Diagnostics are fielded to work in distinct modes:

- **Radiative regime** are ubiquitous in astrophysical systems, material fluxes, i.e. heated matter.

A time-integrated visible light image of the target in the chamber during laser irradiation. Plasma plumes are proved to be a powerful means of measuring local electron temperature. This is not fielded in the present experiments, but may be a useful diagnostic if fielded in the future.

- **Contributions to the Xe Total Mass Attenuation Coefficient**

Diagnoses are fielded to work in distinct modes:

- **Passive detection**: Henway spectrometer and Ross pair filters
- **Transmission x-ray imaging**: Streaked x-ray radiography
- **Scattered x-ray spectroscopy**: Zinc Thomson spectrometer
- **Scattered x-ray imaging**: Pinhole imaging of scattered photons

- Incoherent Thomson scattering
  - Involves photon scattering from individual electrons.
  - Recall of free electrons leads to an energy downshift in the scattered spectrum.
  - The shift is given by the Compton formula: \( \lambda - \lambda' = \frac{h}{m_e c} (1 - \cos \theta) \)

- Scattered x-ray Radiography
  - Imaging a streak camera film with long-duration backlighting provides information about shock velocity and absolute position.

- **Scattered spectra** shows a clear inelastic peak, which is fit for the 400 micron-slit target. Low signal-to-noise limits the use of data from the 150 micron case.
- Least-squares analysis yields an optimal single-temperature plasma model that is consistent with the theoretical predictions.

- **Ross Pair Ranges and Flux**

- Passive detectors confirm x-ray lines from expected diagnostic sources and inform our understanding of the x-ray background.
- Ross pairs serve as a simple, robust diagnostic to obtain absolute photon yields.
- The Henway x-ray spectrometer consists of ten independently-filtered crystals covering 2-13 keV, monitoring x-ray sources and background in the range of the diagnostics.

- **Ross pair matrix** results from s61968_spca1_2, monitoring x-ray sources and transmission to form the Ross pair matrix.

- **A more realistic multi-temperature profile** based on simulations is ongoing, and will be verified with future high resolution experiments.

- **Incoherent Thomson scattering experiment** shows several spectral lines. These must be accounted for in analysis of down-scattered signal.

- **Stationary XRTS Data and Fits**

- **XRTS Results**

- **Streak camera records** shock front progression at sweep speeds of 2.5 ns and 5 ns, providing time resolution ~150 ps.
- A decelerating shock is clearly observed (2010 data).

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