About the Cover:

The cover photo highlights Laboratory for Laser Energetics (LLE) senior scientists Dr. Sean Regan (right) and Dr. Reuben Epstein presenting results on hot-spot mix mass in ignition-scale inertial confinement fusion (ICF) targets. Studies led by these scientists have used x-ray spectroscopy to infer values of hot-spot mix mass for implosions on the National Ignition Facility (NIF). In the background are experimental 1-D spectral imaging data that provide clear evidence for Ge-doped material mixing with the assembled hot spot. These results are important for ICF because there is a requirement for ignition (that the hot-spot mix mass be less than 75 ng) set from multidimensional radiation–hydrodynamic simulations. The amount of hot-spot mix mass, estimated from the Ge K-shell line brightness using a detailed atomic physics code, was found to be comparable to the 75-ng allowance for hot-spot mix.

The image to the left shows the x-ray spectrometer "Supersnout" developed by LLE to diagnose hot-spot mix in NIF implosions. The Supersnout contains the hot-spot x-ray spectrometer (HSXRS). HSXRS is a time-integrated spectrometer that combines a slit aperture with a pentaerythritol (PET) Bragg crystal to record 1-D spectral images of an implosion core with a magnification of ~11 and a spatial resolution of ~100 μm. Absolute photometric calibration of HSXRS (9.75 to 13.1 keV) relates Ge K-shell emission-line brightness to the hot-spot mix mass.

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