

Mandie Gehring - Colloquium Seminar - March 27, 2025

Los Alamos National Lab

Measuring Intense X-ray Spectra and an Overview of Space Research at Los Alamos National Laboratory

Los Alamos National Laboratory is famous for designing the atomic bombs used at the end of World War II in 1945. Post-war, many further advancements were made in the development of nuclear weapons, and treaty verification also became an important pillar in the lab's mission. In this talk, I'll discuss the evolution of LANL's work through the decades on space-based nuclear explosion detection.

In addition, x-ray radiography is employed at LANL for both dynamic and static imaging. Knowledge of the x-ray energy spectrum produced by both flash and continuous sources aids in reconstructing the density of the probed objects and in assessing machine performance. Compton spectrometers are one option for conducting spectral measurements. In this technique, x-rays impinge on a converter foil from which Compton electrons are ejected. The electrons enter the magnetic field region of the spectrometer, and the electron momentum is proportional to position on the focal plane. From the electron signal, the x-ray energy spectrum can be determined. Several continuous and flash x-ray sources have been measured, and a sample of these results will be presented.