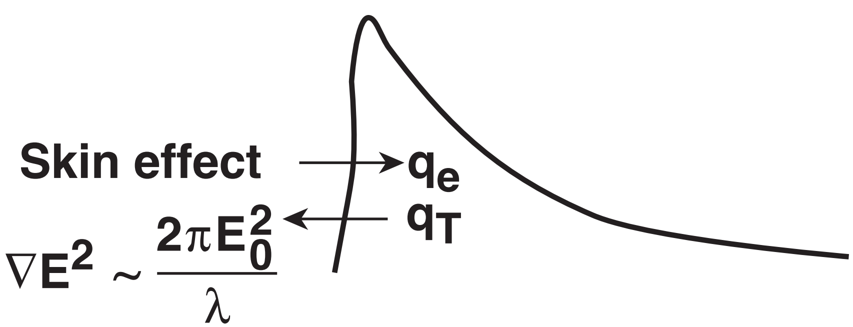
$$\mathbf{q} = \kappa_1 \nabla T - \kappa_2 \nabla E^2$$

Heat transfer

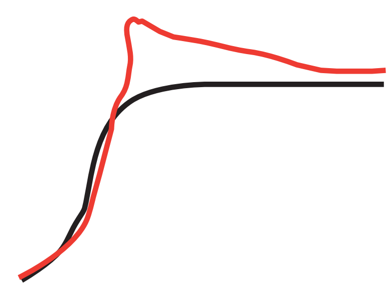
$$\rho \frac{dU_j}{dt} + \ldots = -\frac{ne^2}{4m\omega^2} \nabla E^2 - \frac{\partial}{\partial r_k} \sigma_{kj}$$

Momentum

$$\sigma_{kj} = \frac{4ne^2}{15m\omega^2} \left(E_k^* E_j + E_k E_j^* - \frac{2}{3} \delta_{kj} E^2 \right)$$



With electric field



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