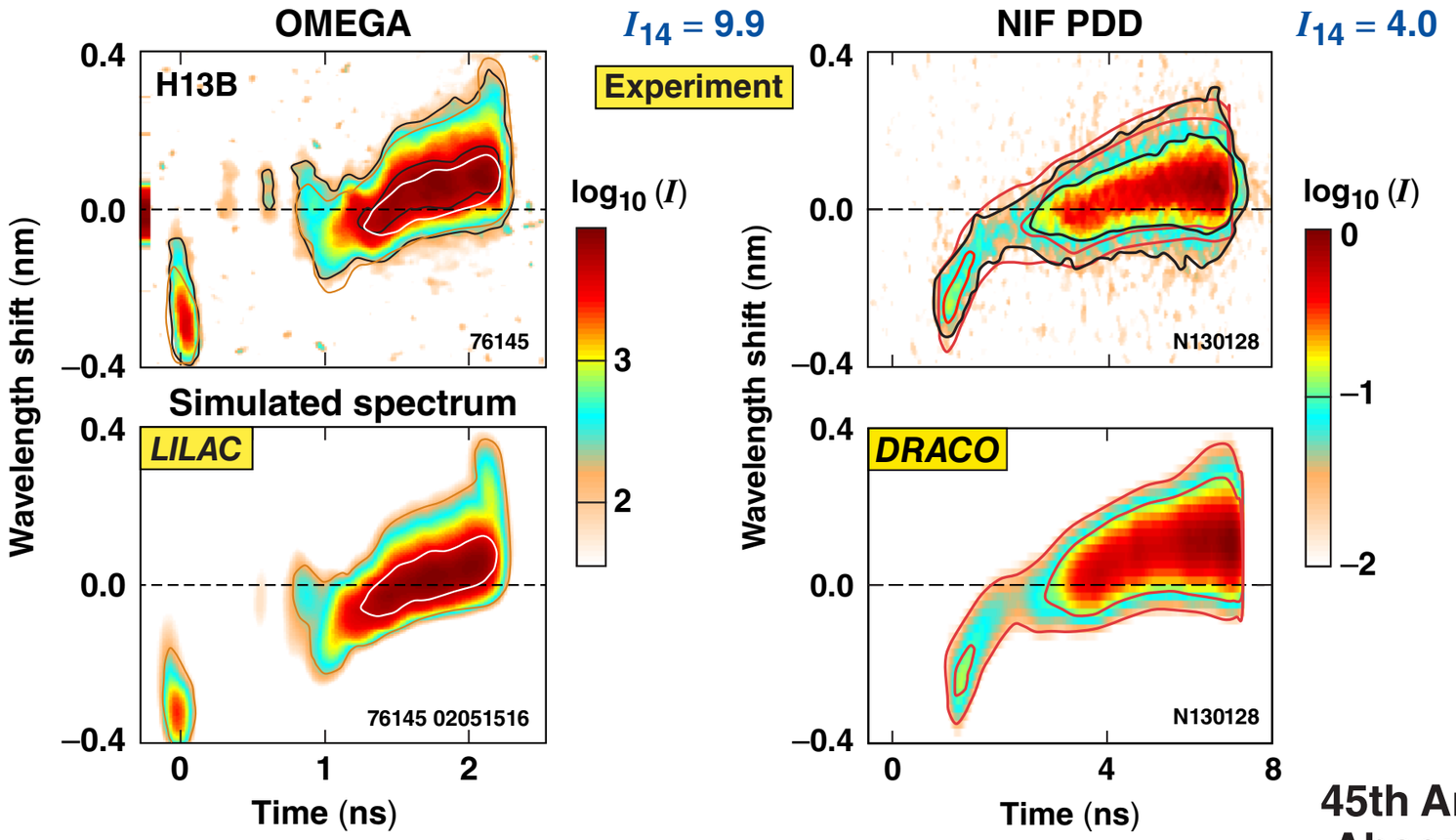
The Current *LILAC* Model for Cross-Beam Energy Transfer has been Extended to *DRACO* and Nonsymmetrical Illumination



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Summary

The current cross-beam energy transfer (CBET) model has been extended from 1-D *LILAC* to 2-D *DRACO* and from OMEGA to National Ignition Facility (NIF) implosions

- Simulated scattered-light spectra, powers, and energies for spherical implosions using *LILAC* and *DRACO* and current CBET models agree with each other and experiments
- Two-dimensional *DRACO* modeling of OMEGA polar-direct-drive (PDD) implosions compares favorably with experiments
- For PDD implosions on the NIF, the temporal behavior of the scattered-light spectra and powers agree well with experiments
- Residual discrepancies between simulations and experiments point toward reduced drive in the experiments relative to simulations

Collaborators

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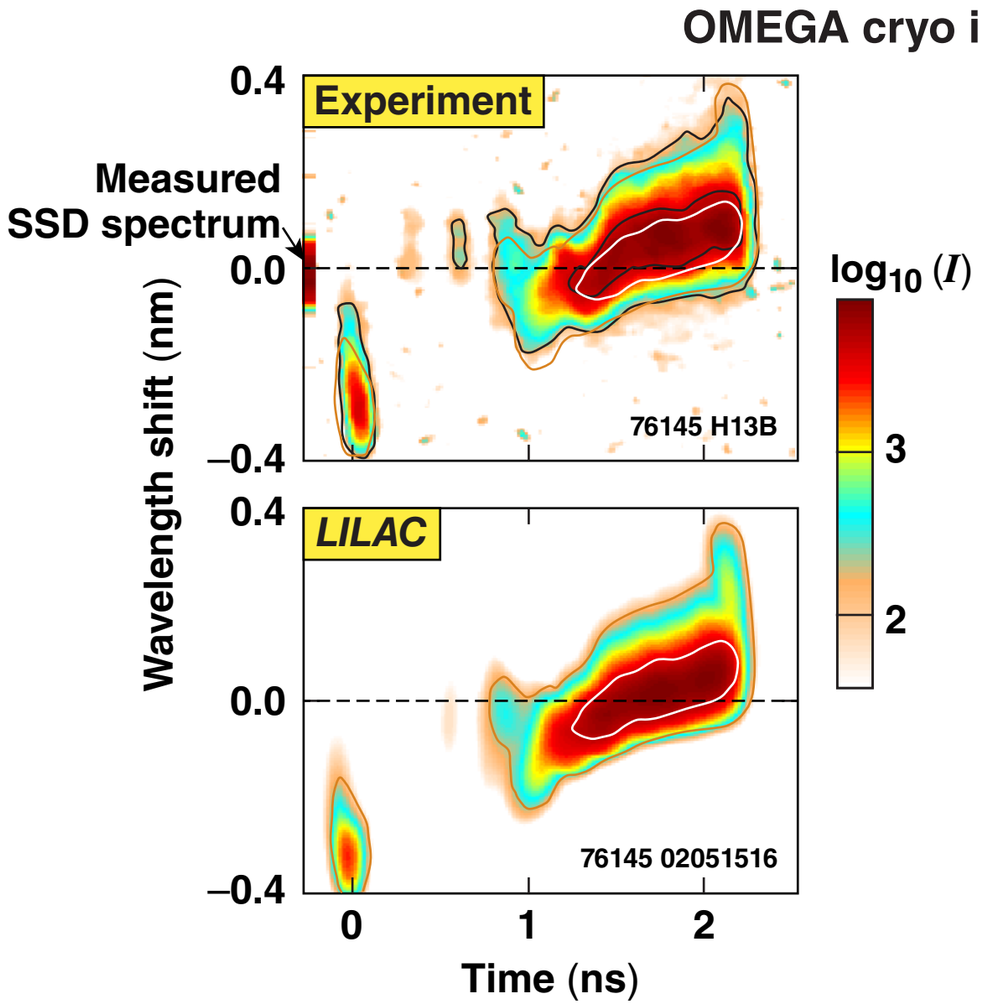
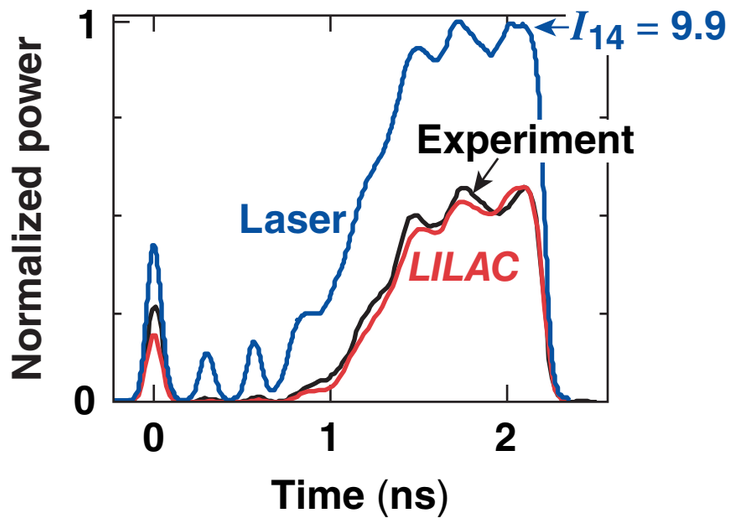
For OMEGA cryogenic implosions, the scattered-light spectra and powers are matched well by *LILAC*



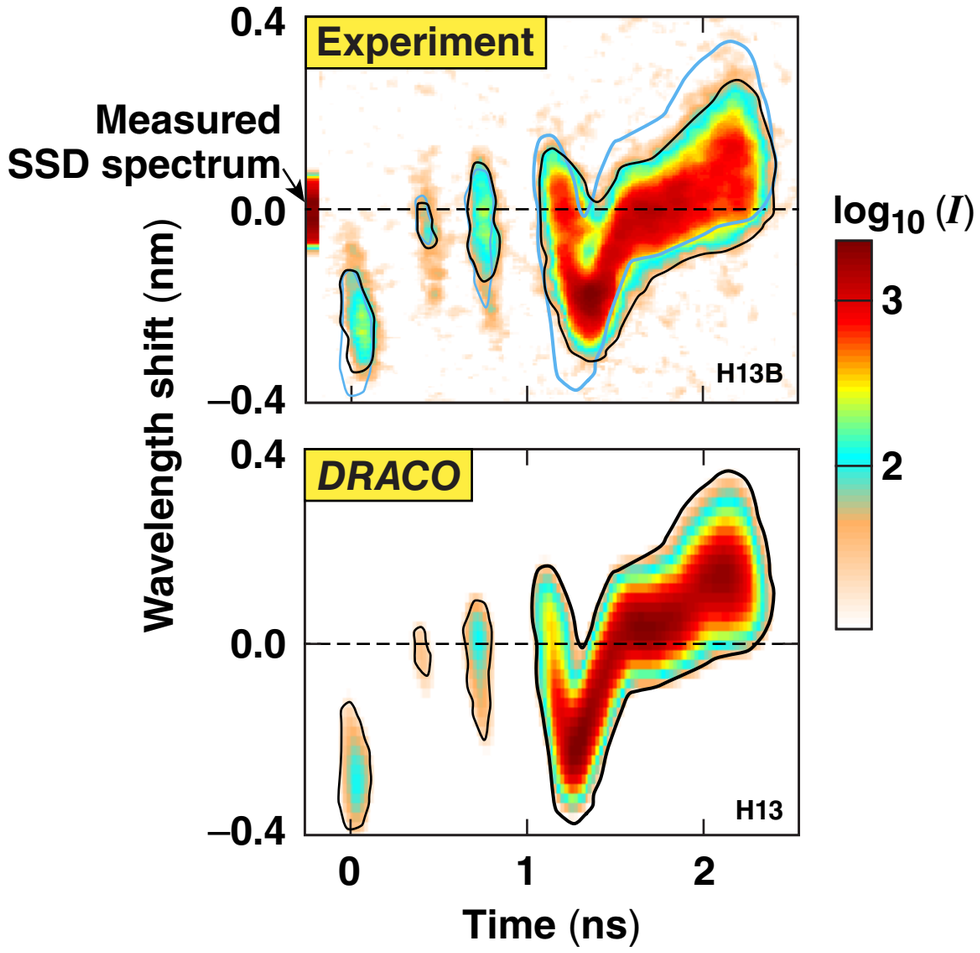


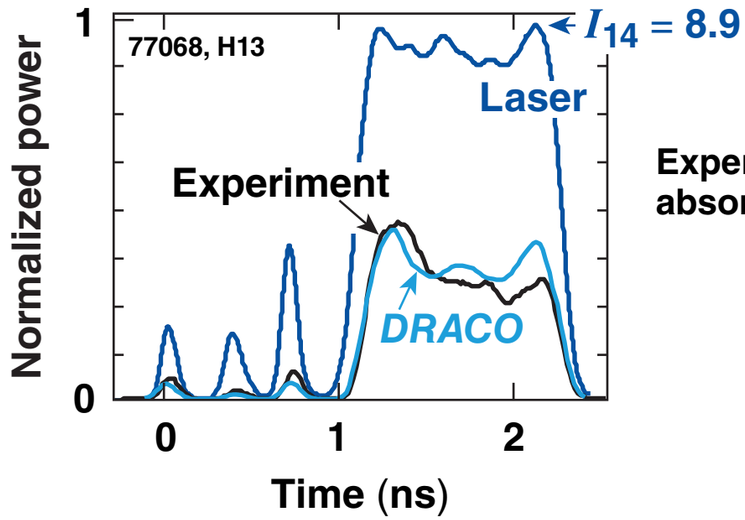
- *LILAC* includes
  - nonlocal (NL) electron thermal transport
  - CBET with field swelling and polarization smoothing
  - simulations use narrowband incident laser and are then convolved with the experimental SSD spectrum

E24242

DRACO (1-D) and *LILAC* simulate spectra equally well if CBET is included

OMEGA implosion using symmetrical illumination



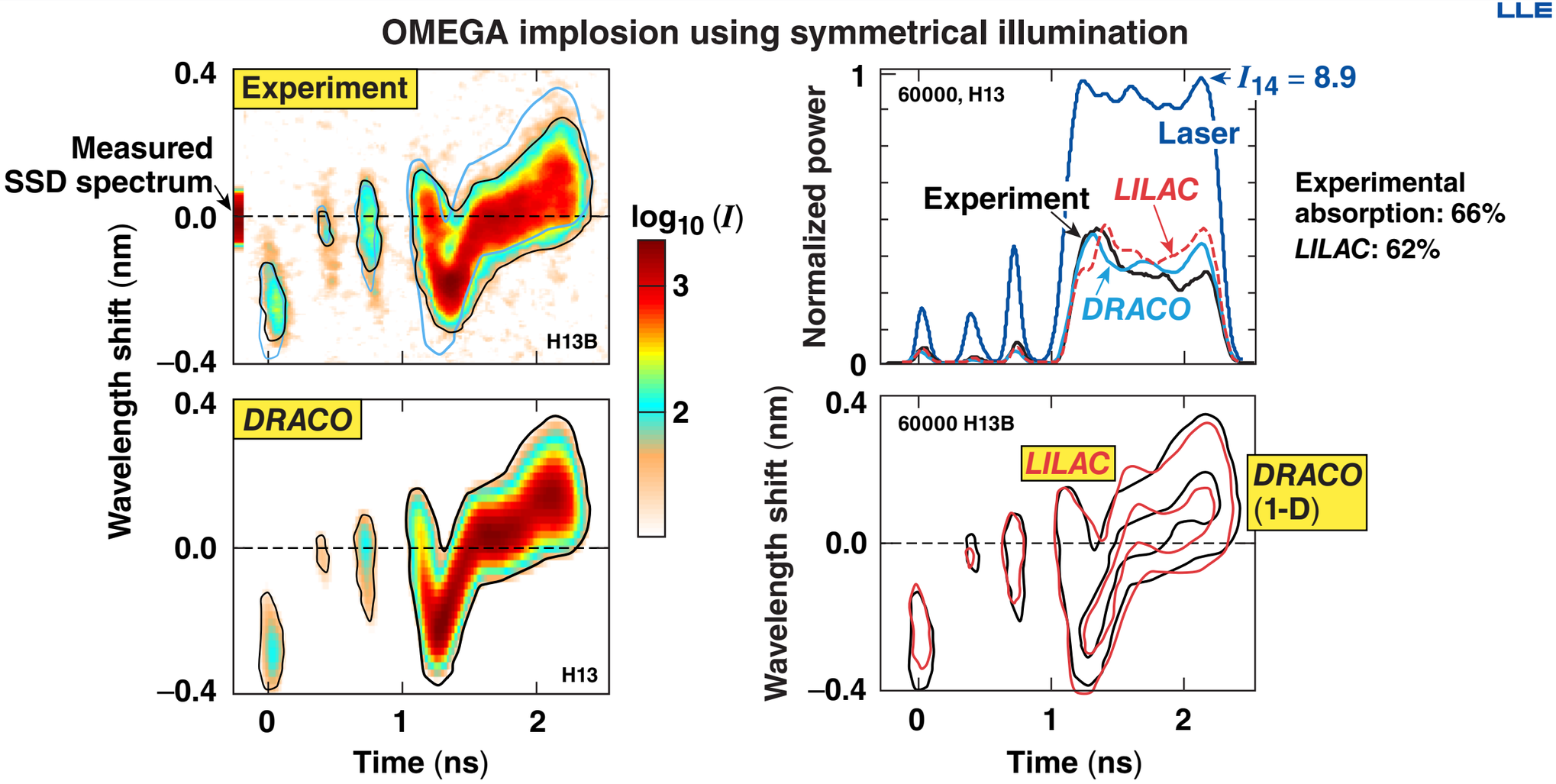


Experimental absorption: 66%

- *DRACO* includes
  - NL electron thermal transport
  - CBET with polarization smoothing but no field swelling
  - by increasing CBET gain 2×, *DRACO* simulations agree with *LILAC*

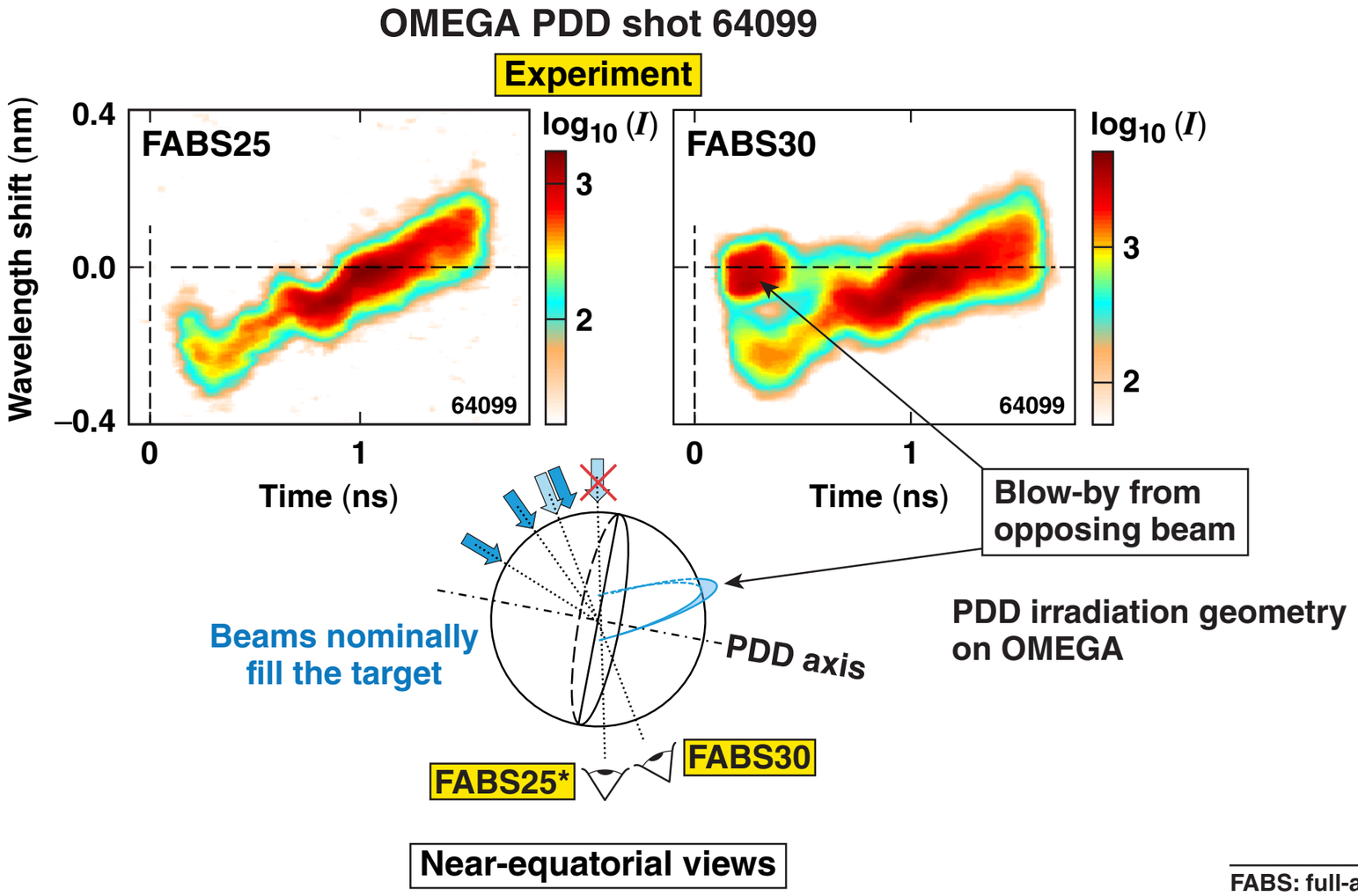
E24243

DRACO (1-D) and *LILAC* simulate spectra equally well if CBET is included



E24244

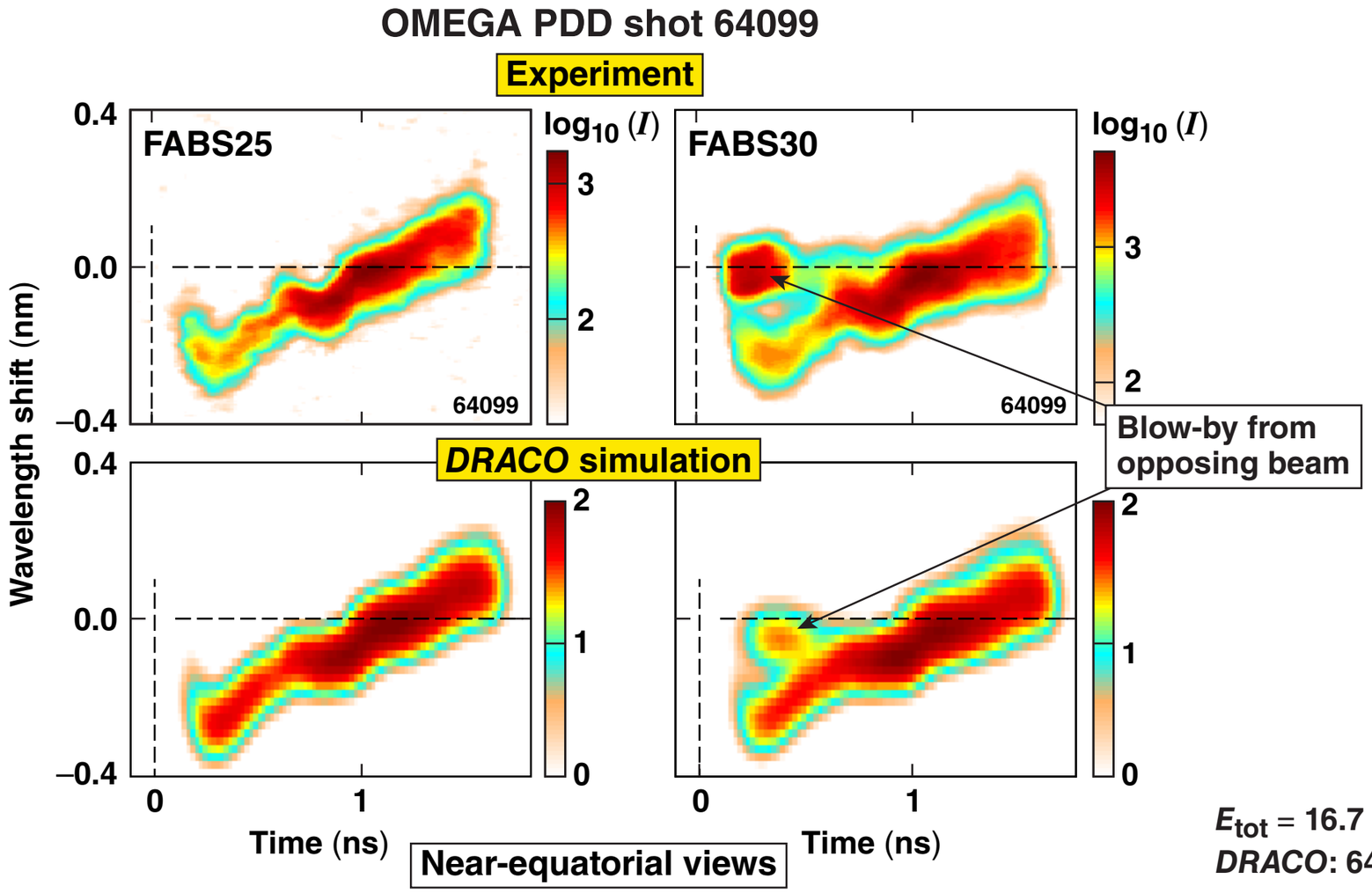
Experimental scattered-light spectra of OMEGA PDD implosions are similar around the target except for blow-by



FABS: full-aperture backscatter station

E24245

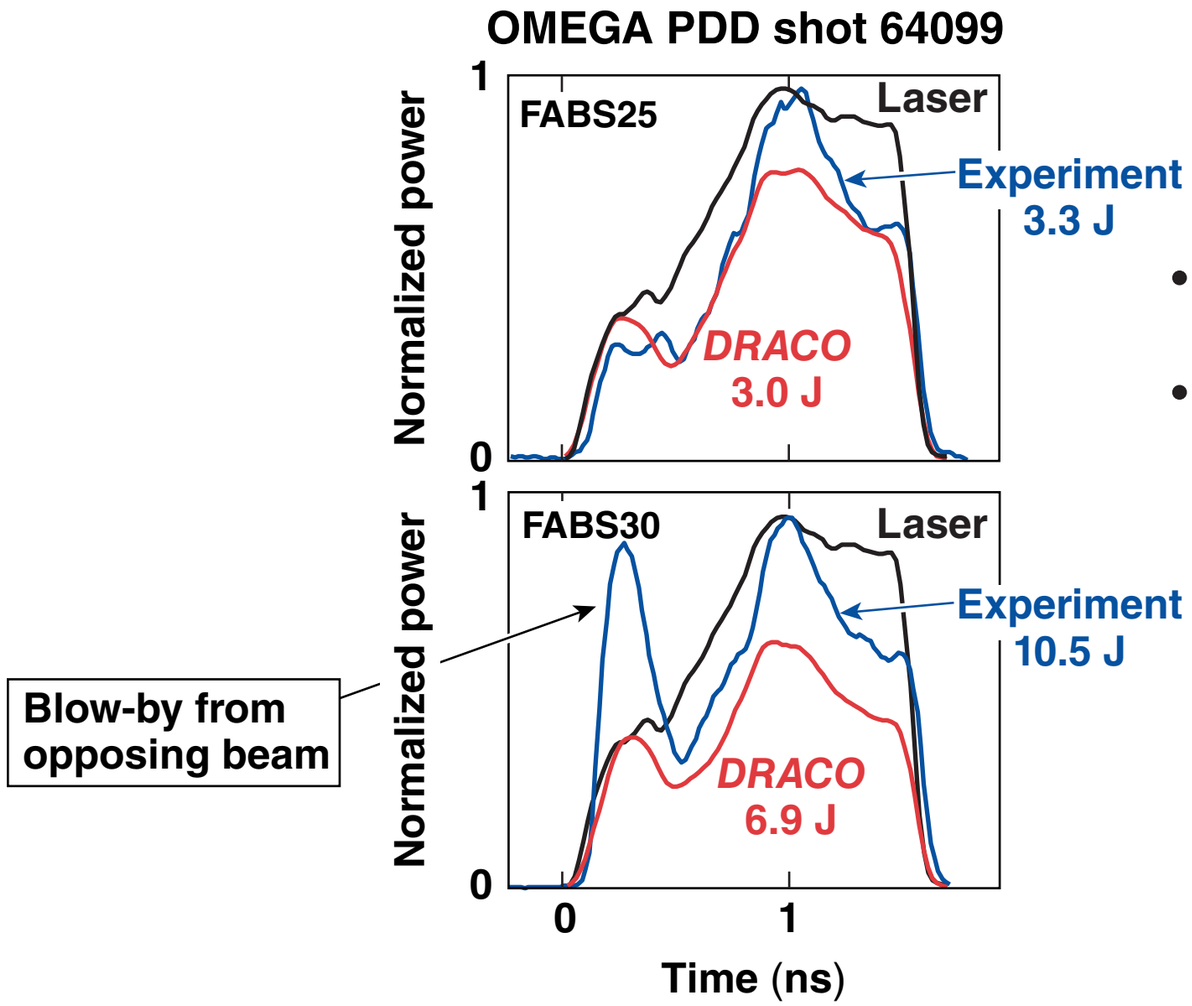
Scattered-light spectra of OMEGA PDD implosions are simulated well with 2-D *DRACO*



E_{tot} = 16.7 kJ
DRACO: 64099 CBET × 2 NL

E24246

Scattered-light powers of OMEGA PDD implosions are close to simulations if corrected for blow-by around the target

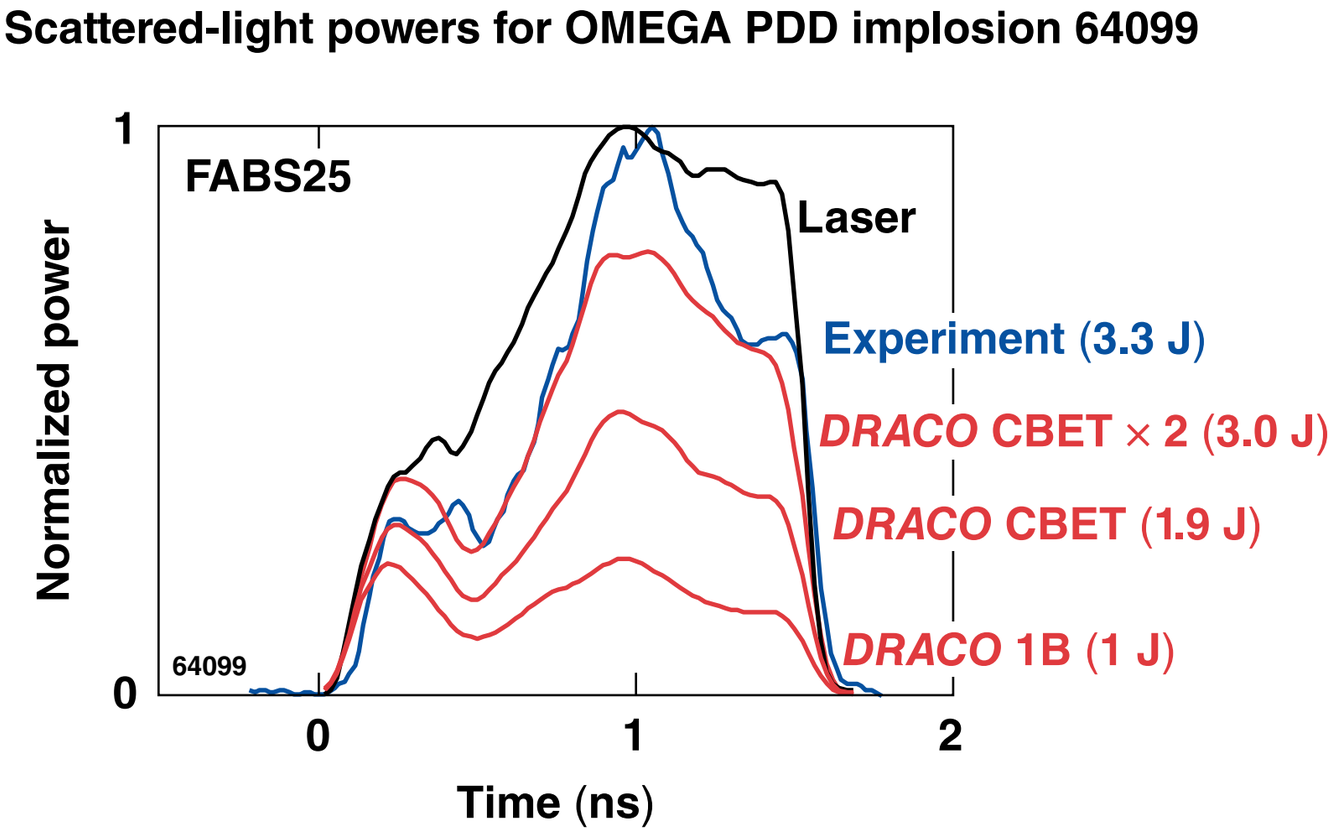


- Experiment and *DRACO* powers are to scale
- After subtracting blow-by, simulated powers are within 10% of experimental data

E_{tot} = 16.7 kJ
DRACO: 64099 CBET × 2 NL

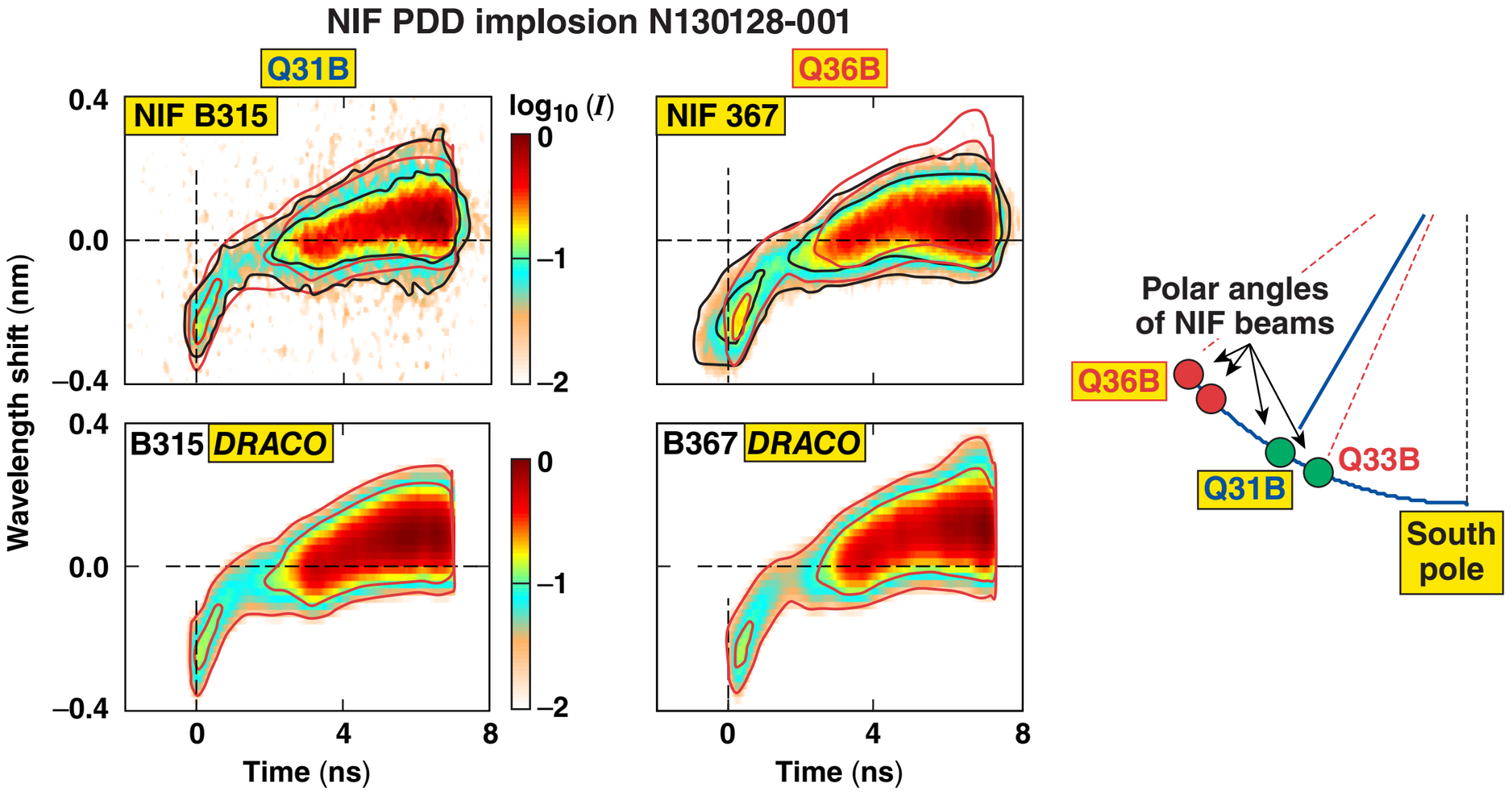
E24253

Different CBET models lead to obvious changes in the scattered powers for PDD implosions



E24254

NIF PDD implosions are also well modeled with *DRACO*

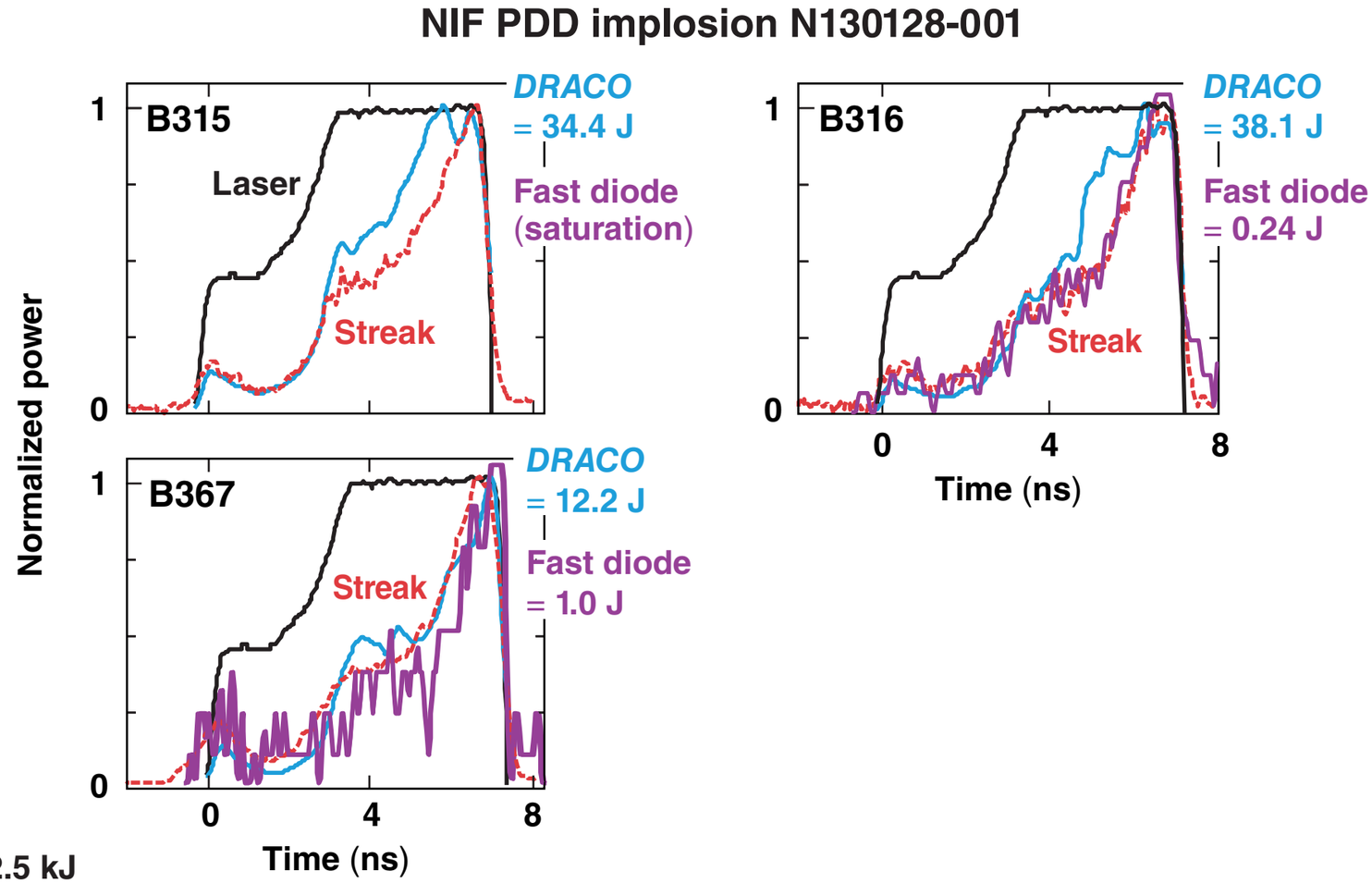


E_{tot} = 342.5 kJ
I_{14} (nominal) = 4.1

E24255

N130128-001 CBET × 2 NL

DRACO models temporal behavior of scattered-light powers well for NIF PDD implosions but the predicted energies are far from NIF "fast-diode" energies



E_{tot} = 342.5 kJ
I_{14} (cold target) = 4.1

E24256

N130128-001 CBET × 2 NL

Summary/Conclusions

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