X-ray Spectroscopy II Outbrief (1)
J. Koch

- Diffraction on Z (Tommy Ao, Marius Schollmeier)
  - Z can drive large samples with flyer plates, ramp compression or a combination to access different states along different EOS trajectories.
  - Source for diffraction experiments can be a laser-produced plasma or an x-pinch, but laser-produced plasma was discussed in detail. Challenges include large backgrounds.
  - Plans are to use a lens-focused version of ZPW (100 ps pulse length) to produce > 10 keV K-alpha sources in Z, with lens required for shrapnel reasons.
  - Next stage of development is a separate laser-only experiment driven by the Chaco laser and using the 100 ps ZPW, with the intensity as high as 8×10^{18} W/cm^2 if there are no aberrations in the beam (actual focus not known yet).
  - Optimal intensity probably quite a bit less than 8×10^{18} W/cm^2, so room for wavefront aberrations.
  - *Good opportunity to collaborate on backlight characterization, perhaps at other laser facilities capable of comparable intensities and pulse lengths. Questions include what the spectrum will look like with such a long pulse. Could shorten the learning curve and help optimization of source.*

X-ray Spectroscopy II Outbrief (2)
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- Te(t) from continuum on Z (Armon McPherson)
  - Described plans to measure Te(t) on Z using a spectrometer coupled to fast diodes (McDAX).
  - Dispersion element is a flat multilayer mirror. Some discussion on possible advantages of a curved focusing mirror.
  - Slope of continuum provides time-resolved space-integrated electron temperature from Boltzmann factor, and quantifying the absolute signal level may help constrain Te from the multiplier and constants in front of the Boltzmann factor.
  - Challenges include getting the electrical detector signal out of the Z environment with a low noise floor, interpreting data in presence of gradients.
  - *Opportunity to collaborate with LLNL? next talk*

X-ray Spectroscopy II Outbrief (3)
J. Koch

- Te from SPIDER and DISC (Shahab Khan)
  - Near-polar (SPIDER) and equatorial (DISC) measurements of continuum emission spectra using filter combinations and streak cameras.
  - Data analysis fits both absorption and emission by looking at multiple energy bands including those where absorption is expected to be significant, and doing a minimization.
  - Best fits tend to have no absorption, or absorption that changes rapidly in time, and the inferred Te also depends on how the temporal profiles are used (directly, or fit with Gaussian functions), so questionable.
  - Want to go to 20+ keV to avoid absorption, this is unlikely to work with SPIDER but may with a close DISC in a DIM if neutron backgrounds can be suppressed (DISC is not suitable for high-yield environments). One suggestion was to use one of the old SSCs with MCP electron detection and film.
  - *May be opportunity to collaborate with Z (previous talk) on continuum spectroscopy data analysis and interpretation, even though the instruments are quite different. Gradients are a common theme, absorption is a common theme, and a consistent treatment would be beneficial to all.*

X-ray Spectroscopy II Outbrief (4)
J. Koch

- Time and space resolved diagnosis of Omega implosion cores (Roberto Mancini)
  - Update on nice progress of diagnosis of Omega direct-drive implosions using time-integrated, time-resolved/space-integrated, and MMI-based data.
  - Shells doped with Ti on the inner surface, Ar fill, shows Ar and Ti line emission, some weak Ti absorption.
  - Analysis approach is to look at 3 circular regions in the images, the central region and two surrounding annular regions.
  - Observe that very early in time, Ti is getting into the core and emitting lines, and the spatial distribution always evolves to be centrally peaked. 85% of the initial Ti gets into the hot core with the inner surface layer of the shell doped with Ti.
  - *Ongoing collaboration with LLE, good opportunities to collaborate with LLNL at NIF on doped gas-fill indirect-drive implosions using similar (but new) instruments. Could impact both groups, NIF for new implosion physics experiments and UNR for new platforms and collaborations, students, etc.*
  - *Potential (?) transformational if these kinds of implosion diagnostic capabilities were brought to bear at the NIF.*