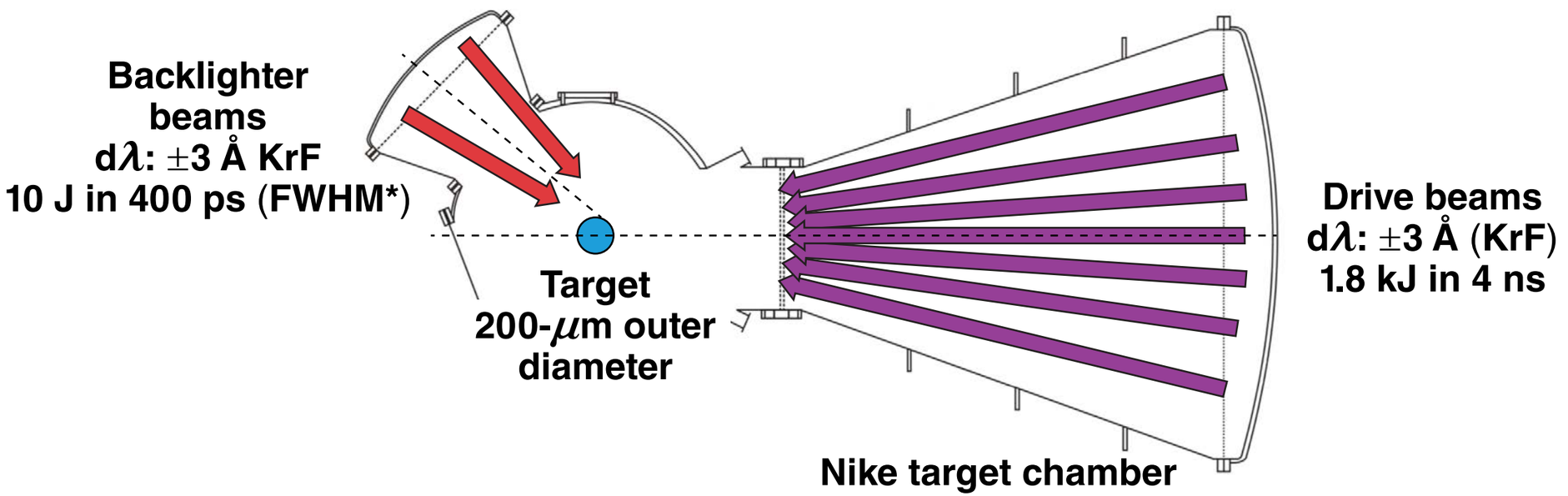
Evaluation of Wavelength Detuning to Mitigate Cross-Beam Energy Transfer Using the Nike Laser



P. W. McKenty
University of Rochester
Laboratory for Laser Energetics

57th Annual Meeting of the
American Physical Society
Division of Plasma Physics
Savannah, GA
16–20 November 2015

Summary

The Nike laser can be employed to examine the effects of laser wavelength detuning to mitigate cross-beam energy transfer (CBET)

- Wavelength detuning is predicted to shift the CBET interaction region within the corona, affecting the gains/losses because of CBET
- The Nike platform is well suited for these studies, providing a well-diagnosed system over a range of detunings ($\Delta\lambda$ ~6 Å KrF)
- Initial experiments have commenced on Nike, measuring energy dependence of wavelength detuning

Collaborators

J. A. Marozas

University of Rochester
Laboratory for Laser Energetics

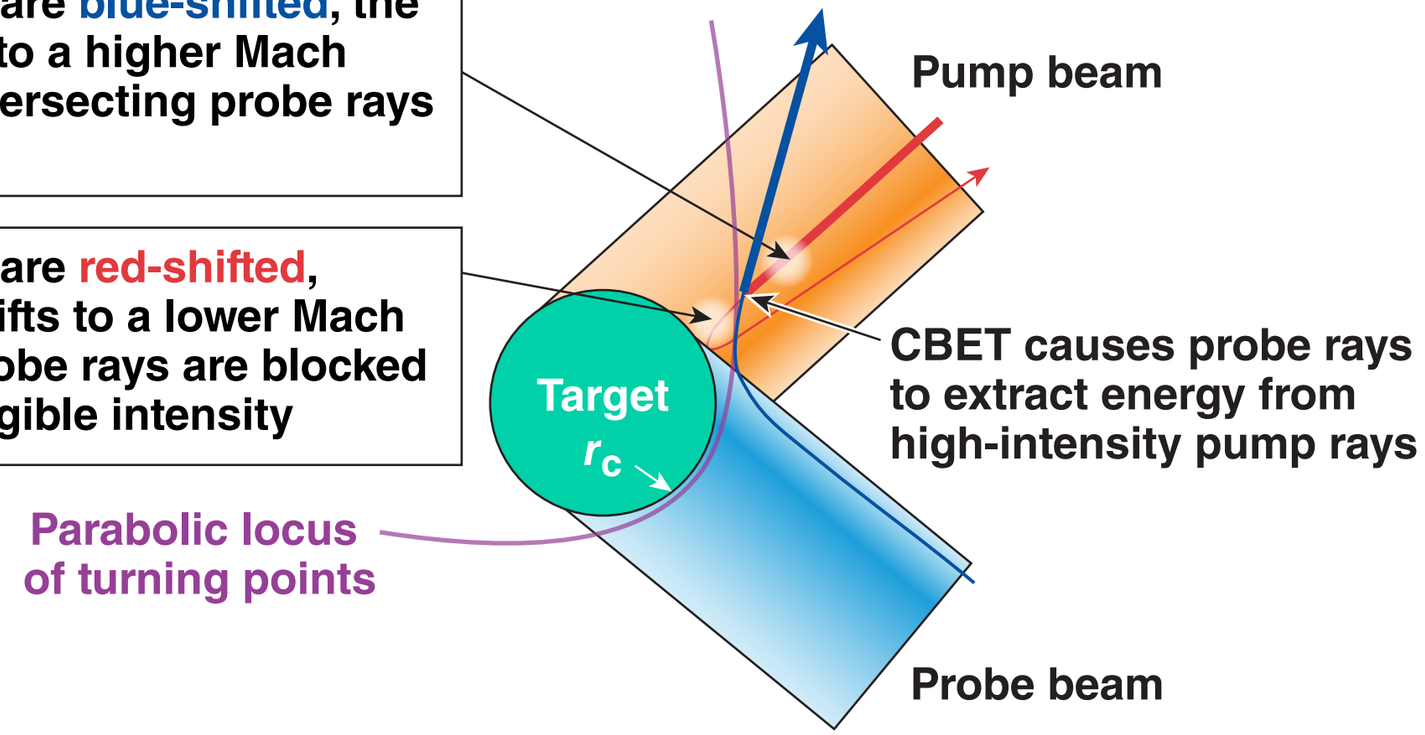
J. Weaver, S. P. Obenschain, and A. J. Schmitt

Naval Research Laboratory

Successful wavelength detuning shifts the resonance location sufficiently to mitigate CBET

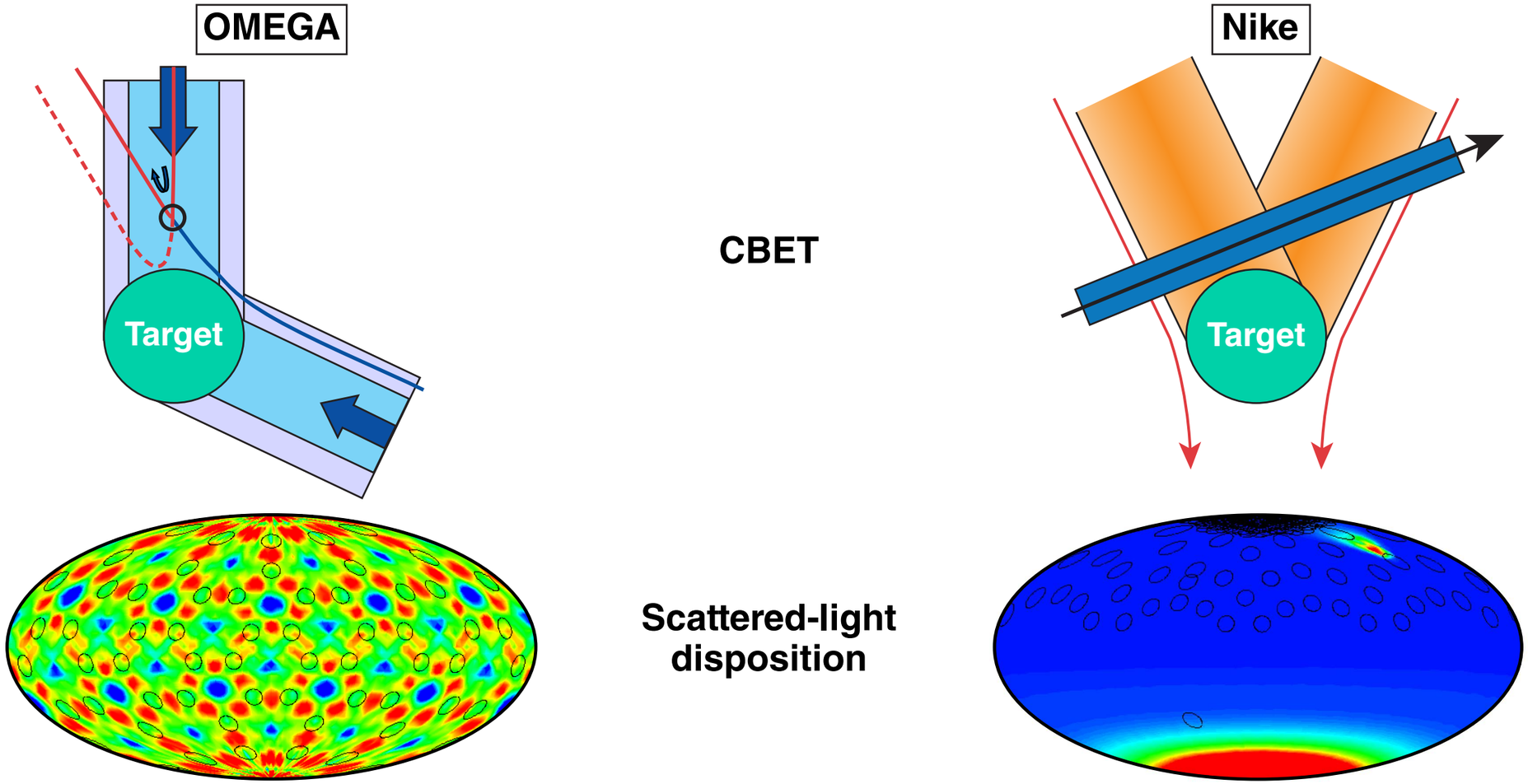
When probe rays are blue-shifted, the resonance shifts to a higher Mach number where intersecting probe rays are negligible

When probe rays are red-shifted, the resonance shifts to a lower Mach number where probe rays are blocked and/or have negligible intensity



TC11766e

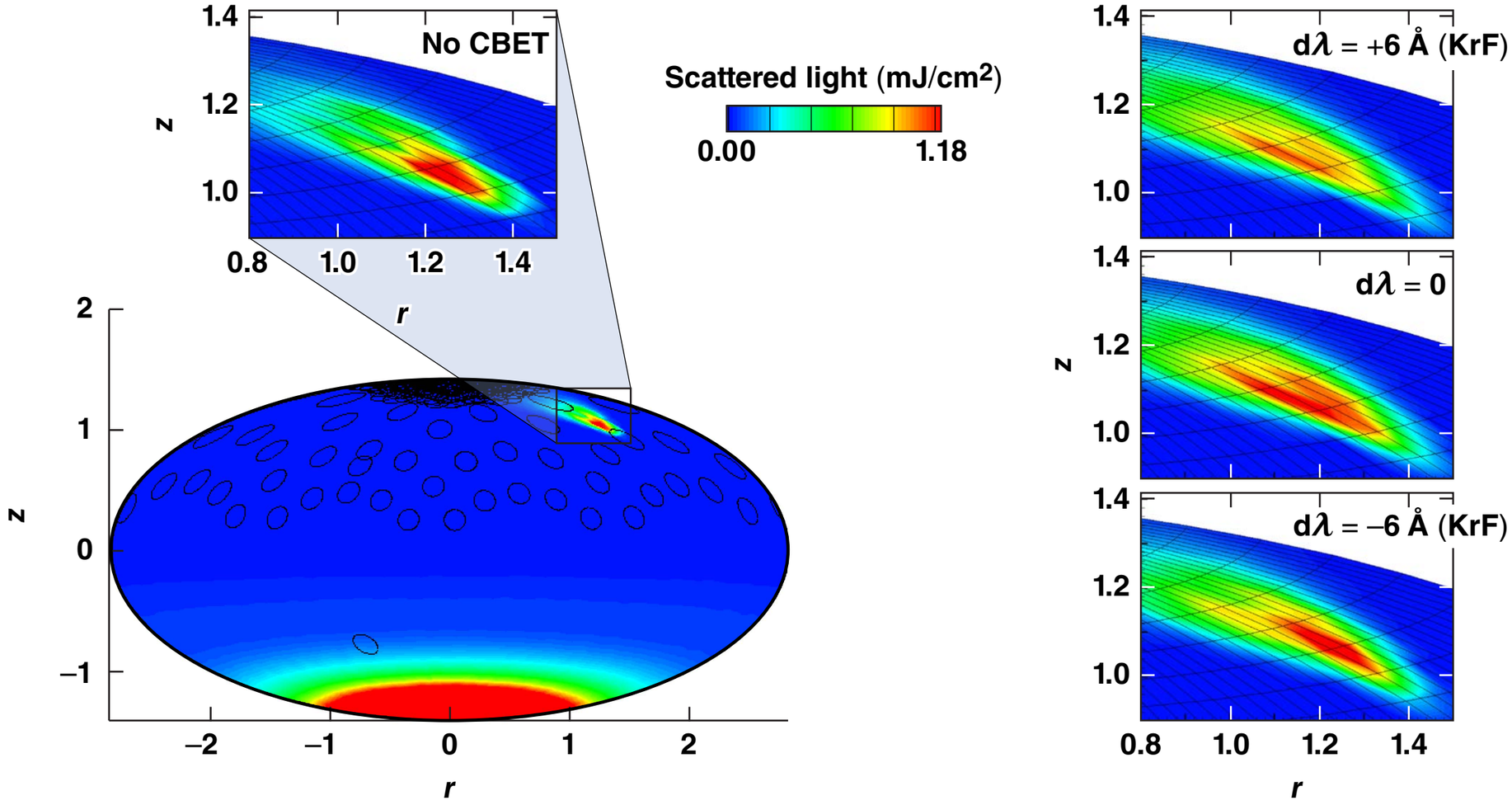
The NIKE experiments will evaluate the disposition of the scattered light at two specific locations



D. H. Edgell *et al.*, JO5.00004, this conference.

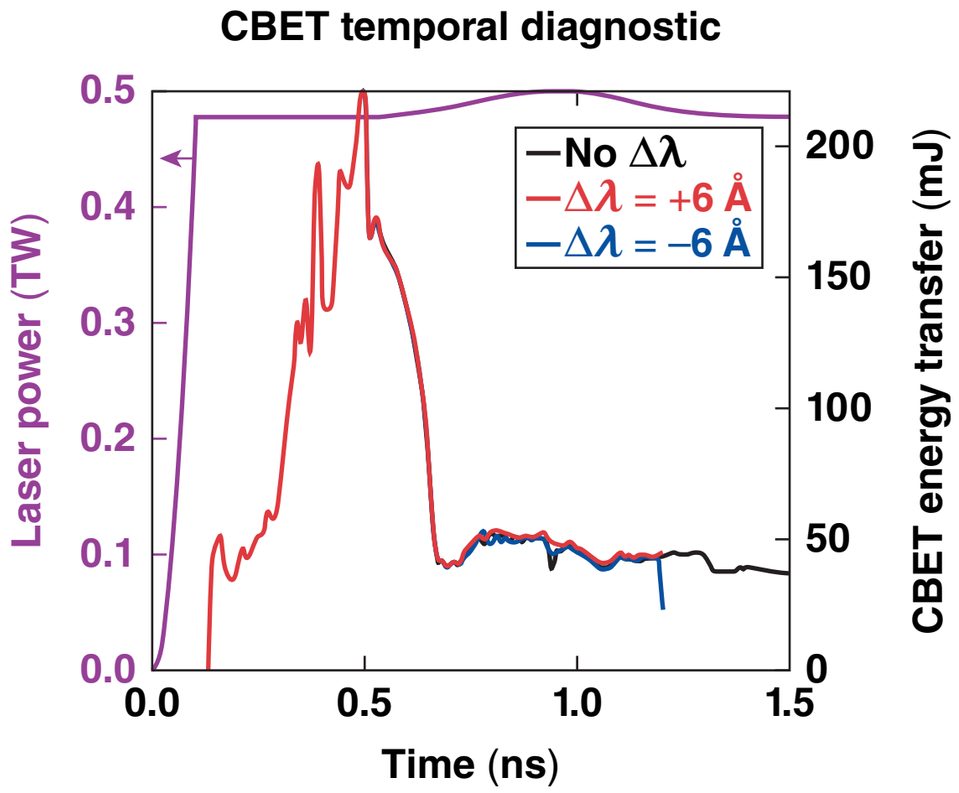
TC12420

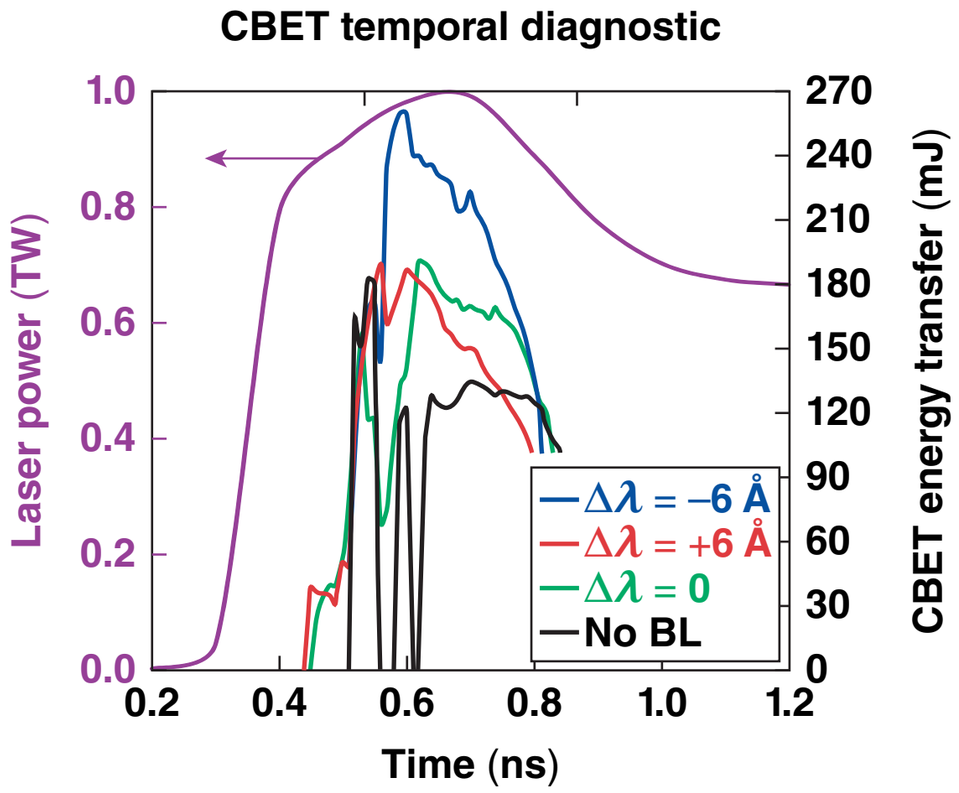
The predicted scattered light from the single probe beam failed to produce discernible signals



TC11503a

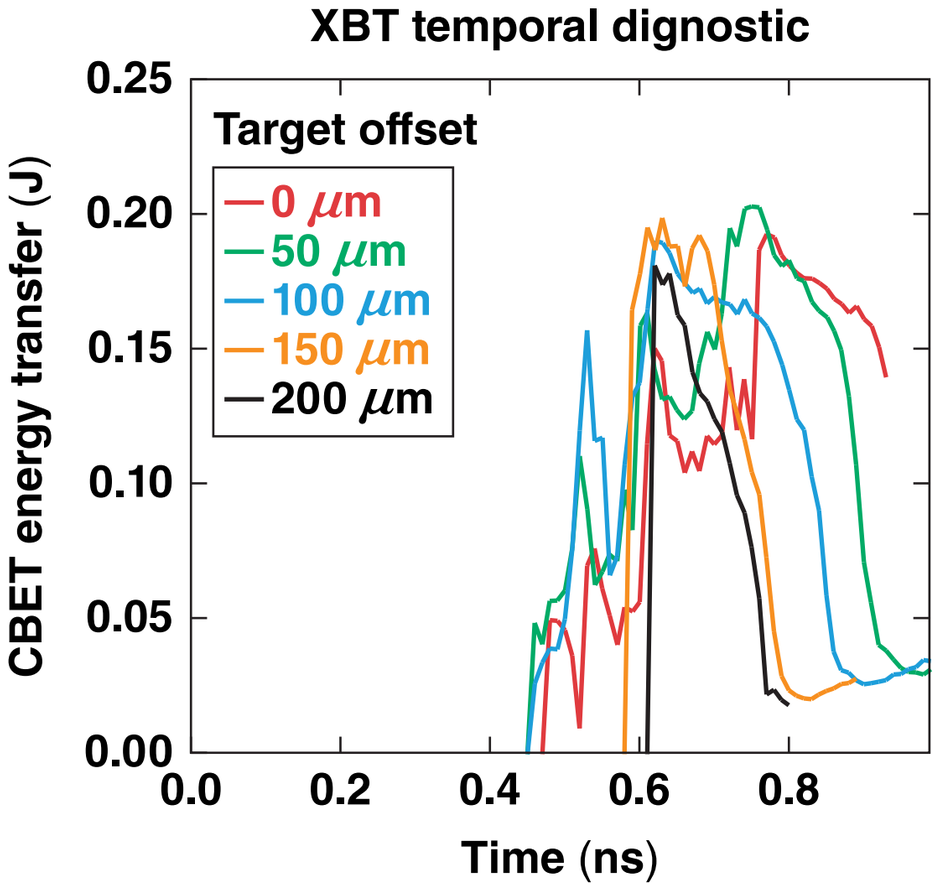
Enhancement of CBET requires using all backlighter beams and retiming them to come on earlier in the implosion

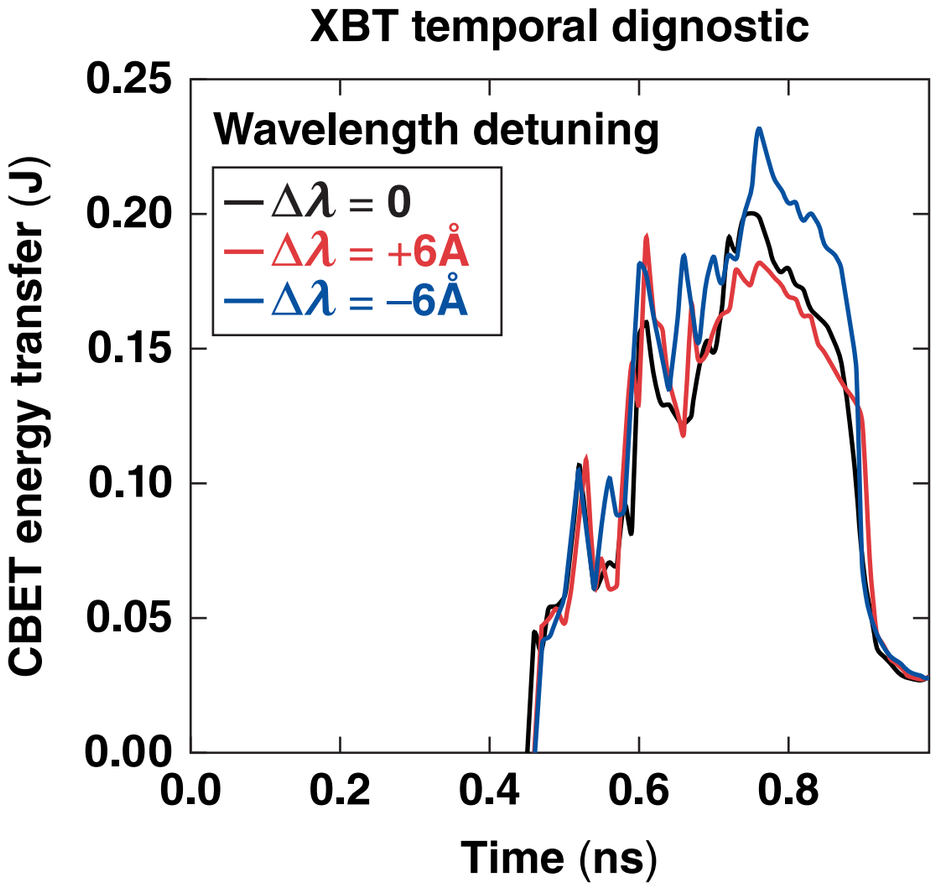




TC12421

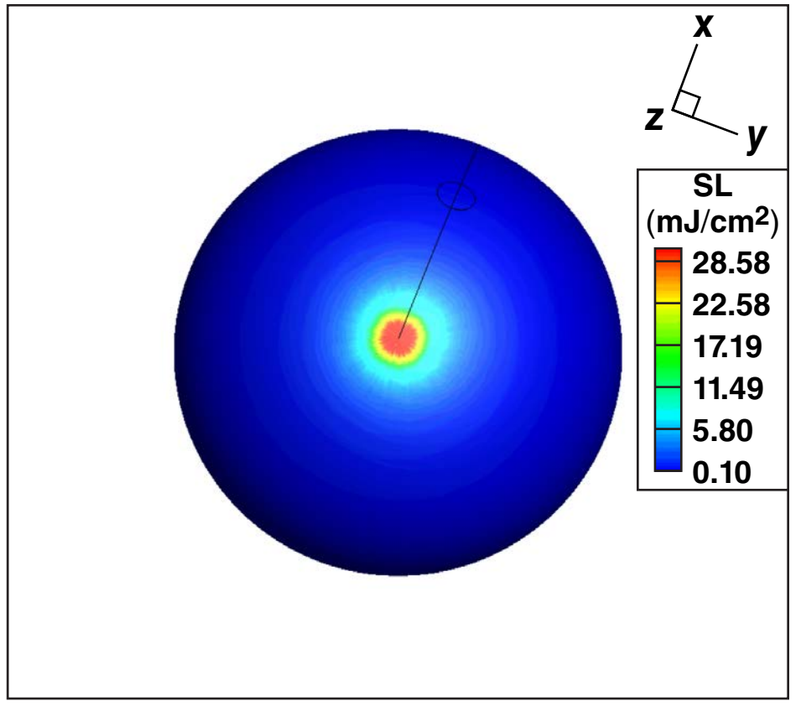
The Nike experiment will be able to evaluate spatial and spectral mitigation of CBET

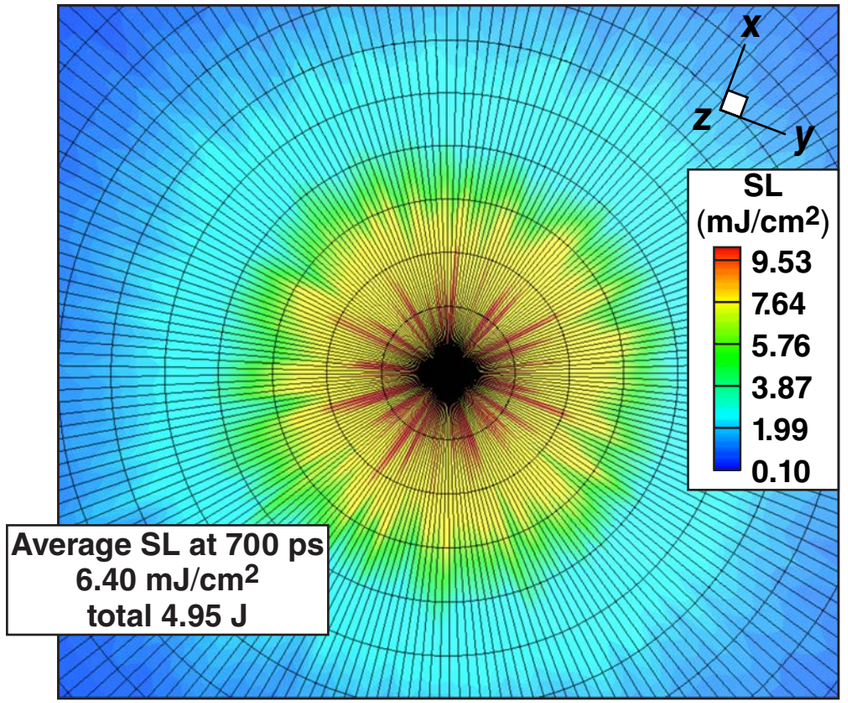




TC12615

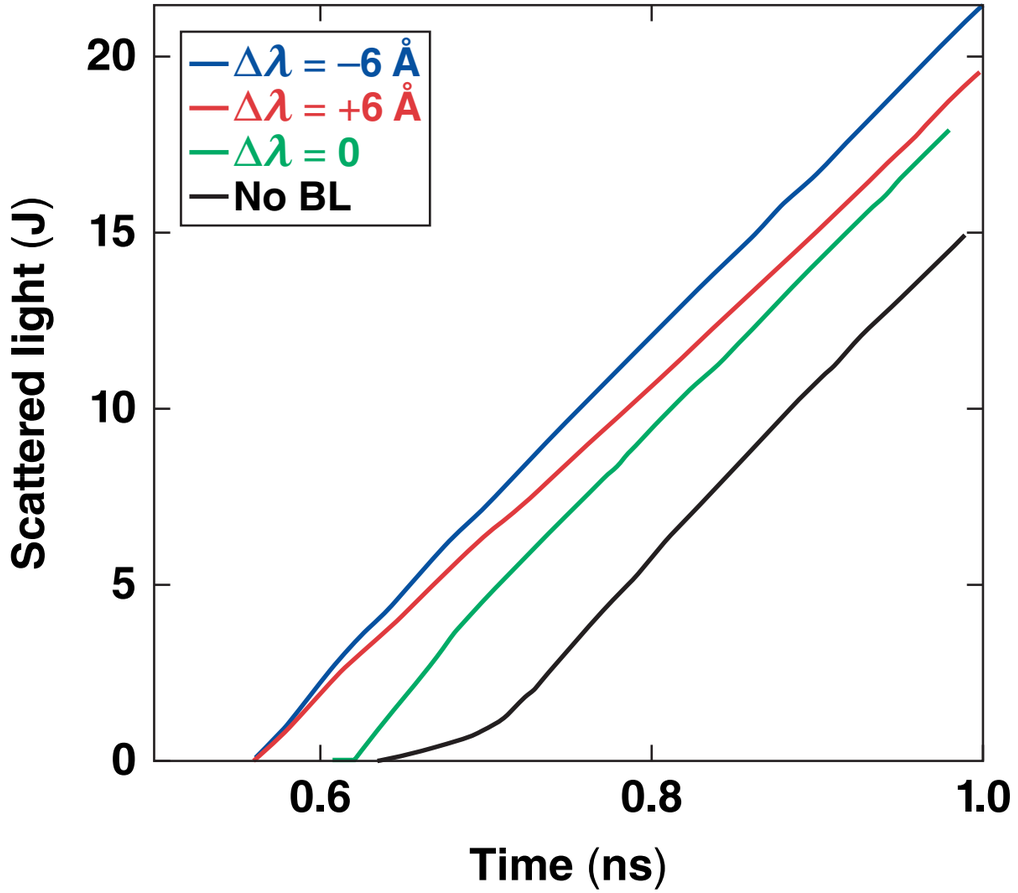
Analysis of the scattered light (SL) looks at the temporal behavior of the spatial average behind the target





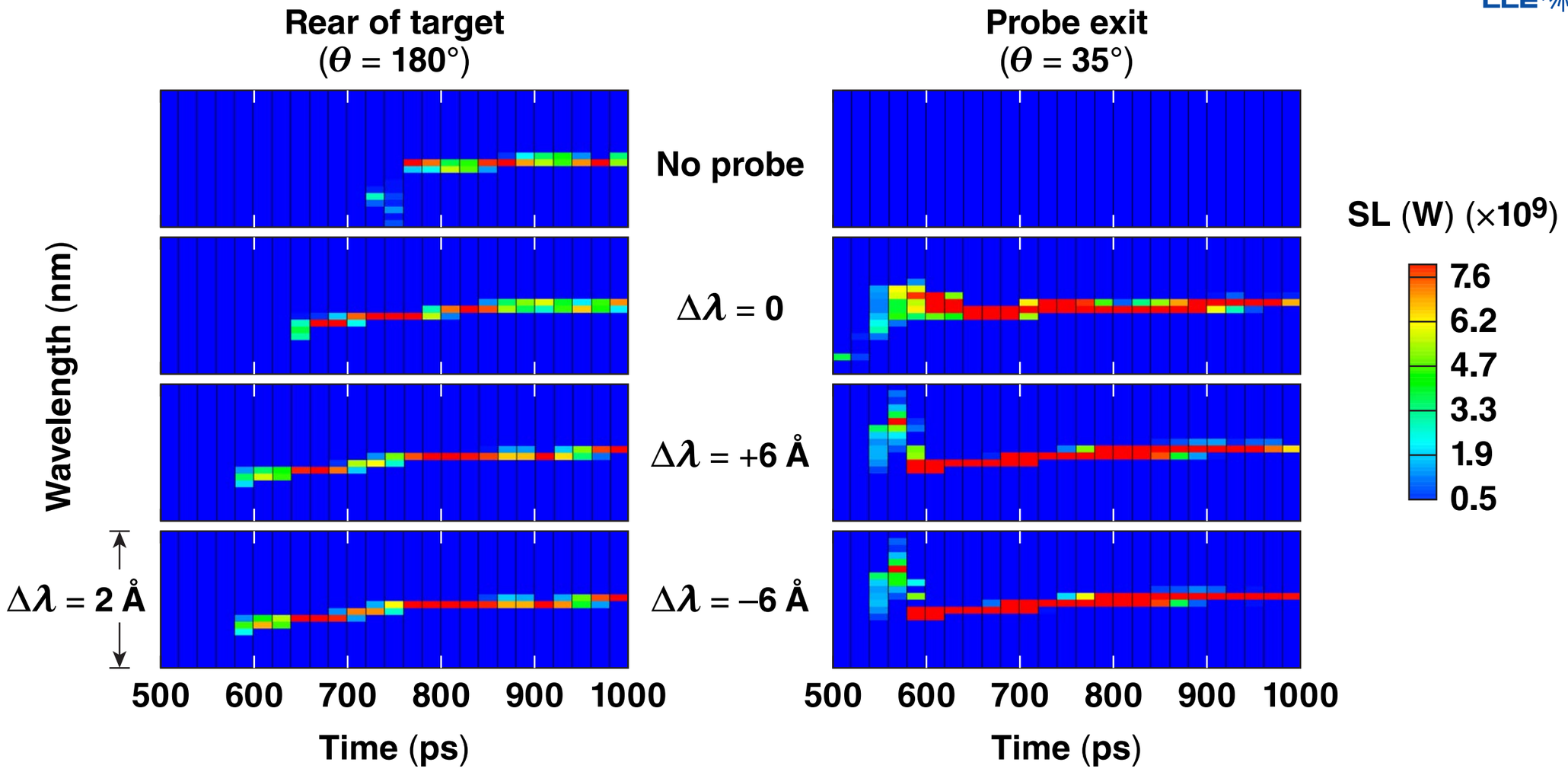
TC12422

The averaged scattered light tracks that predicted by the CBET gain term



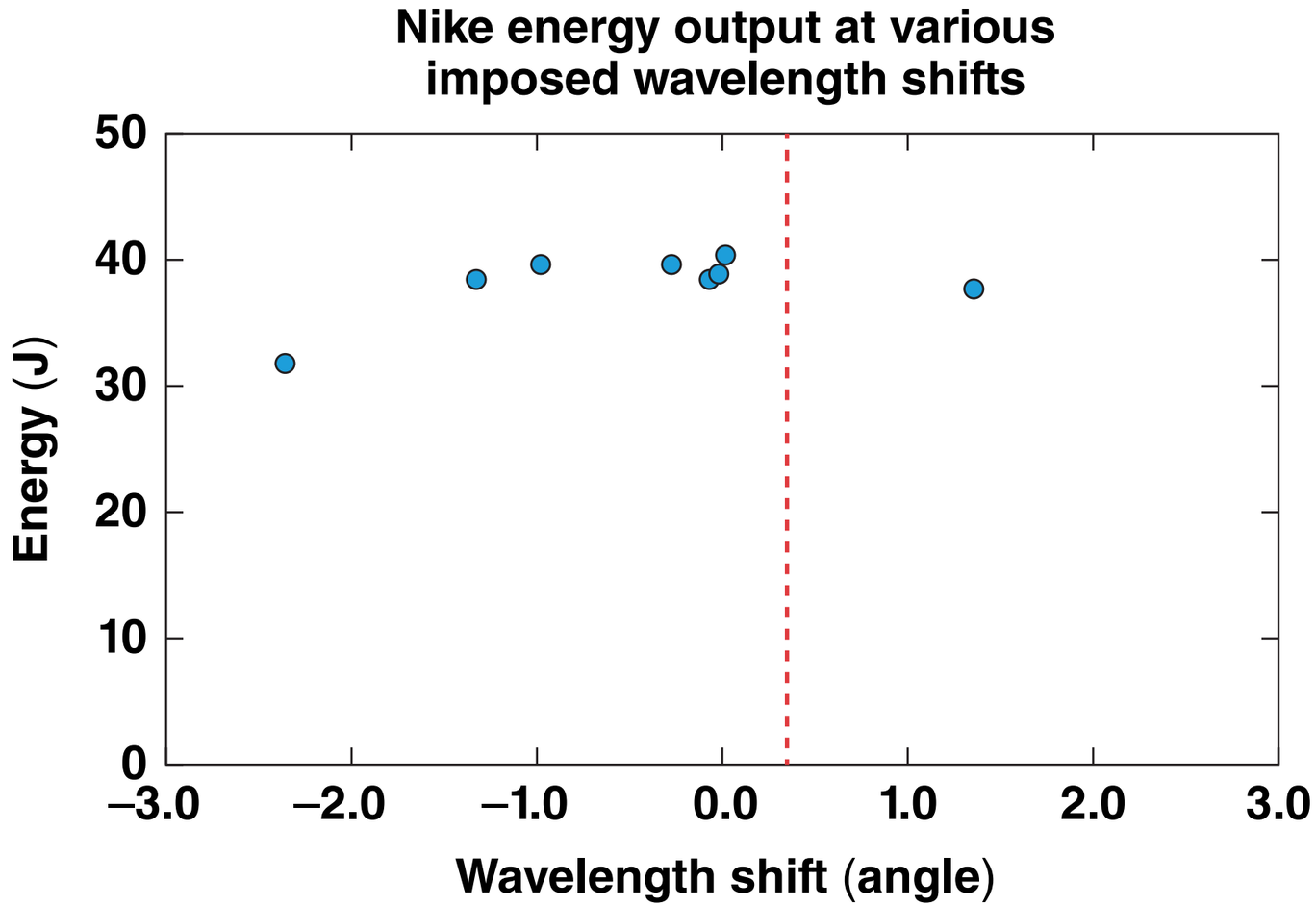
TC12423

Evaluation of the temporal histories of the scattered-light spectra yields unique signatures



TC12505

Initial experiments have commenced on Nike, examining energy dependence of spectral shifts



TC12616

Summary/Conclusions

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