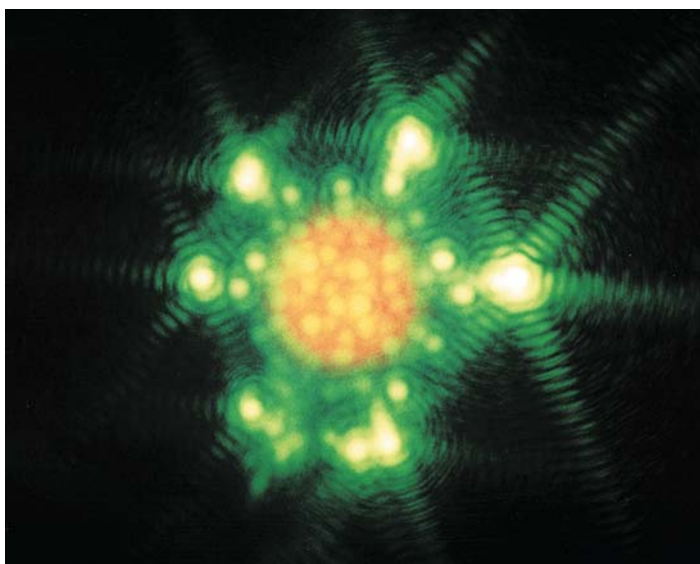


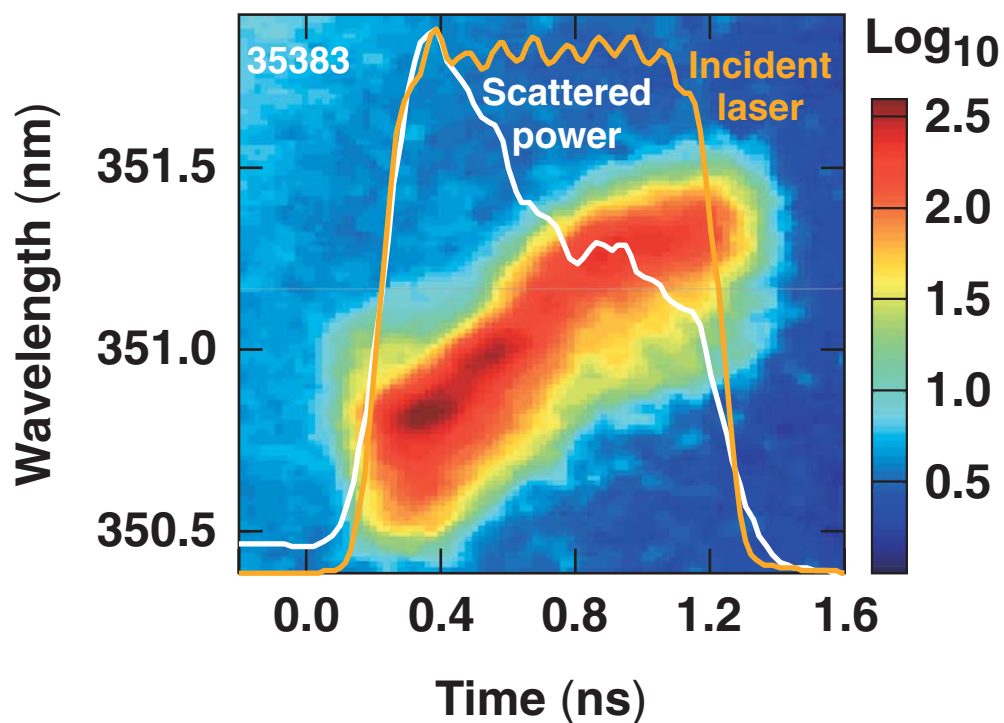
Scattered Light Measurements from Spherical Implosions on OMEGA



Scattered light image



Scattered light spectrum/power



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Contributors



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Summary

Absorption measurements are used for calibrating hydrocode simulations



- **Experimental absorption measurements are essential for comparison with simulations.**
- **Absorption measurements in the few-percent range are now possible.**
- **Comparison with hydrocode simulations show**
 - close agreement for 1-ns pulses and
 - overpredicted absorption for shaped long pulses.
- **Change of spectral distributions in scattered light points to contributions from nonlinear processes (SBS?)**

Outline

- **Motivation**
- **Experimental details**
- **Scattered light**
- **Comparison with simulations**
- **Conclusions**

Motivation

Accurate knowledge of absorbed laser power is essential for hydrodynamic simulations



- Hydrodynamic codes need to be calibrated against experimental data.
- Experiments must distinguish between linear and nonlinear contributions to scattered light.
 - Hydrocodes only model linear absorption and refraction.

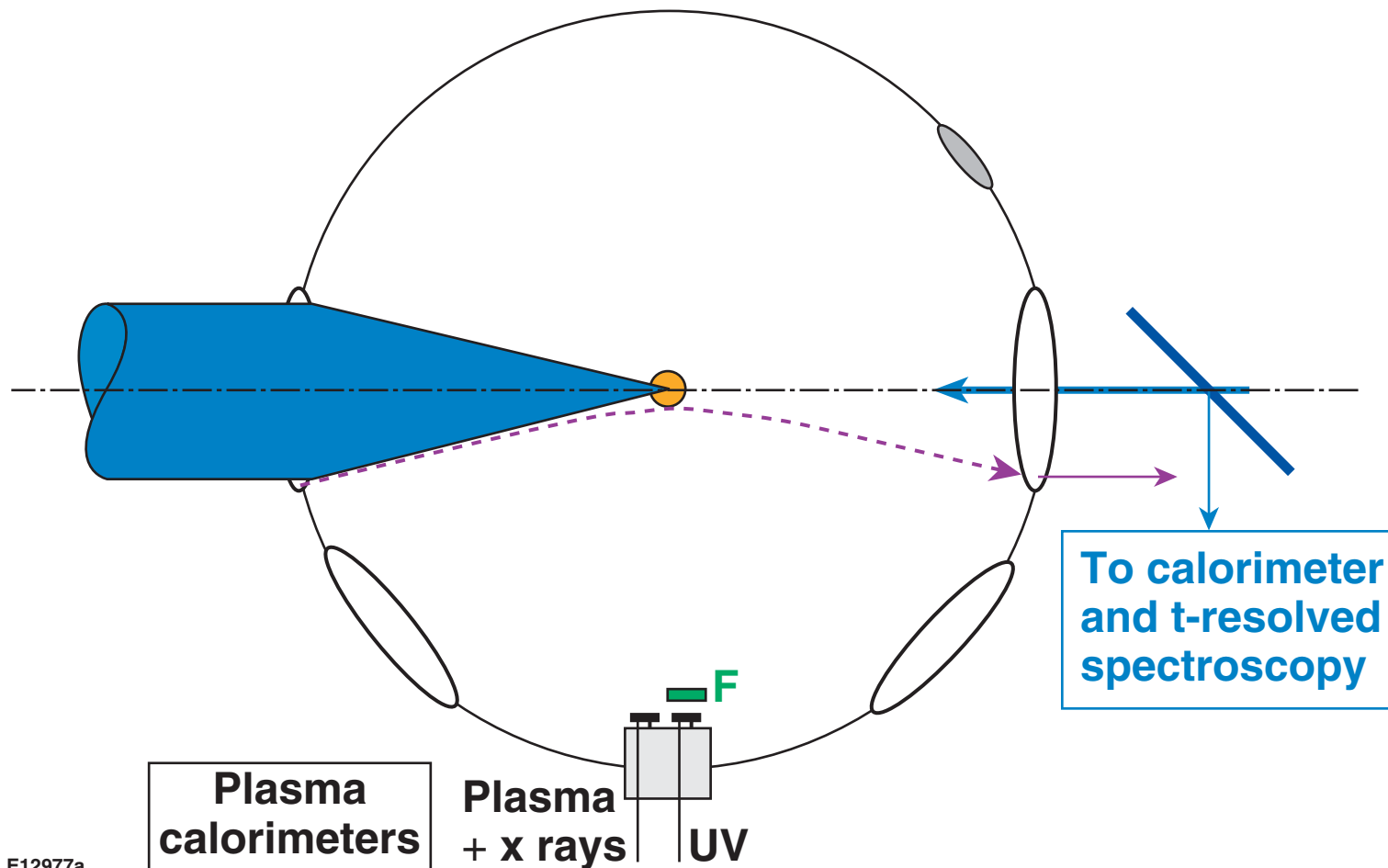
Scattered light measurements must be corrected for incident laser light missing the target



- All 60 beams contribute to the scattered light signal collected at any location around the target chamber.
- Full-aperture backscatter stations (FABS) are sensitive to blow-by and post pulses from second-order ghosts.
- Measurements between focusing lenses are sensitive to light scattered by nearby diagnostics or the target chamber.
- Nonlinear effects, such as SBS, increase scattered light.
 - may (or may not) be directional

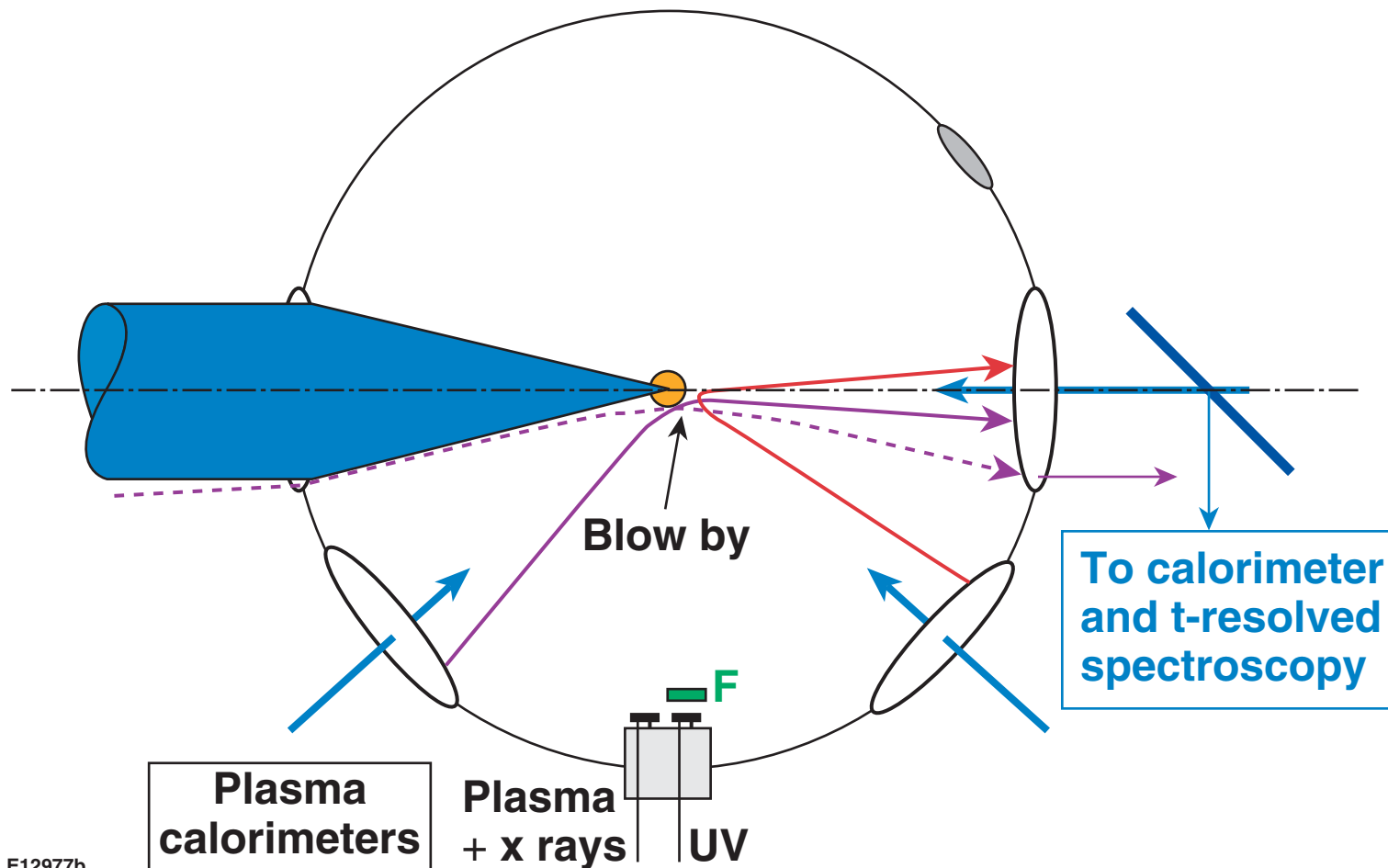
Experimental Details

All 60 beams contribute to scattered light measurements at one time or another



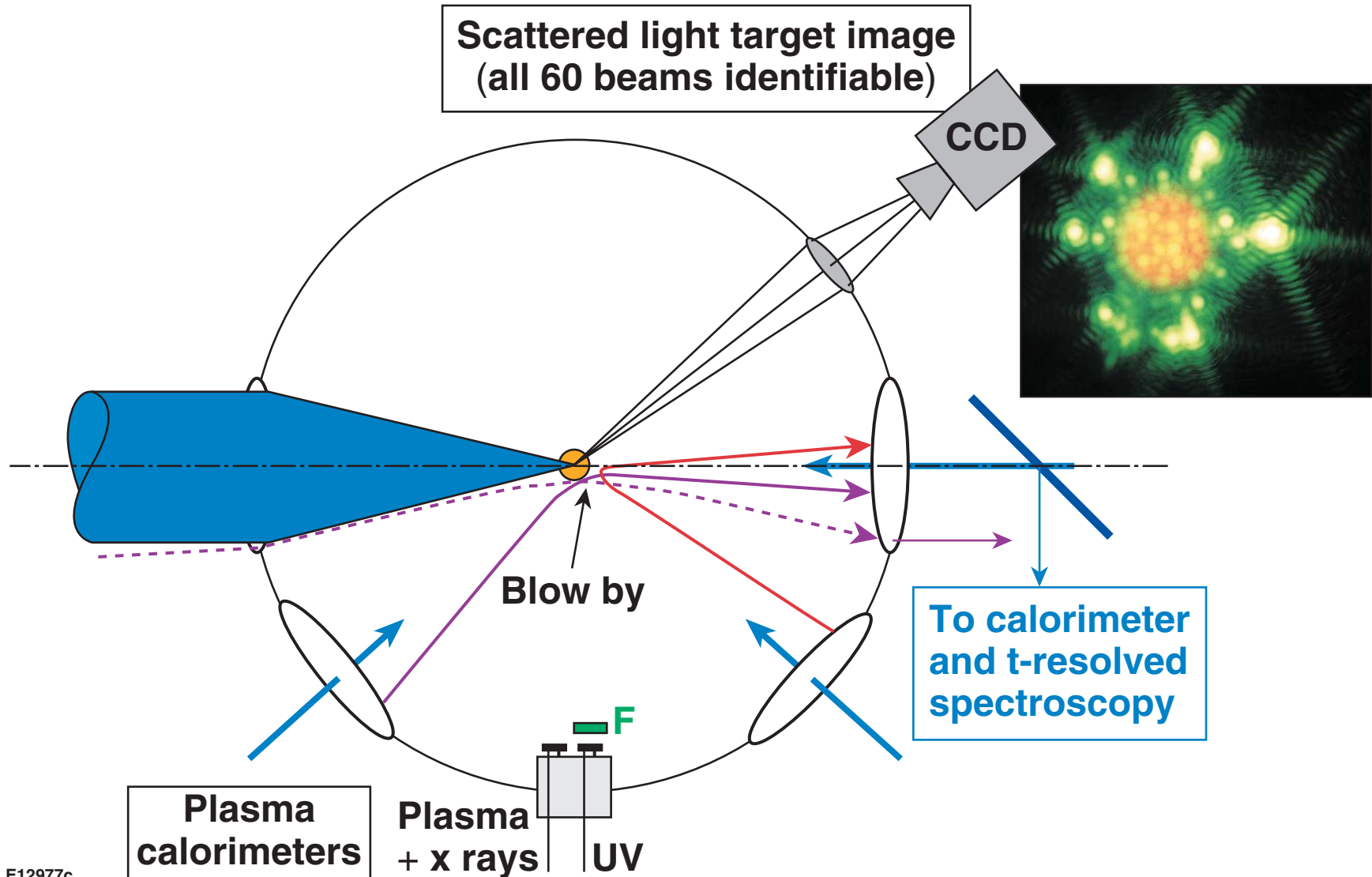
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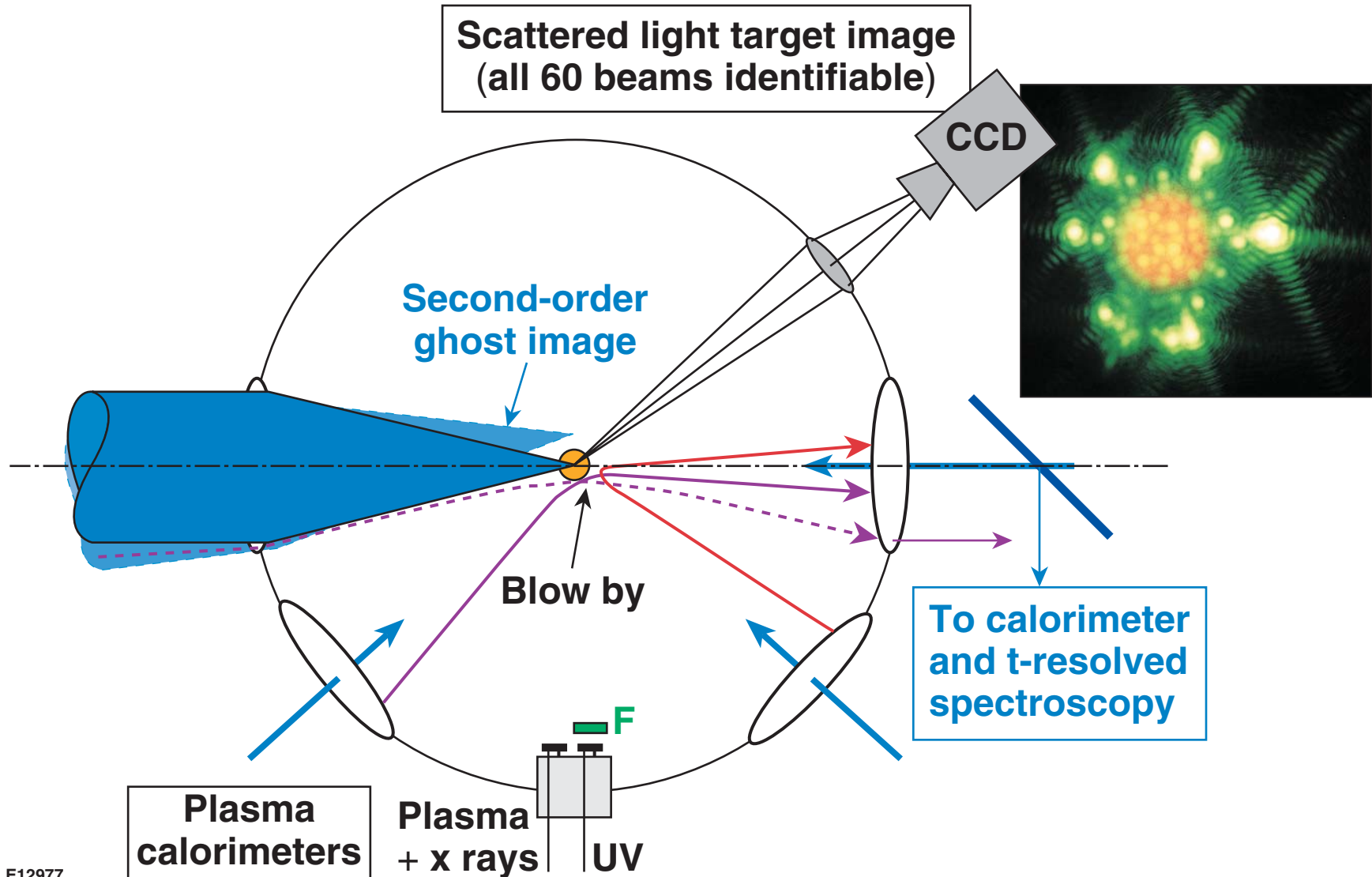
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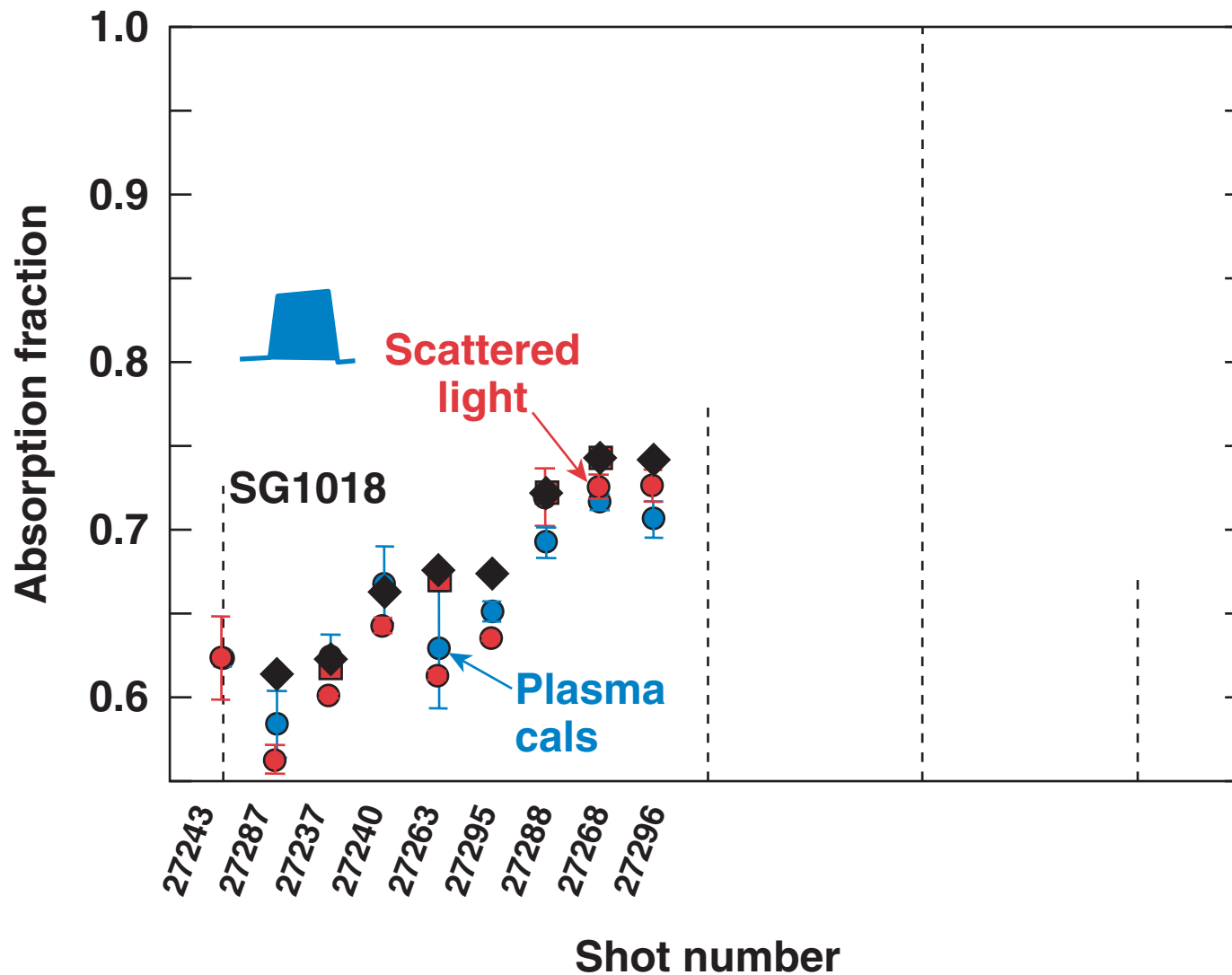


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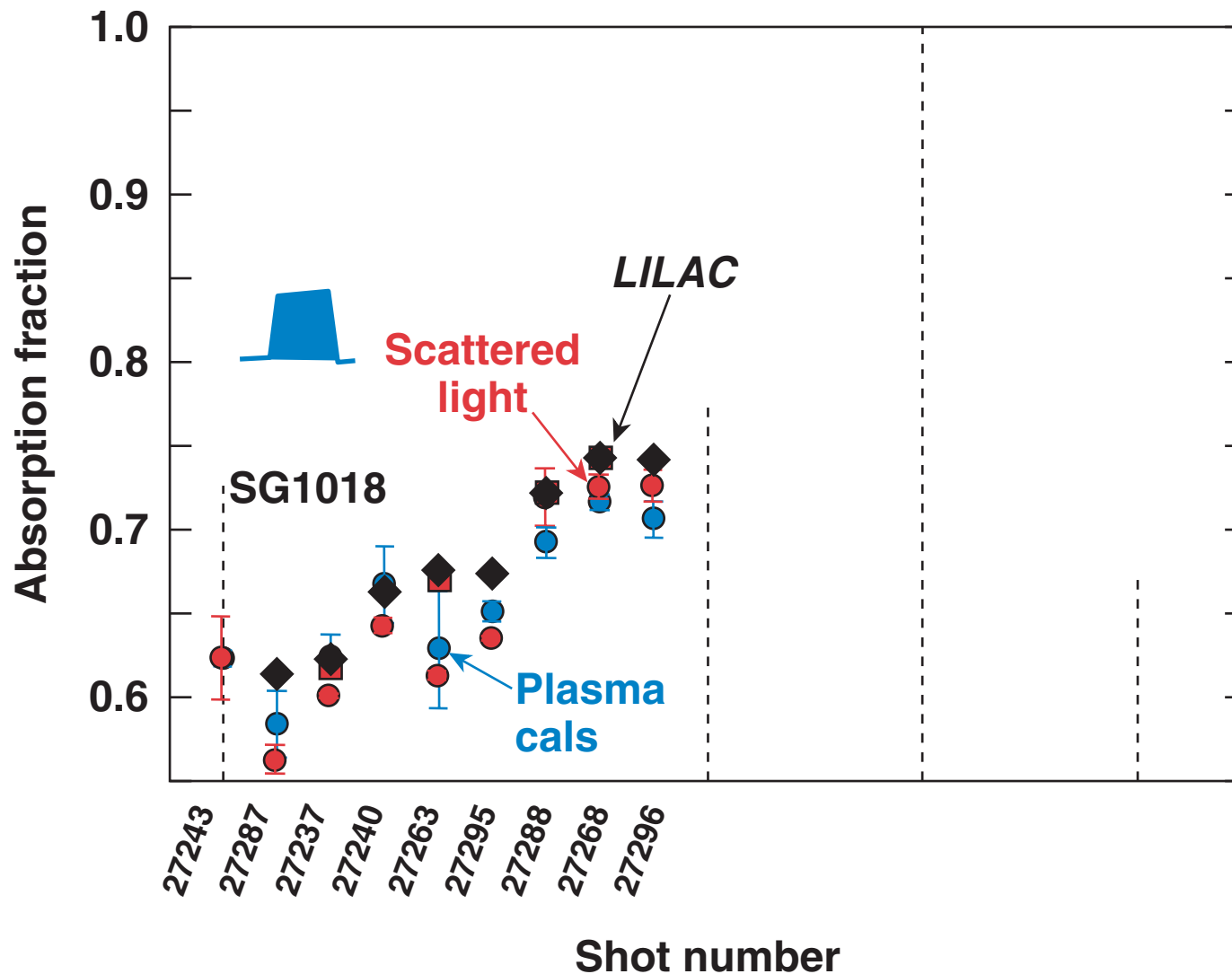
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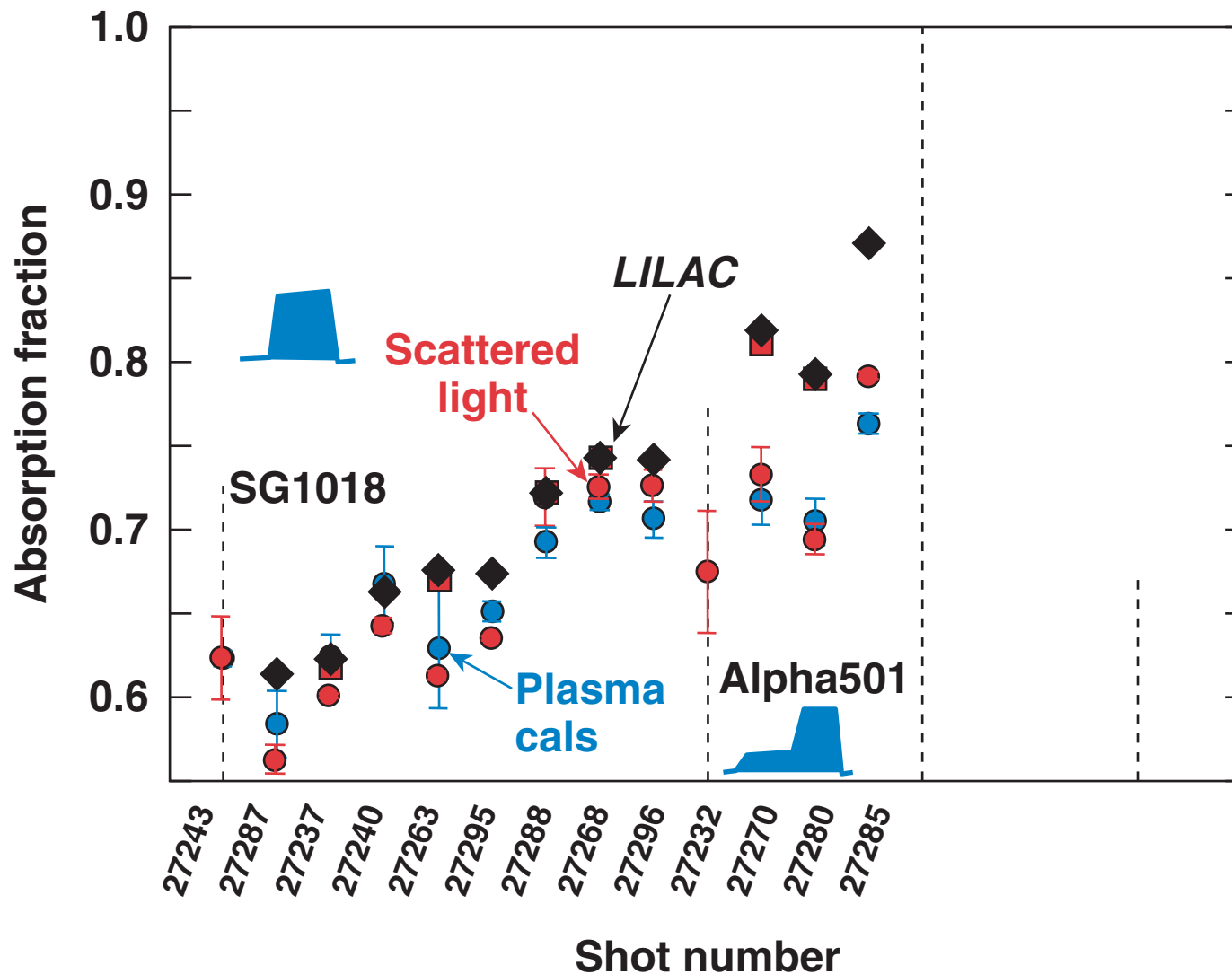
1-D hydrosimulations agree well with experimental absorption measurements for 1-ns-square pulses, less so for shaped pulses



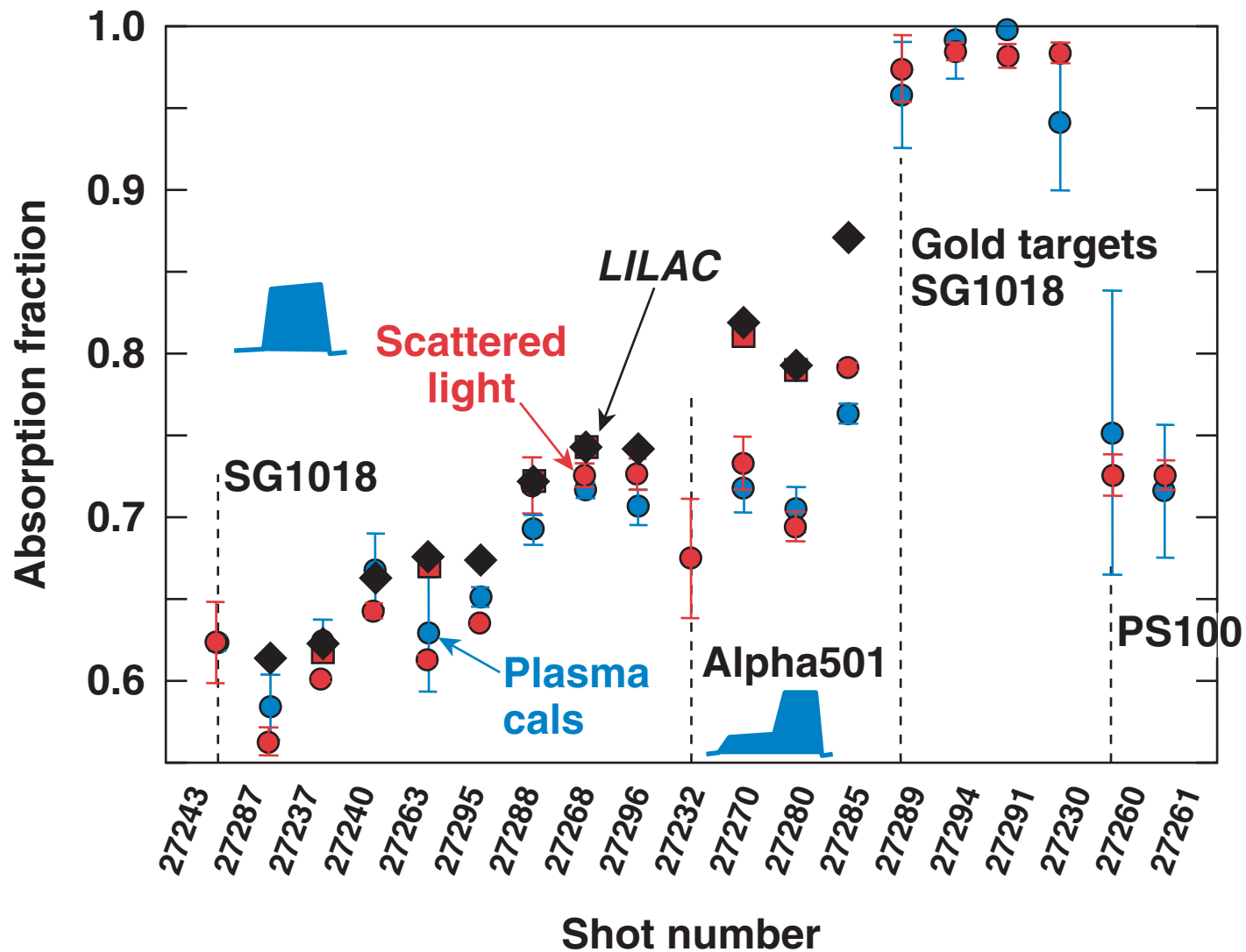
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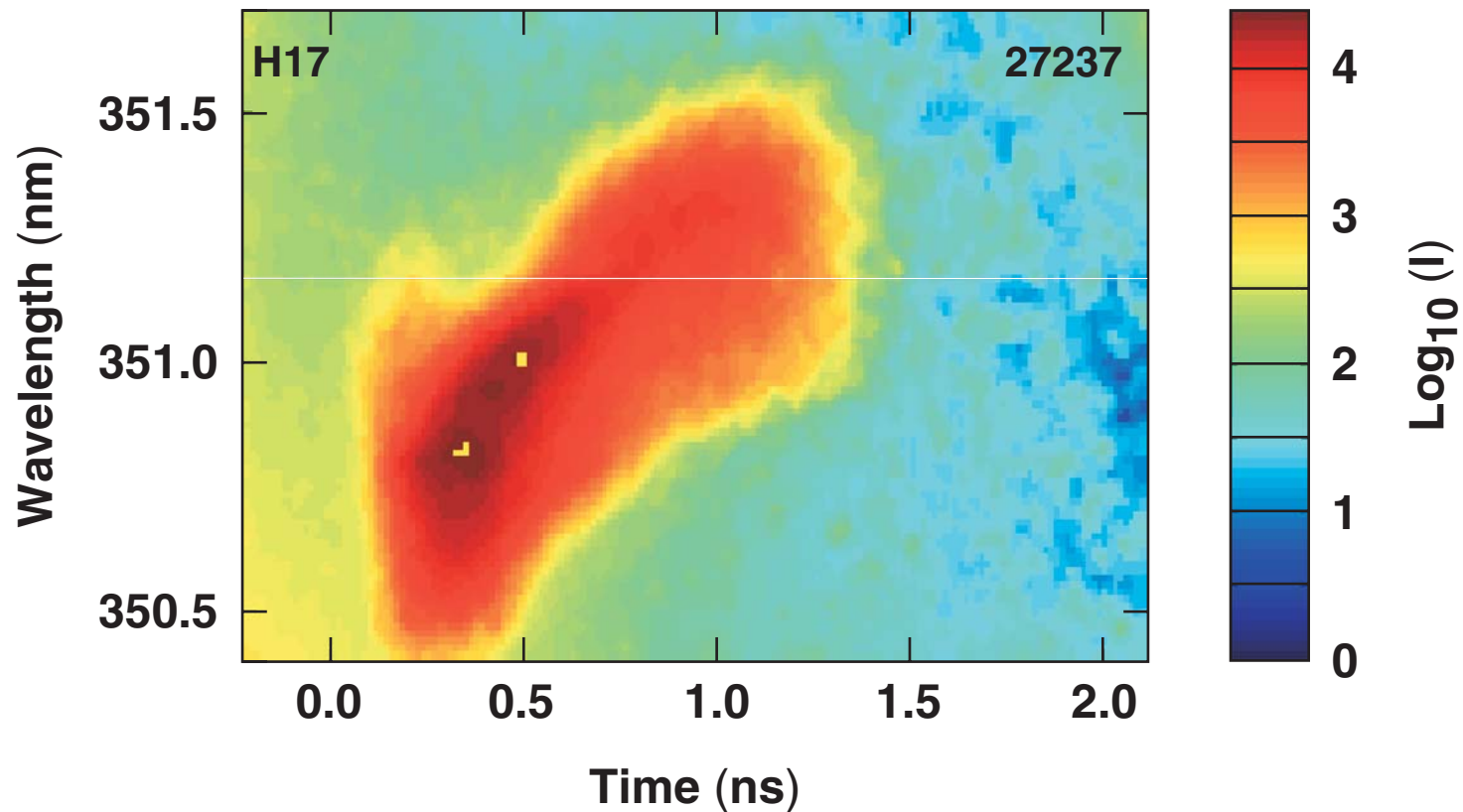
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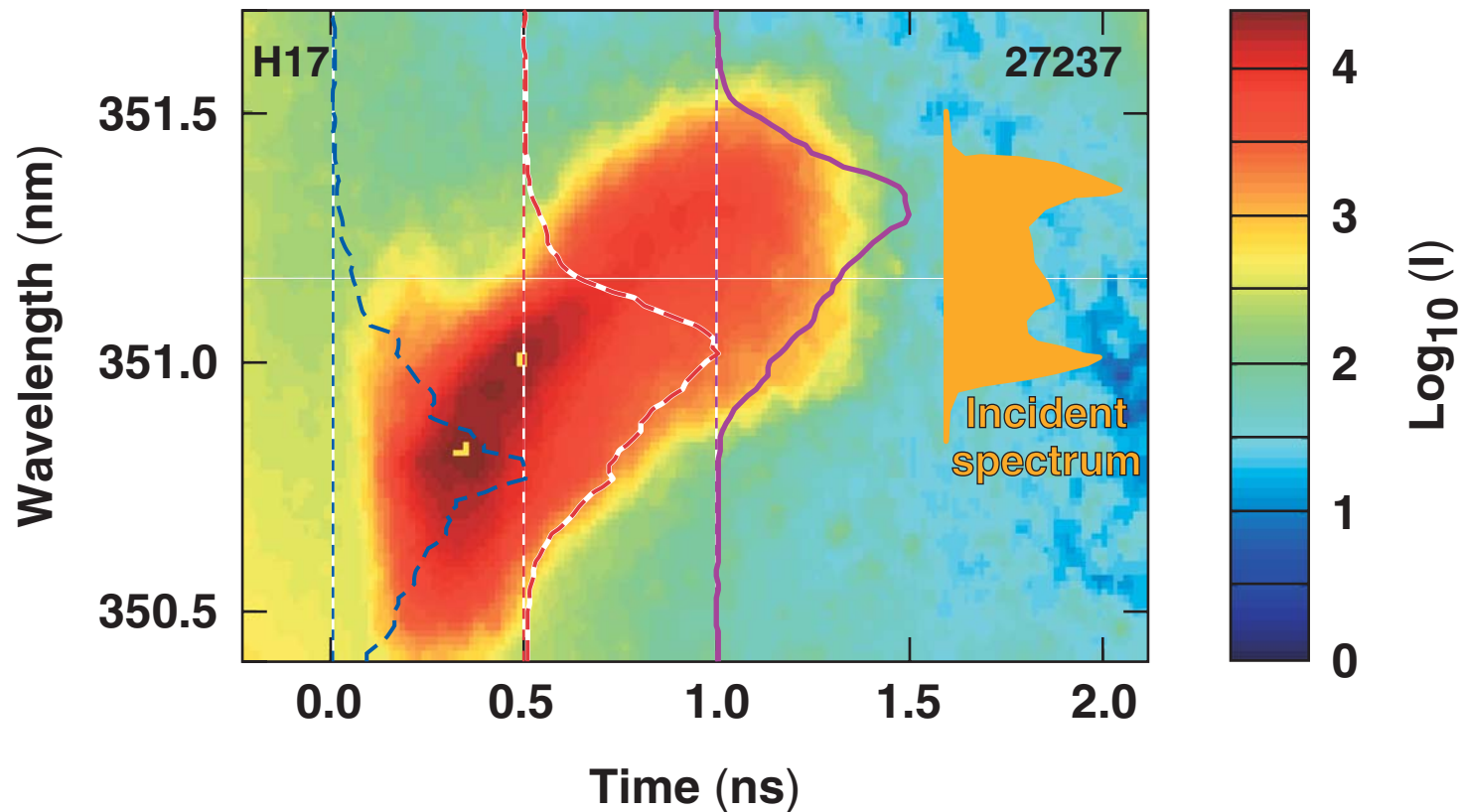
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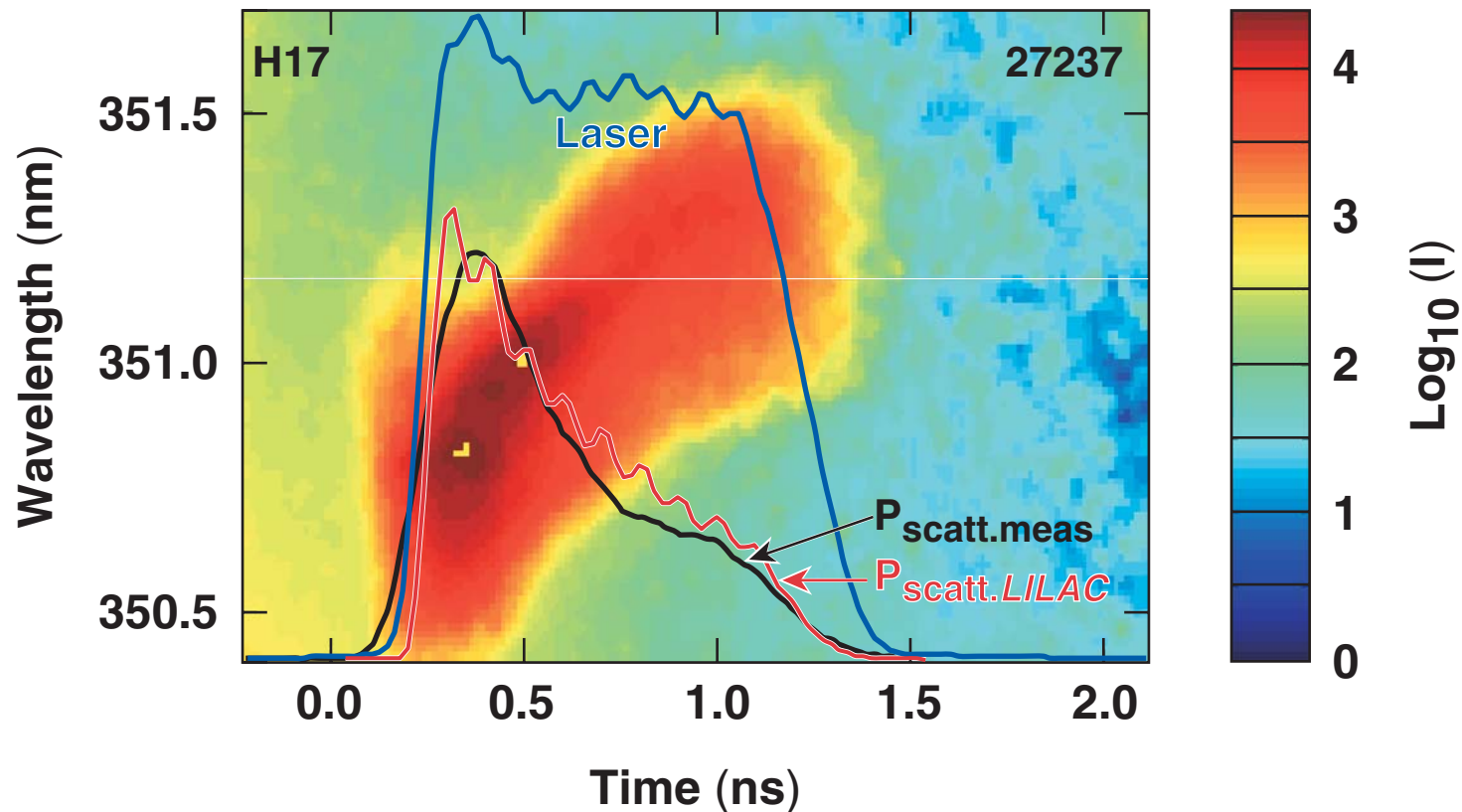
Time-resolved spectroscopy shows corona formation, start of target implosion, and possible nonlinear interaction effects



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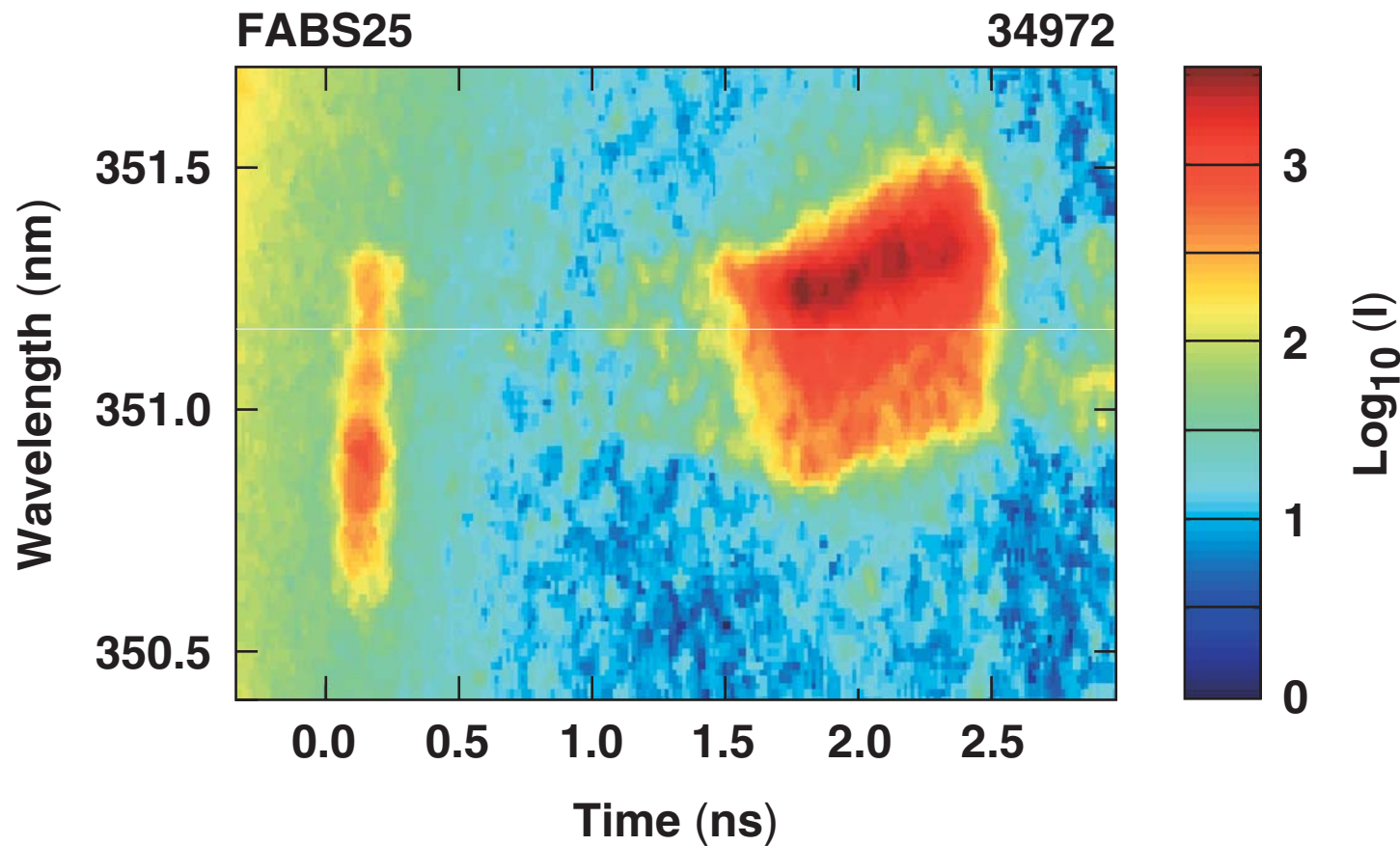


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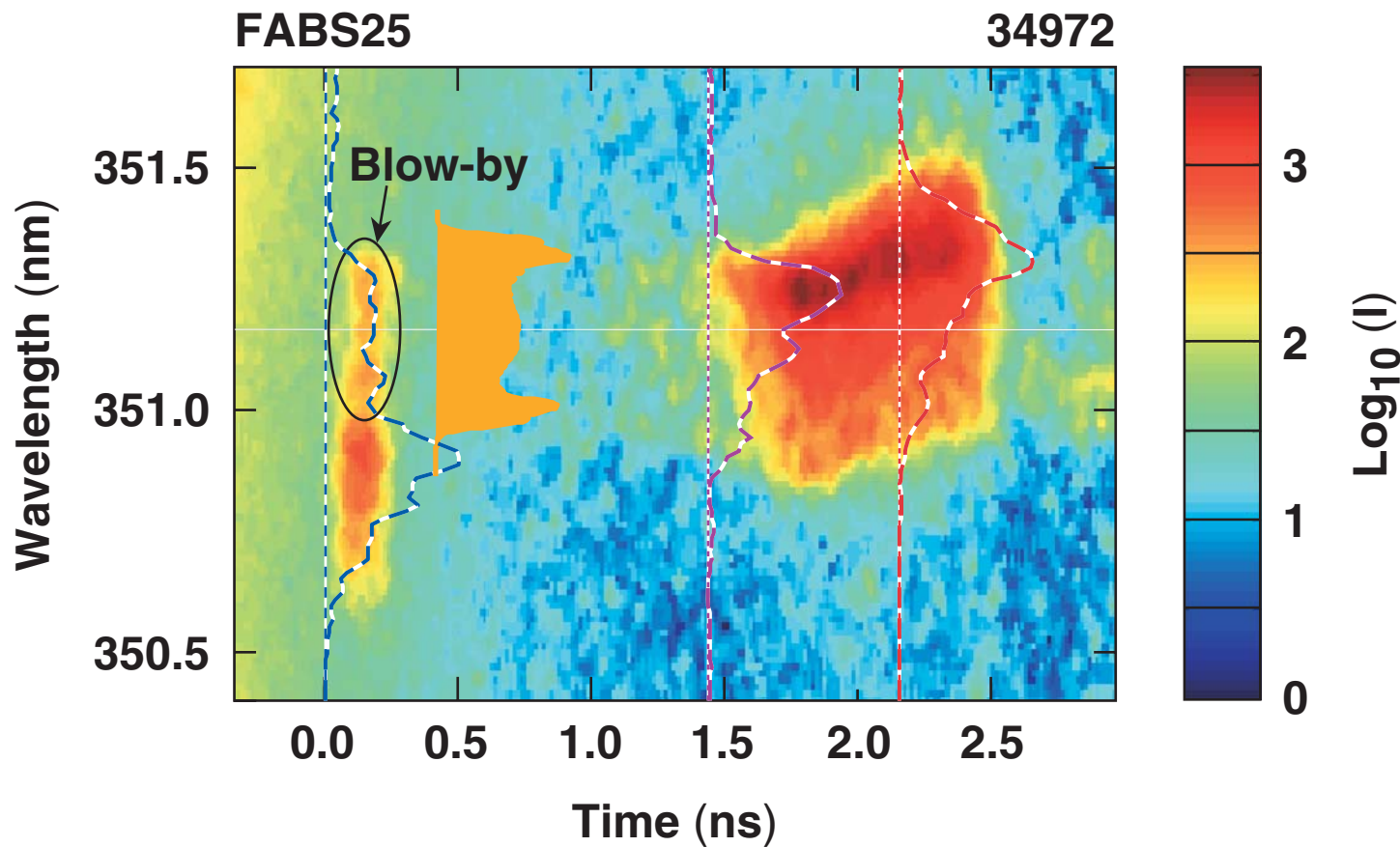
For 1-ns square-top pulses, the 1-D *LILAC* hydrodynamic simulations agree very well with the scattered-light measurements.

For shaped, long pulses, *LILAC* overpredicts the absorption—the experiments may indicate SBS side-scattering losses



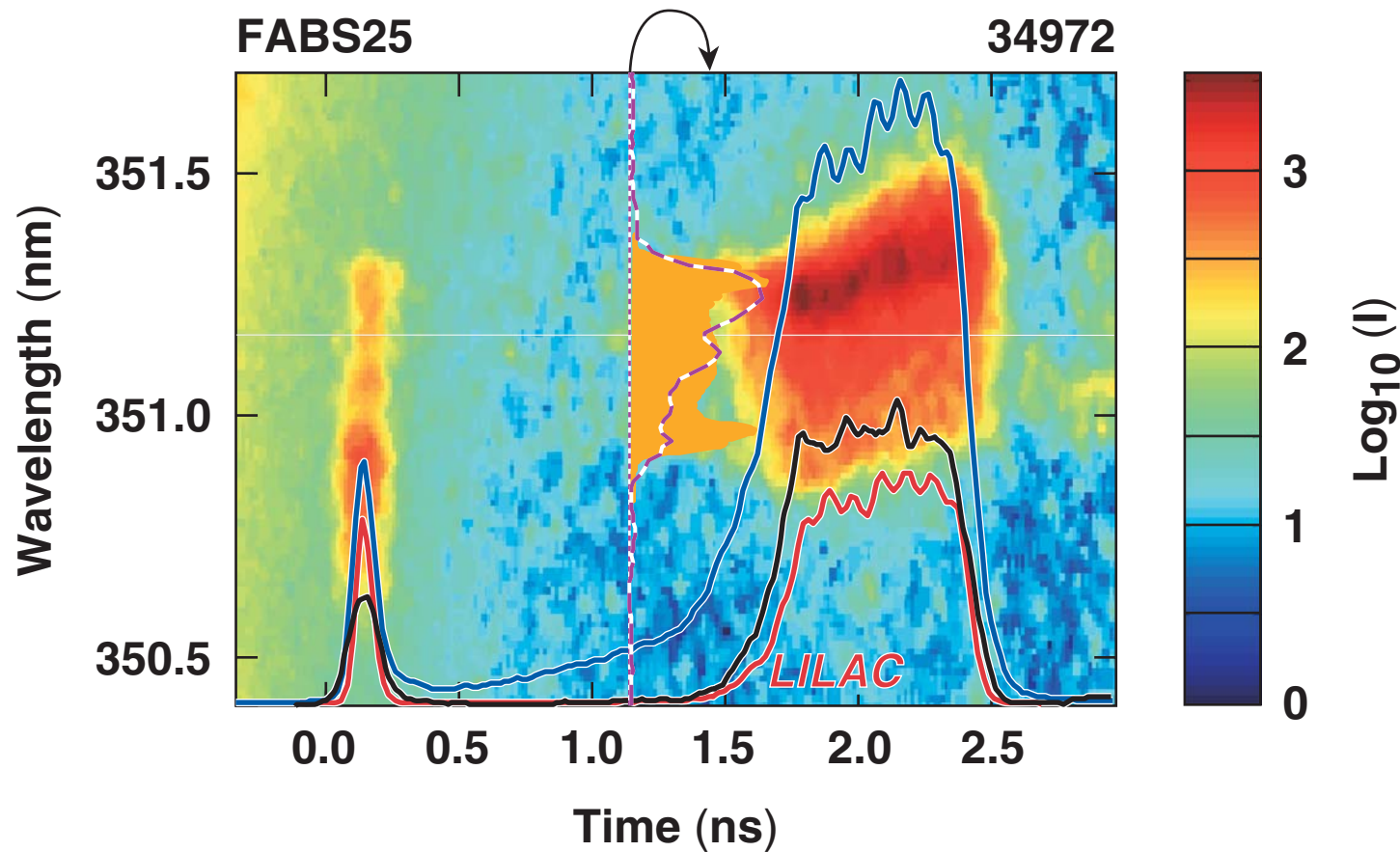
Target: 860- μ m foam shell, 60-beam implosion

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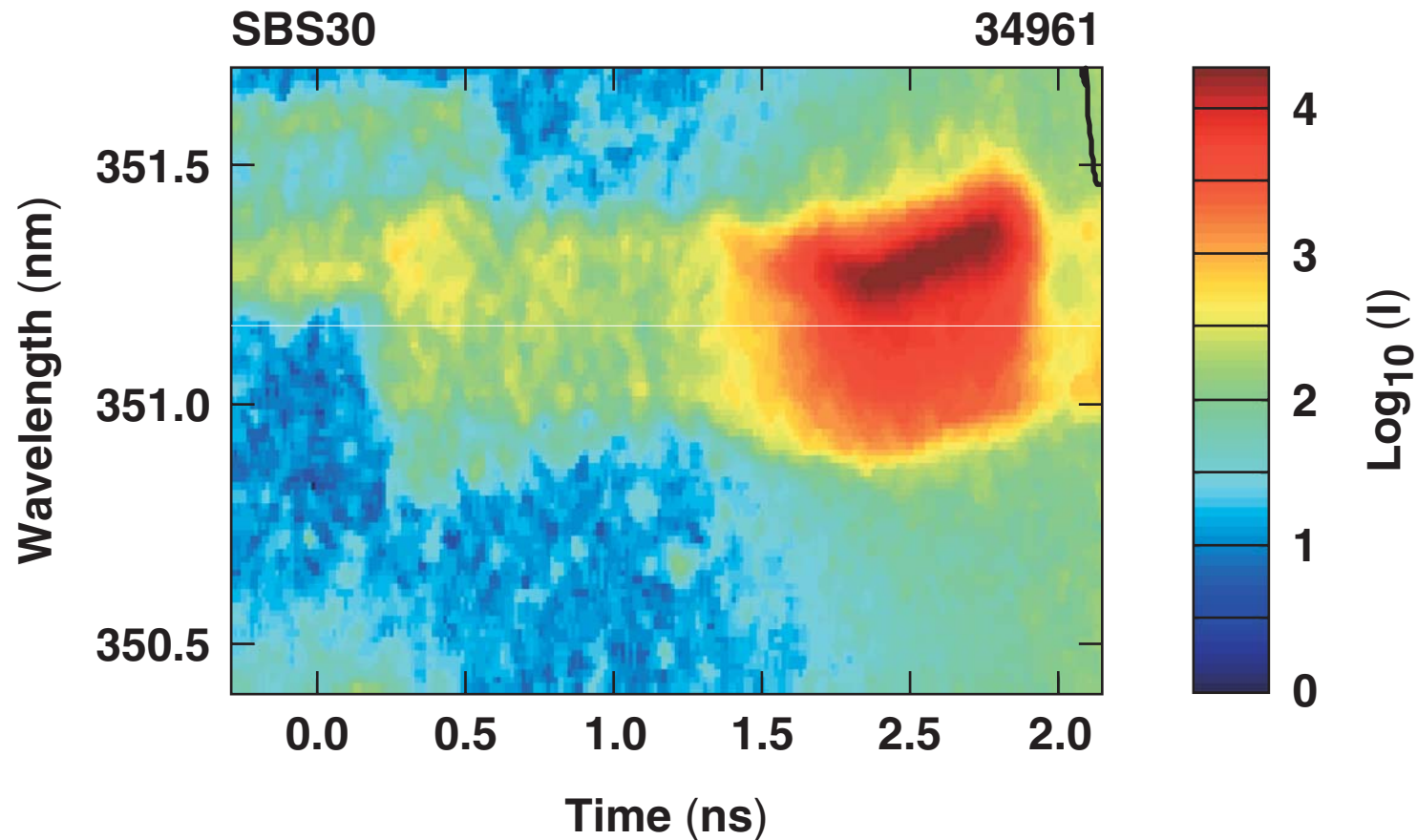
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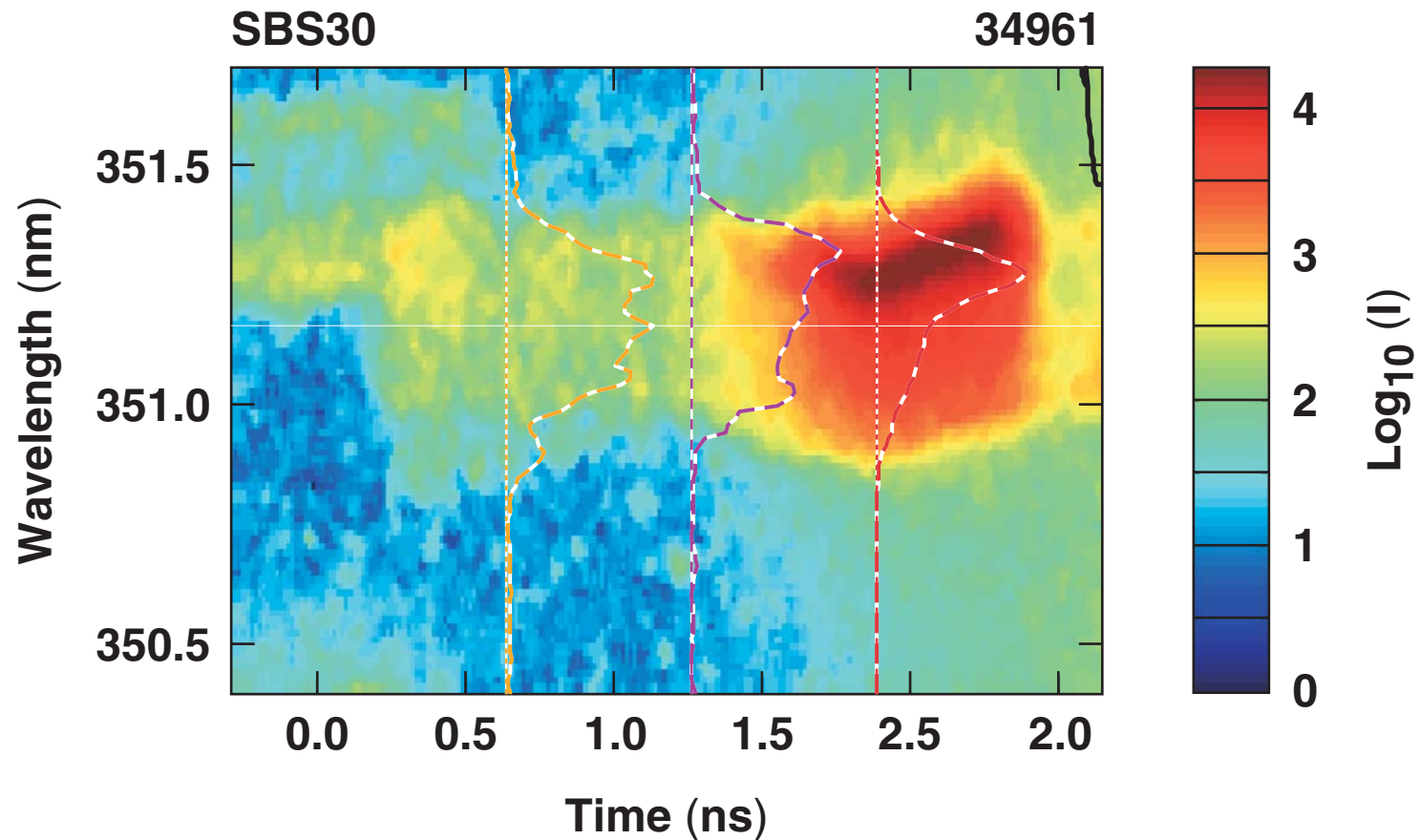


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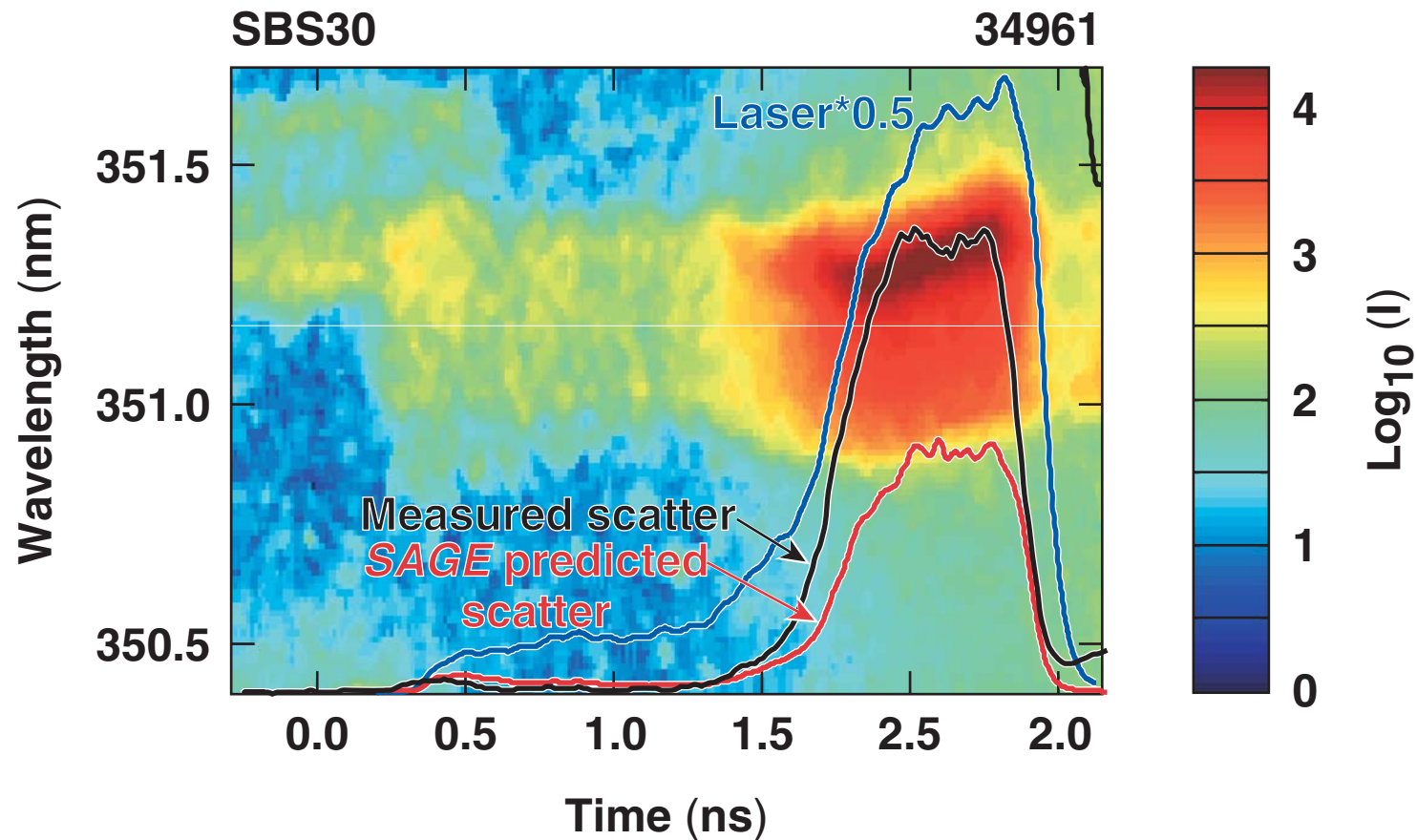
SAGE also overpredicts absorption for long pulses, but also furnishes first estimates for overall wavelength shifts



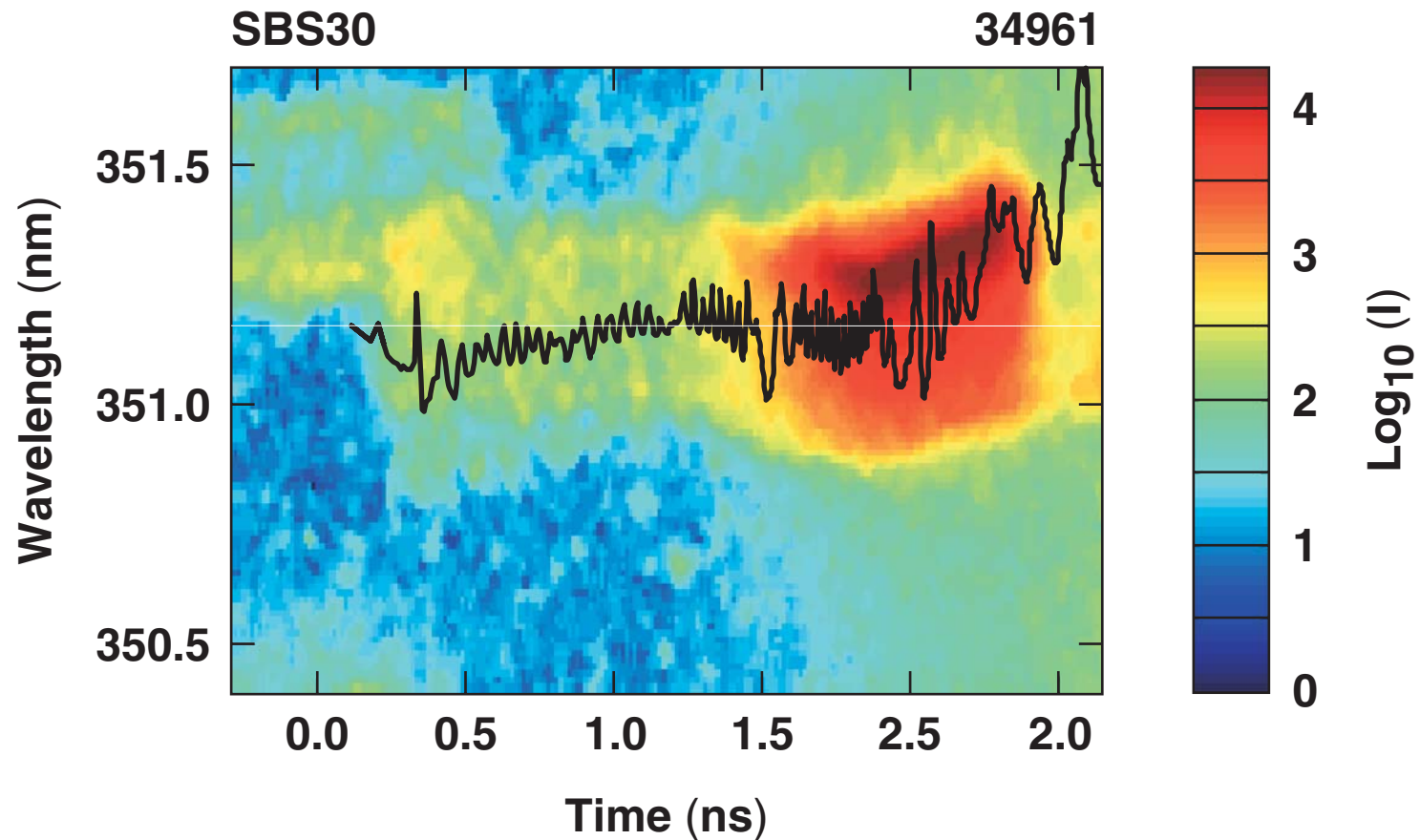
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