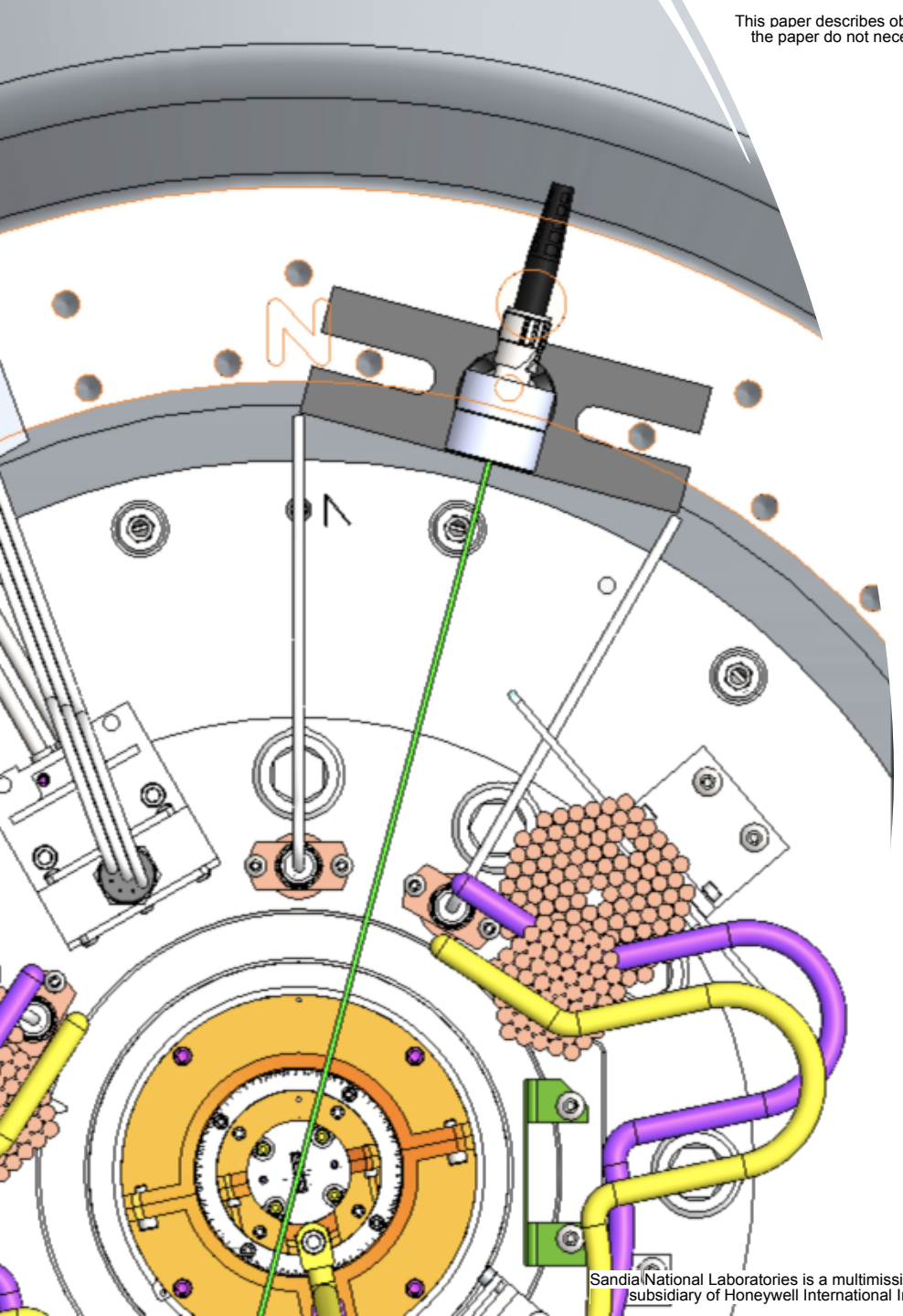
SAND2021-9631C



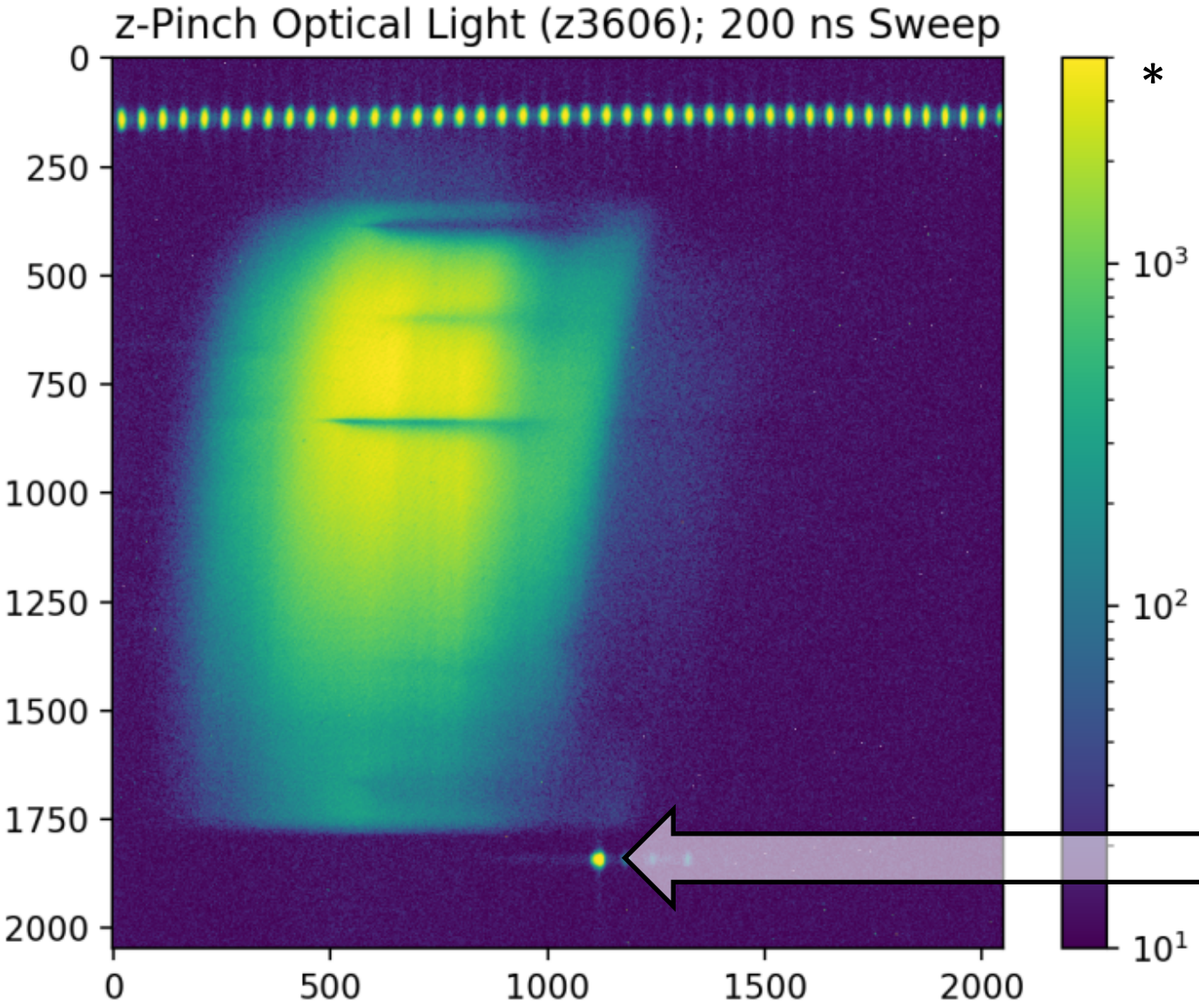
The Z pinch as a high speed shutter for optical spectroscopy

Bart H. Dunlap

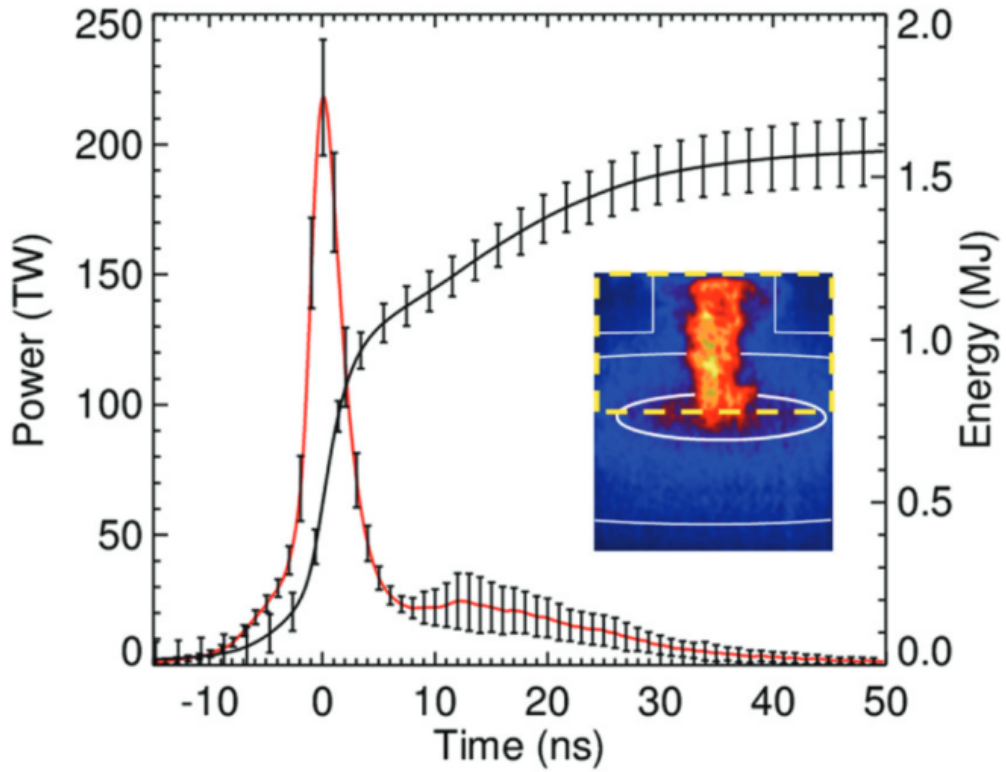
TEXAS
The University of Texas at Austin

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.

Pinch light timing



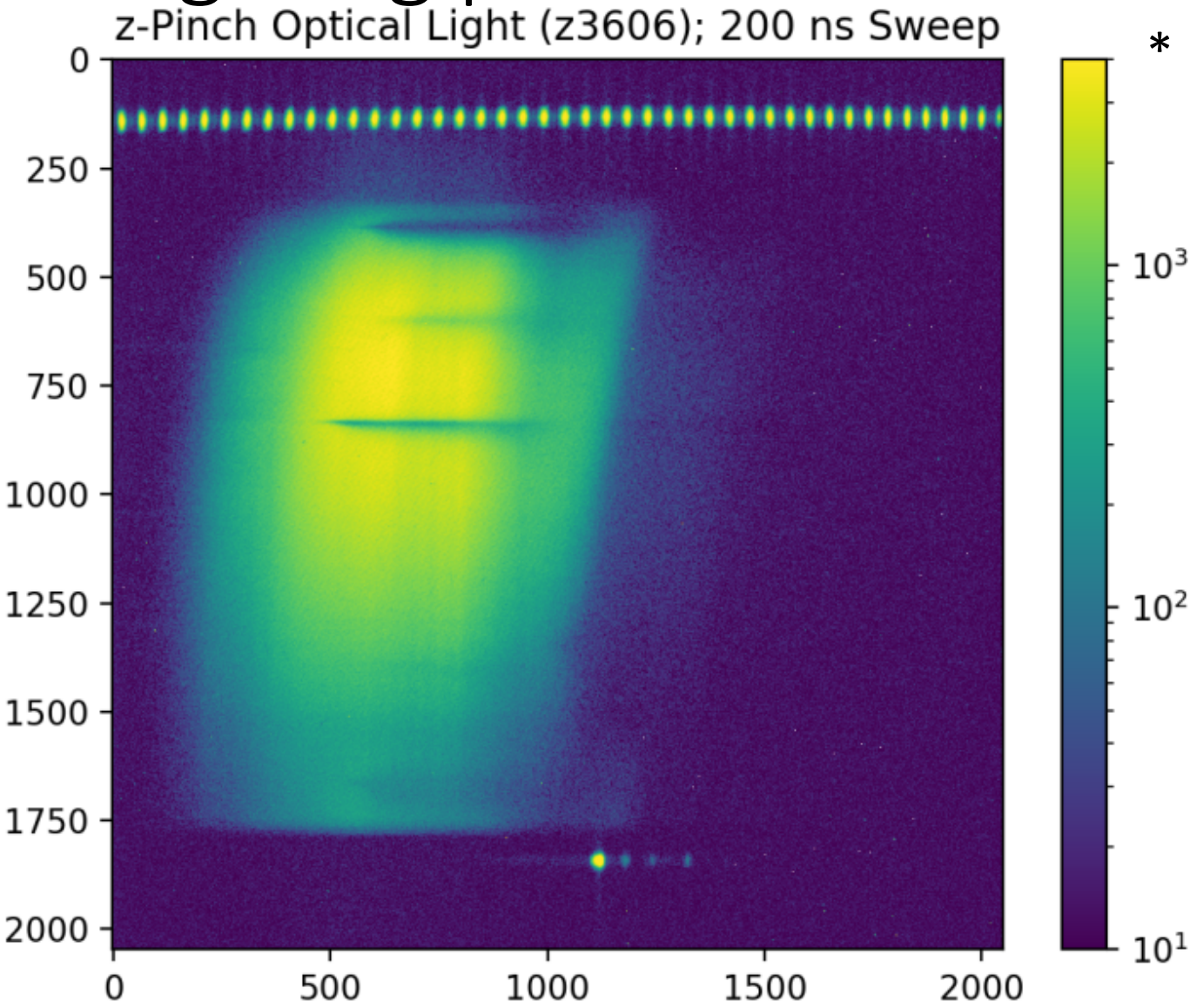
We lose light ~10 ns before peak x-ray brightness (3115-ish ns)

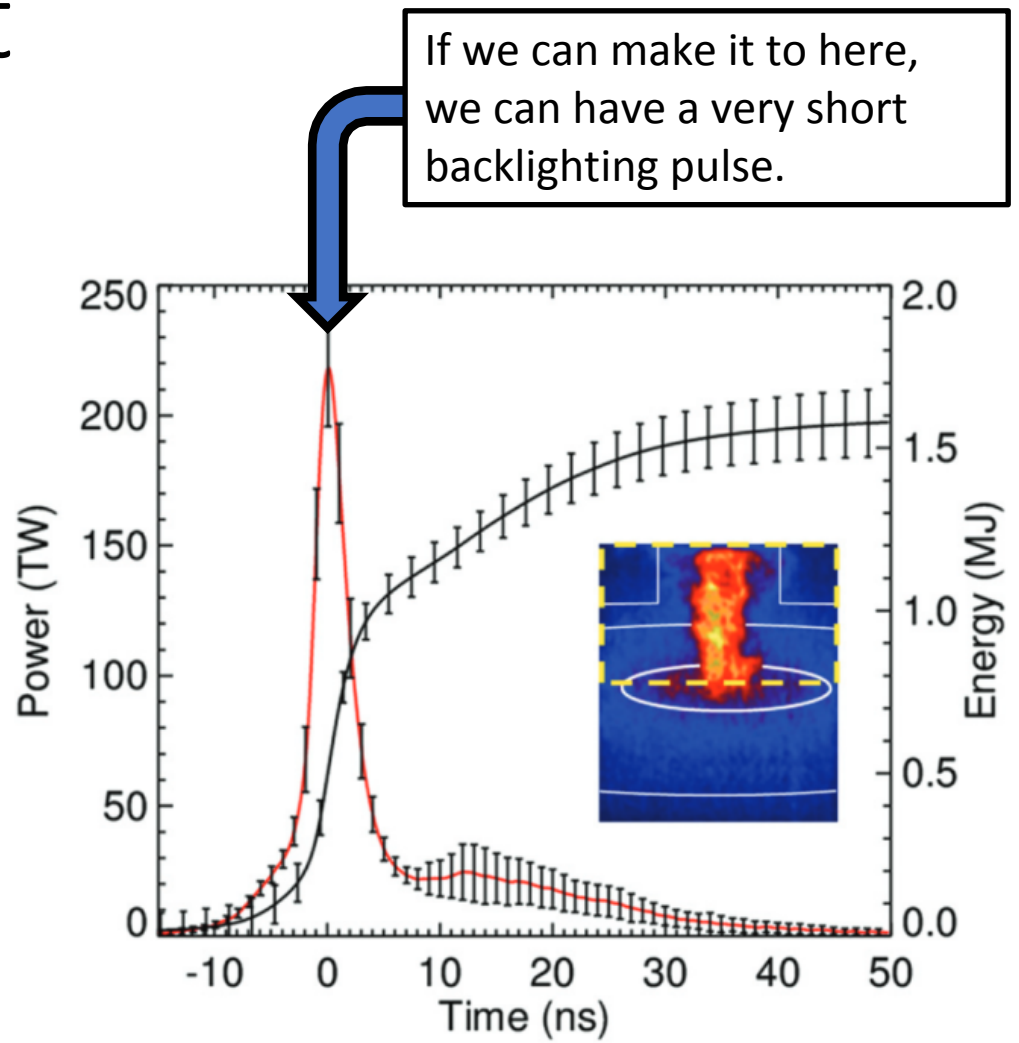


Timing fiducial @ t = 3100 ns, so full data span ~ 3000—3200 ns

*Note these data (z3606) taken with ND1 filter

The Z pinch can provide a short backlighting pulse



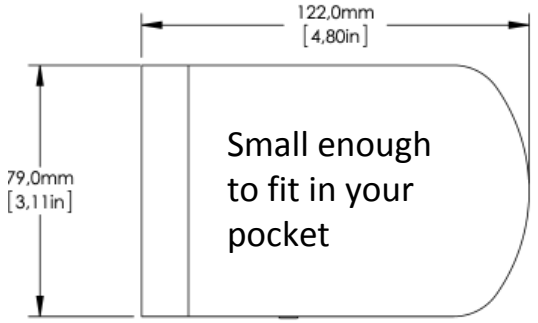


*Note these data (z3606) taken with ND1 filter

An off-the-shelf compact spectrometer could be used for higher S/N data

- Placed in boat or chamber to minimize fiber losses
- The detector can be triggered for a 10 µs exposure
- The short backlight pulse from the pinch would provide a short effective exposure time for absorption measurement
- Could allow measurements farther into UV

THORLABS



Specs

- Wavelength range: 350 – 700 nm
- Resolution: 5 Å FWHM
- Cost (spectrograph + detector): $2,000