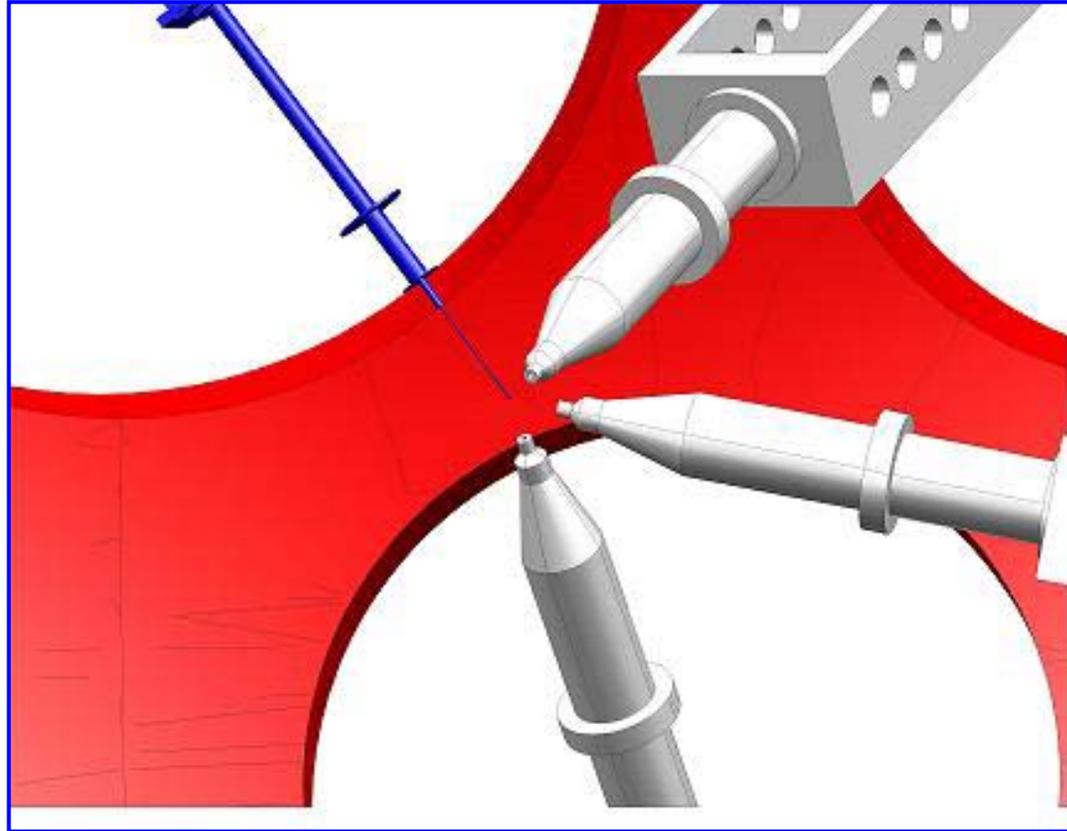


The dependence of measured burn profiles on capsule and laser parameters



UR
LLE



Joseph DeCiantis, et.al.
Plasma Science and Fusion Center
Massachusetts Institute of Technology

46th Annual Meeting of the
Division of Plasma Physics
November 15-19th, 2004
Savannah, Georgia

Collaborators

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University of Rochester

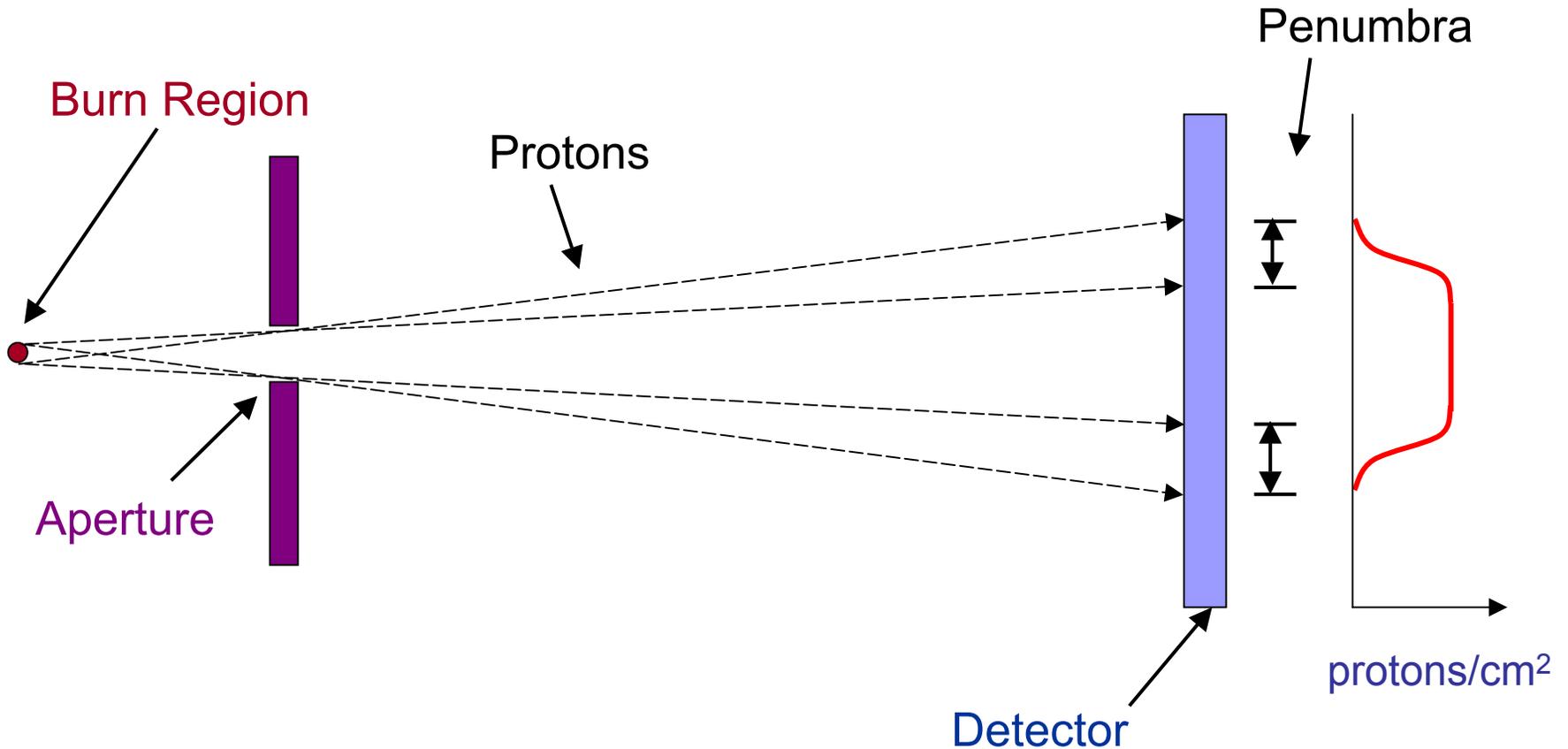
K. Mikaelian, and H. Park
Lawrence Livermore National Laboratory

Measured burn radii reflect various implosion conditions

Summary

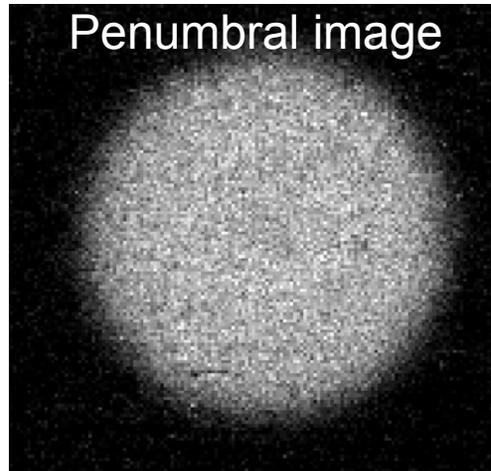
- **Burn profiles show trends for**
 - **different CH shell thicknesses.**
 - **old and new drive conditions (SG3 vs SG4).**
 - **different gas fill pressures.**
- **Burn profiles provide a test for simulations.**
- **Burn profiles will be used to study effects of mix on capsule performance.**

Proton emission images are extracted from penumbral information

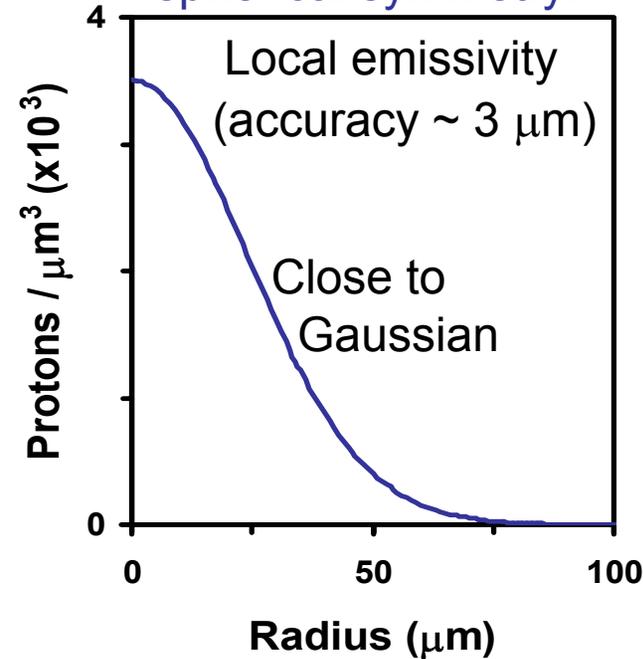


Burn radius: 20-100 μm
Aperture radius: 1000 μm

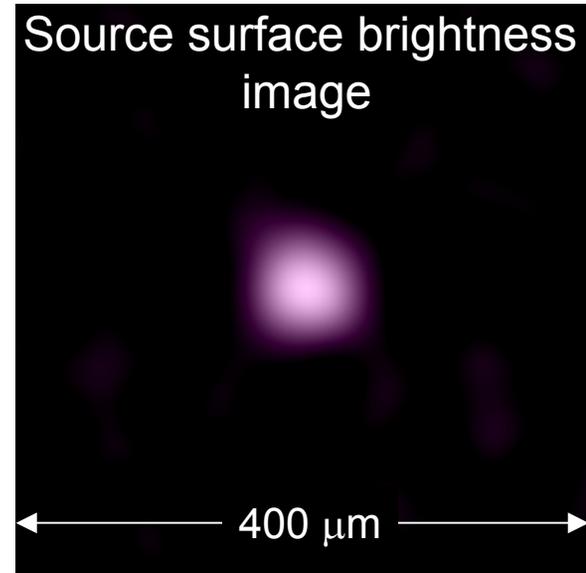
Information about the spatial distribution of burn is extracted from penumbral images in two ways*



1-D reconstruction
when data indicate
spherical symmetry:



2-D reconstruction:



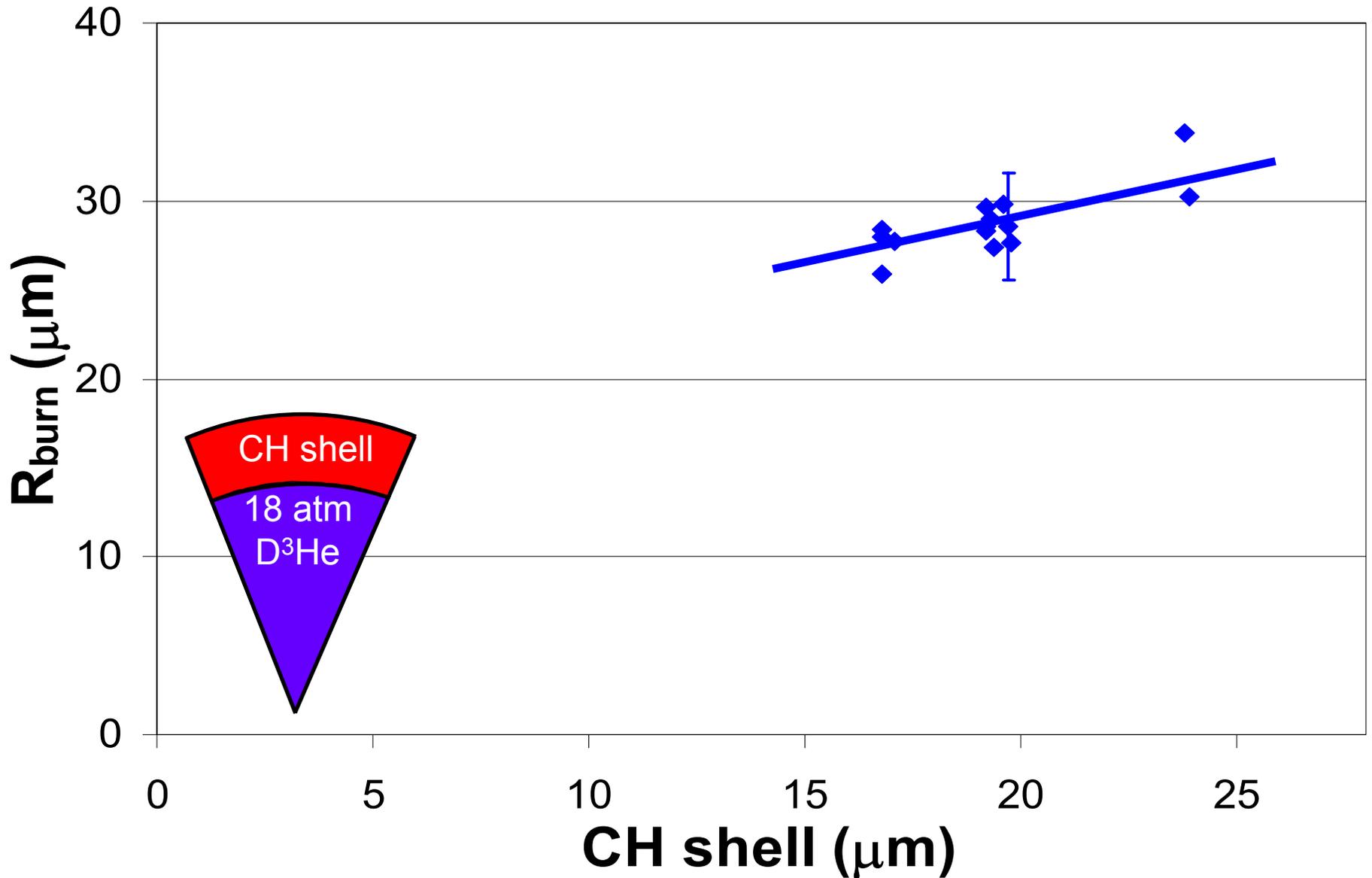
* Séguin *et al.*, RSI **75**, 3520 (2004)

The quality of the Proton Core Imaging System (PCIS) has been demonstrated

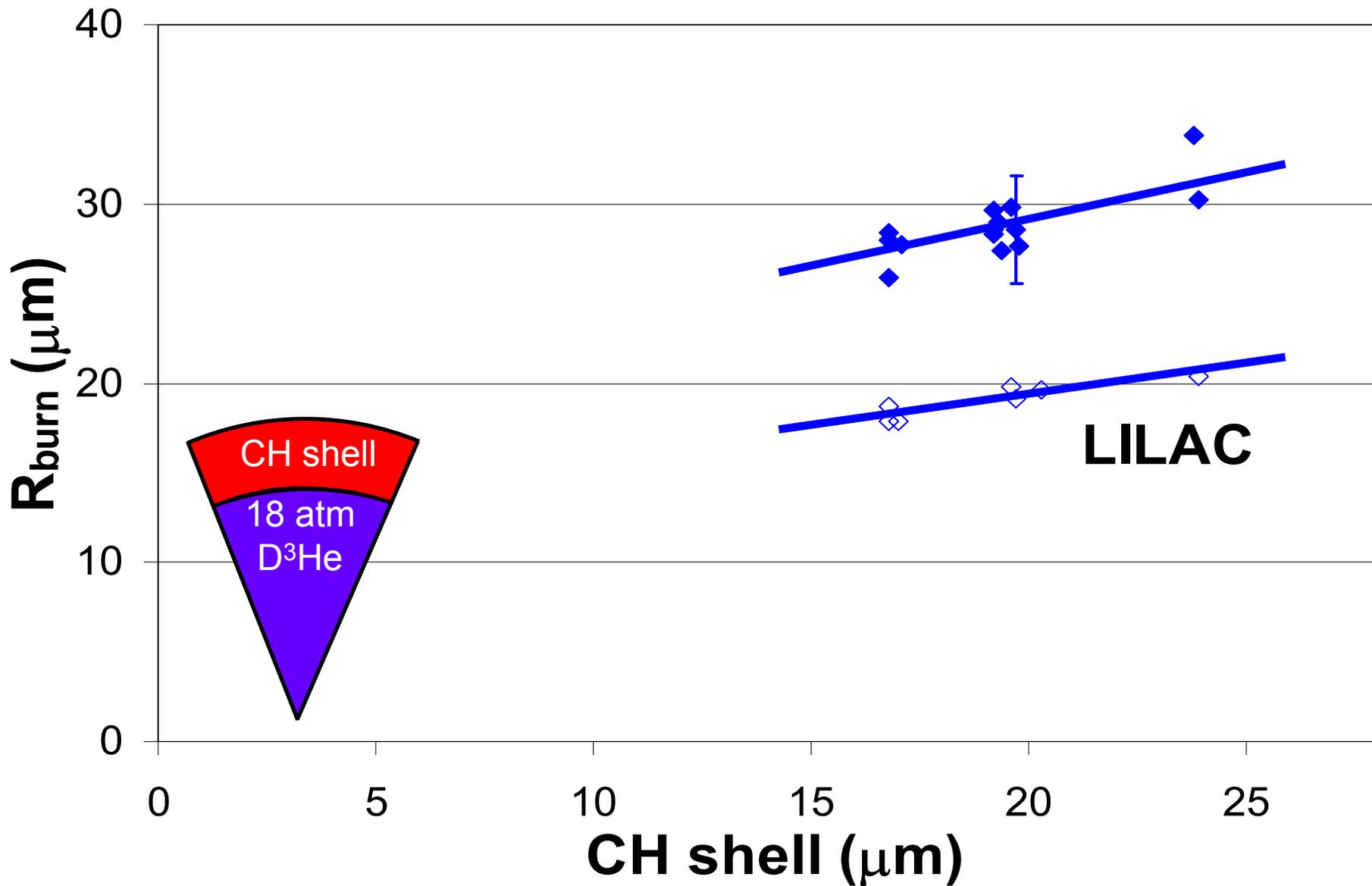
- **On individual symmetric shots, compatible results are obtained from**
 - **Three independent cameras at different angles.**
 - **Different aperture sizes.**
 - **Different geometric magnification.**
- **Emission asymmetry mirrors asymmetric laser drive ***

* Séguin *et al.*, Oral presentation, this session

Measured burn radii increase with shell thickness



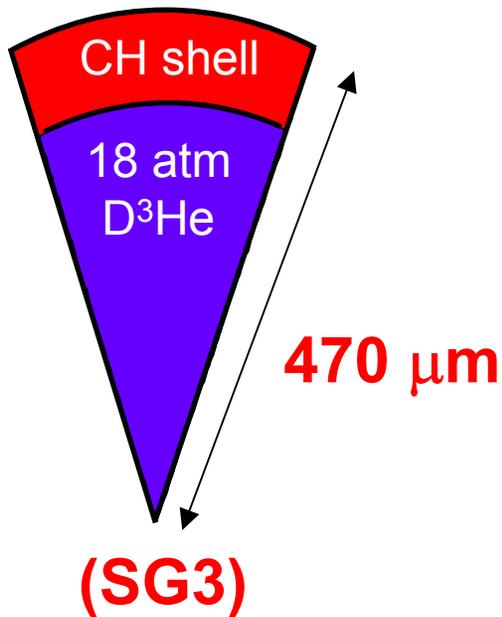
1D-hydro simulations show a similar trend



Changes have recently been made in laser drive

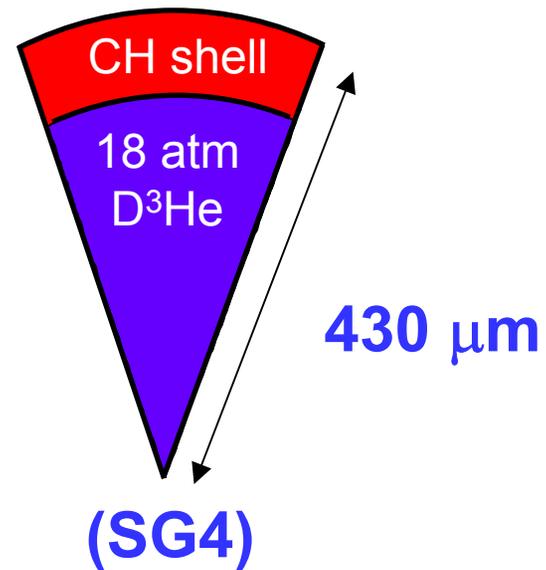
OLD
phase plates

23 kJ

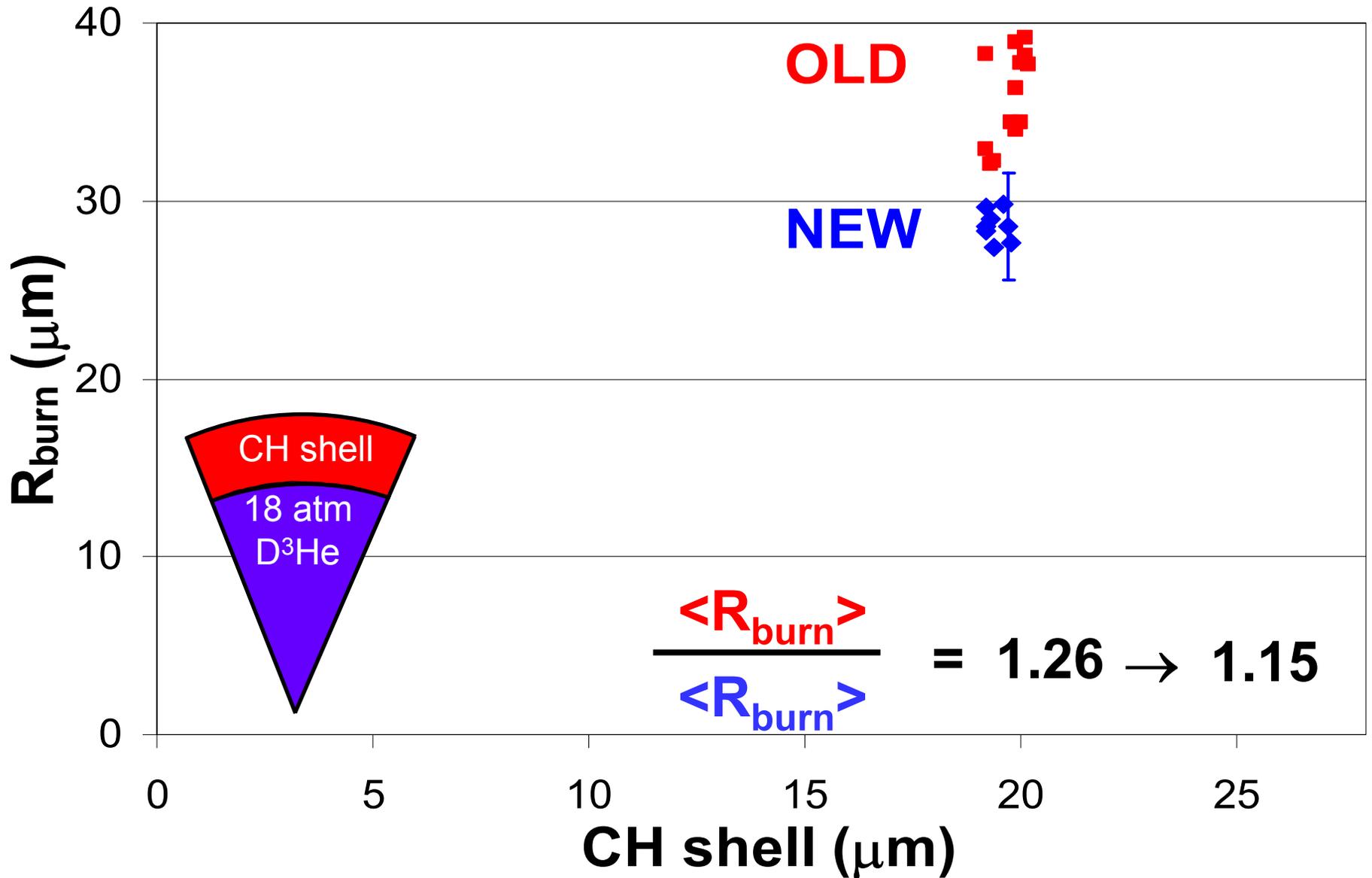


NEW
phase plates

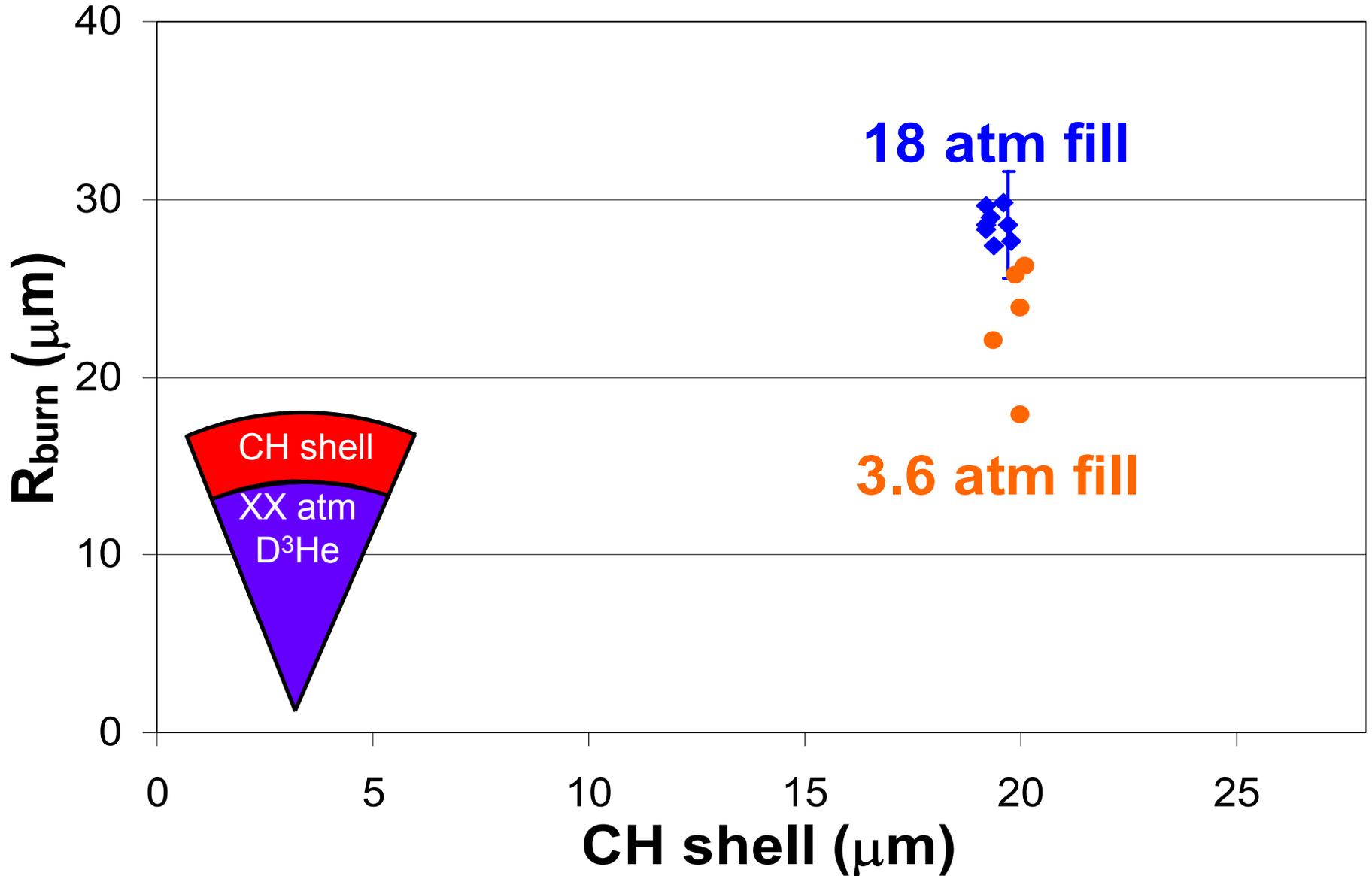
23 kJ



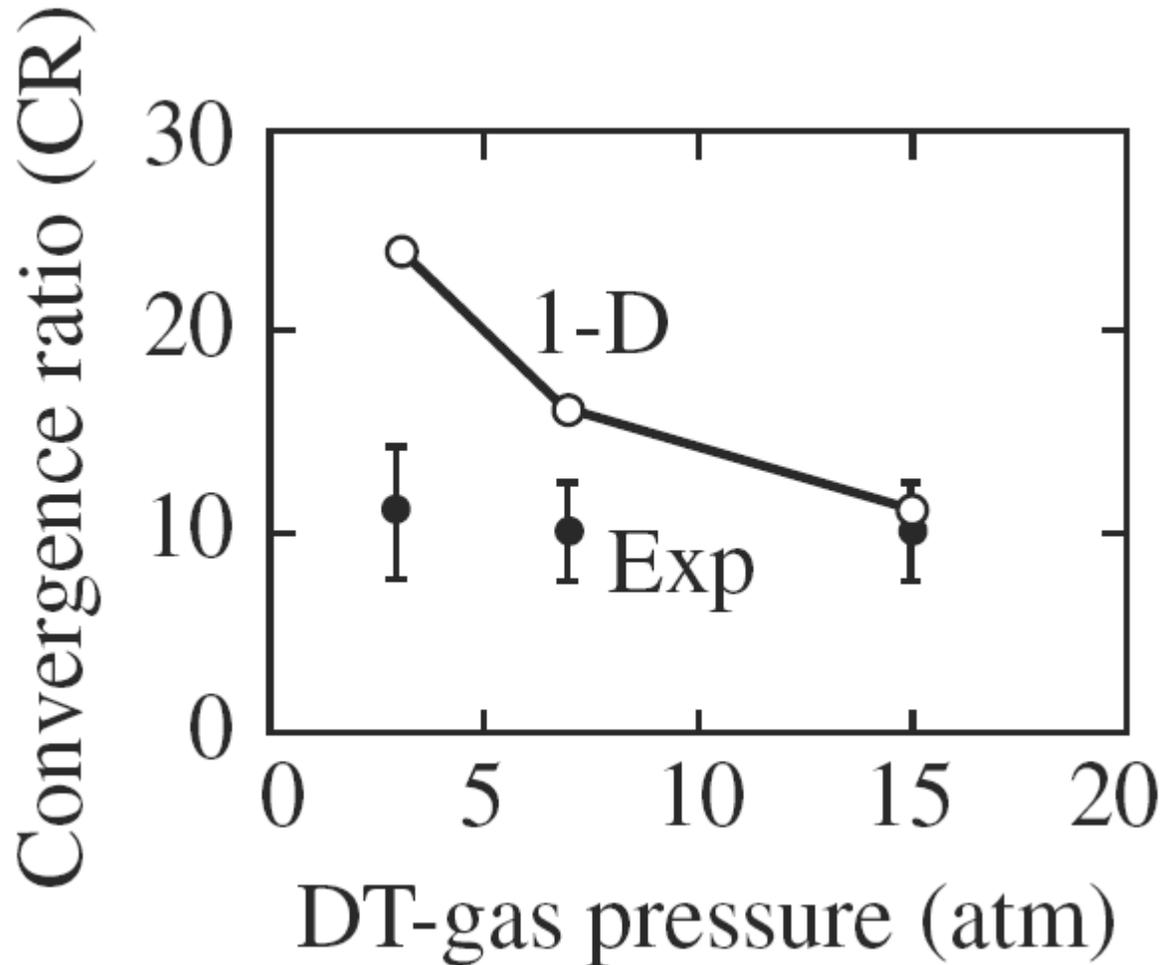
Measured burn radii are smaller with the **NEW** drive conditions



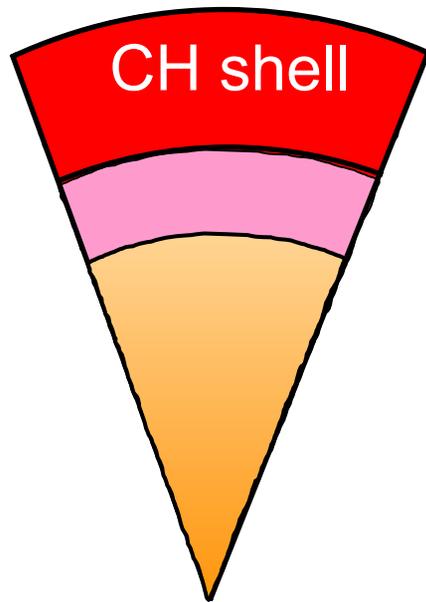
Low fill-pressure implosions have smaller burn radii



Constant convergence has been observed for various fill pressures



Smaller burn radii may be caused by increased mix



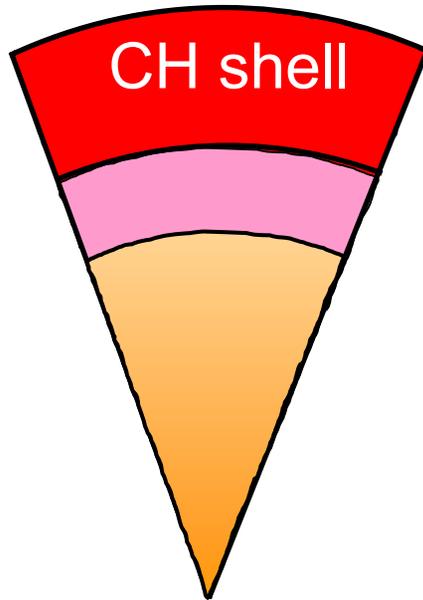
Shell material

Mix region

Burn region

Smaller burn radii may be caused by increased mix

Less mix

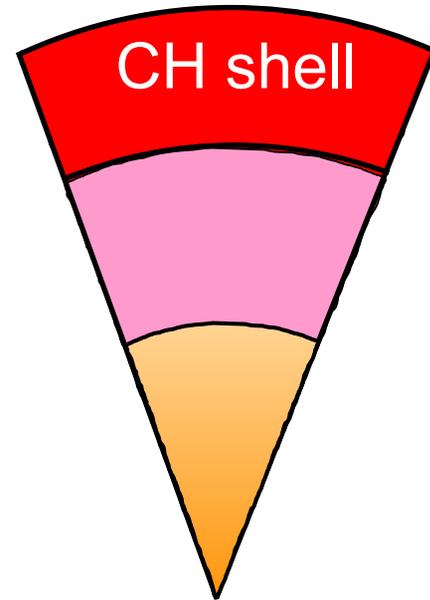


Shell material

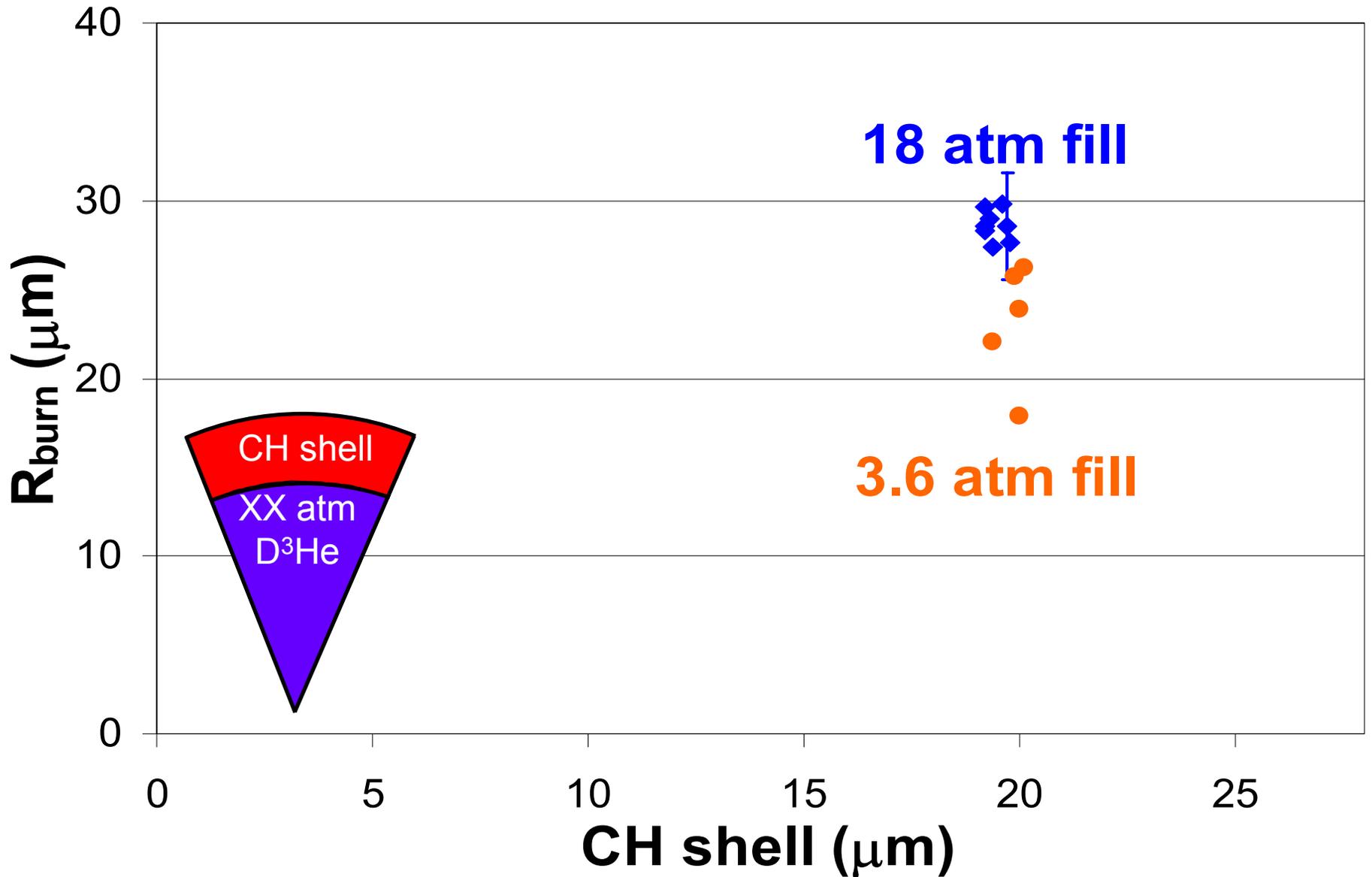
Mix region

Burn region

More mix



Smaller burn radii may be caused by increased mix



Measured burn radii reflect various implosion conditions

Summary/Conclusion

- **Measured burn radii increase with increasing CH shell thickness.**
- **Measured burn radii indicate improved convergence with new drive conditions (SG4).**
- **Burn radii measurements will be used to study mix.**
