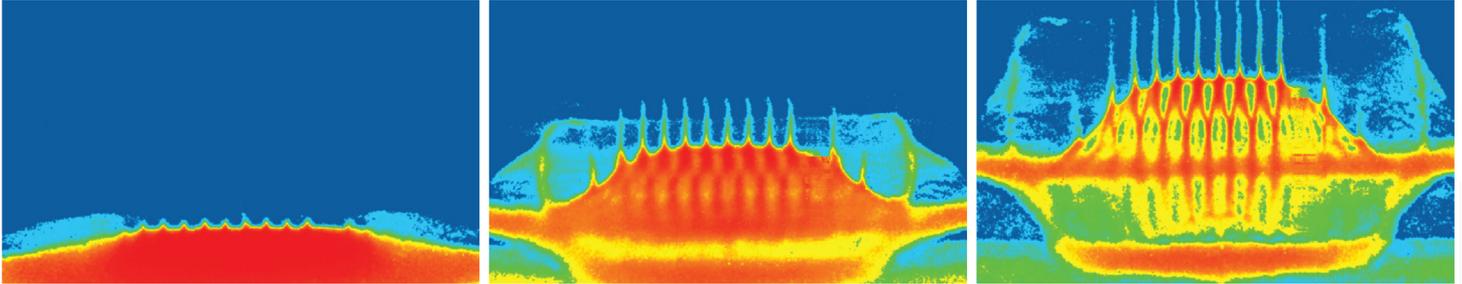


pRad

Proton Radiography at Los Alamos National Laboratory



Facility

Invented at Los Alamos National Laboratory, proton radiography (pRad) is the direct result of the synergy between the Laboratory's defense mission and basic science research scientists, and supports the Laboratory's national security science mission as well as provides for fundamental science discoveries.

The penetrating power of high-energy protons, like that of x-rays, makes them an excellent probe of a wide range of materials under extreme conditions. But the incredible efficacy and versatility of pRad stems from the ability to produce multiple proton pulses, provided by the Los Alamos Neutron Science Center (LANSCE) linear accelerator, manipulated by magnets, and viewed by multiple optical systems. The result is a 42-frame movie of a dynamic event spanning up to 625 microseconds with frames separated by as little as 200 nanoseconds. The LANSCE accelerator team meets the specific needs of each experiment by providing a wide range of timing sequences for the beam's proton pulses.

Research

Proton Radiography provides a unique understanding of the fundamental behavior of materials. The pRad facility has investigated more than 500 dynamic experiments in support of national and international weapons science, global security, and stockpile stewardship programs.

pRad is training the next generation of national security scientists. Every year, high school, undergraduate, and graduate students, as well as postdoctoral researchers, visiting scientists, and professors join the pRad team to conduct exciting experiments. pRad attracts new talent to research in shock physics, weapons physics, dynamic materials, and stockpile stewardship.

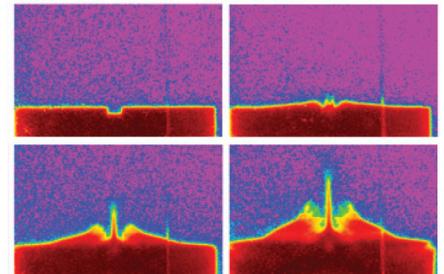
User Facility

Proton radiography at LANSCE has operated as a user facility since 2003 and was recently designated as one of the three Department of Energy user facilities at LANSCE. A committee review process helps ensure proposals for the highest ranked experiments are selected and executed. Presently the user community extends from the DOE-NNSA national laboratories of Los Alamos, Lawrence Livermore, Sandia, and Oak Ridge to international users from the Atomic Weapons Establishment (AWE) in the United Kingdom. The community has recently grown to include Department of Defense laboratories such as the Army Research Laboratory and Eglin Air Force Base, as well as universities, including Harvard University, Imperial College, and Technical University of Darmstadt.

MaRIE— Our Future

Proton Radiography and a similar technique with electron radiography are slated to play an integral role in MaRIE (Matter-Radiation Interactions in Extremes), the Laboratory's planned experimental facility

for the discovery of next-generation materials, which will utilize charged particle radiography to diagnose material properties in dynamic conditions.



For more information about pRad, its capabilities, and the next call for user proposals, please visit <http://lansce.lanl.gov/pRad/index.shtml>.