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Accelerator Based Tools of Stockpile Stewardship

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The Manhattan Project had to solve difficult challenges in physics and materials science. During the cold war a large nuclear stockpile was developed. In both cases, the approach was largely empirical. Today that stockpile must be certified without nuclear testing, a task that becomes more difficult as the stockpile ages. I will discuss the role of modern accelerator based experiments, such as x-ray radiography, proton radiography, neutron and nuclear physics experiments, in stockpile stewardship. These new tools provide data of exceptional sensitivity and are answering questions about the stockpile, improving our scientific understanding, and providing validation for the computer simulations that are relied upon to certify today's stockpile.