Overview

Los Alamos National Laboratory (LANL) has nearly 60 years of experience in developing and implementing Nondestructive Assay (NDA) technologies in support of nuclear safeguards, security, and nonproliferation.

The Safeguards and Security Technology Training Program (SSTTP) at LANL provides NDA training using nuclear material, specialized equipment, and subject-matter expert instructors. The SSTTP's modular training materials can be readily customized to meet customer's needs.

Facility Description & Capabilities

- The training and research facility at LANL's Technical Area 66 (TA-66) provides easy and safe access to sealed items including uranium and plutonium. These materials are used for teaching nuclear material measurements techniques and for research and development of new safeguards and security technologies.
- The 8,600 sq. ft. facility provides ample room for lectures and hands-on training, with two classrooms, a series of interconnected hands-on laboratory spaces, and meeting rooms for up to 24 participants. In addition to training, the facility is used for testing and evaluation of new safeguards technologies with certified nuclear material reference materials.
- Other areas at LANL, representative of actual nuclear fuel cycle facilities, are available for the development and training of nuclear security and safeguards approaches in a realistic environment. These locations in combination with the TA-66 facility yield a safe, secure, flexible, and realistic teaching environment to meet the needs of our domestics and international partners.
- This facility offers testing and evaluation of new safeguards technologies with significant quantities of NM. Certified reference materials are available for measurement campaigns, detector comparisons, and system characterization.

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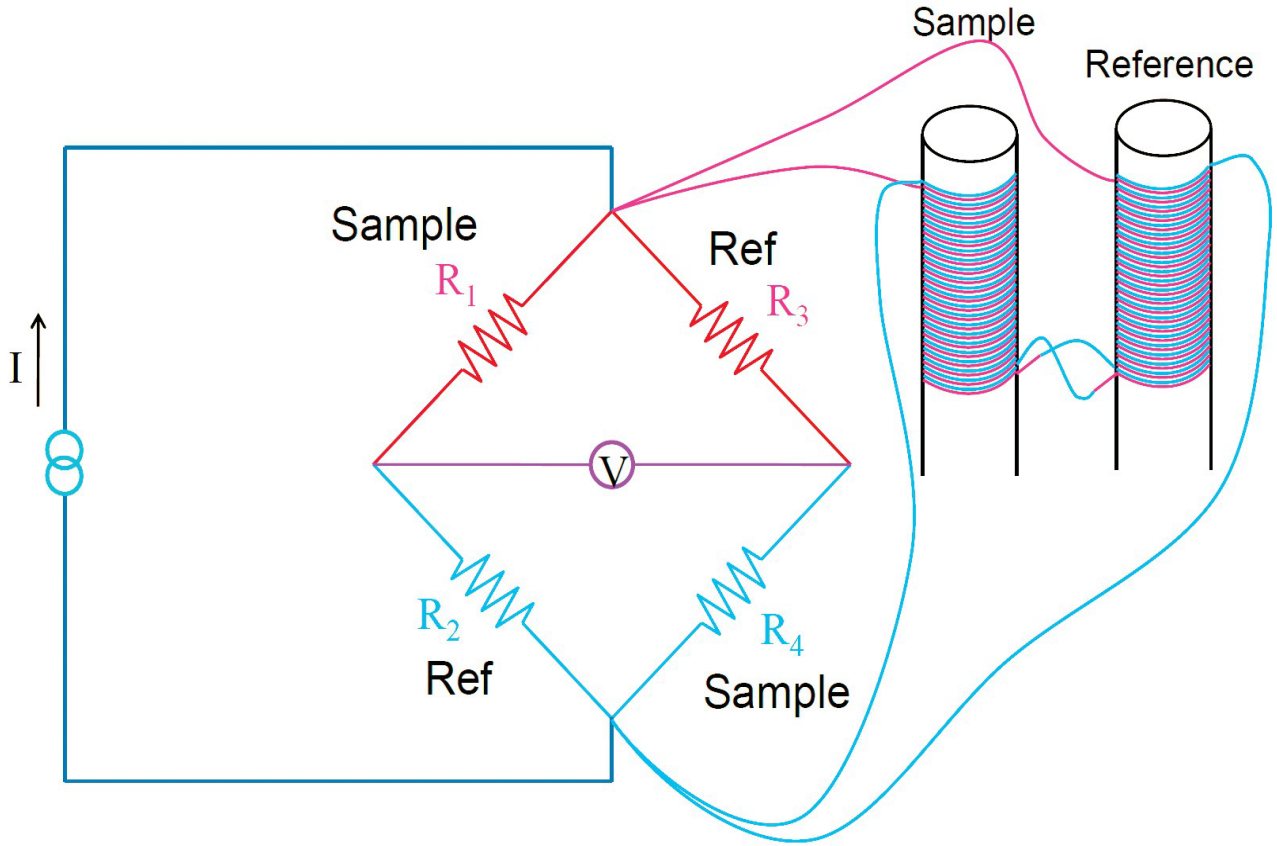
Los Alamos NATIONAL LABORATORY

Plutonium Calorimetry Assay



Course Description

- Principles and applications of heat- flow calorimeters for determining the thermal power emitted from plutonium.
- High-resolution gamma-ray measurements for calculating isotopic composition and specific power.
- Conversion of measured thermal power into an assay result.
- Techniques to increase calorimeter throughput.
- Development and application of heat standards and measurement control.
- The course is composed of lectures that describe underlying theories followed by hands-on laboratory measurements on calorimetric assay techniques for plutonium assay.



NDA Concepts Covered

- Fundamental principles and applications of heat-flow calorimeters
- Operation of calorimeters
- Isotopic composition measurements for determination of specific power
- Calorimetry measurement control program
- Analysis of assay results

NDA Equipment Covered: Twin bridge Calorimeter, Wheatstone bridge sensor.

Course Objective

To provide a comprehensive background in the theory and application of the calorimetric assay of plutonium bearing items.

$$\text{Mass}\,(g) = \frac{\text{Thermal Power}\,(\text{W})}{P_{\text{eff}}\,(\text{W/g})}$$

Additional Information

Course Length: 3 days

Target Audience: Individuals that perform, manage, or supervise measurements involving calorimetry. Auditors, regulators, and policy makers may also benefit from attending this course.