

REVIEW OF MEASUREMENT TECHNIQUES FOR THE  
NEUTRON RADIATIVE CAPTURE PROCESS\*

by

W. P. Poenitz  
Applied Physics Division  
Argonne National Laboratory  
9700 South Cass Avenue  
Argonne, Illinois 60439, USA

ABSTRACT

The experimental techniques applied in measurements of the neutron capture process are reviewed. The emphasis is on measurement techniques used in neutron capture cross section measurements.

The activation technique applied mainly in earlier work has still its use in some cases, specifically for measurements of technologically important cross sections ( $^{238}\text{U}$  and  $^{232}\text{Th}$ ) with high accuracy. Three major prompt neutron radioactive capture detection techniques have evolved: the total gamma radiation energy detection technique (mainly with large liquid scintillation detectors), the gamma-energy proportional detectors (with proportional counters or Moxon-Rae detectors), and the pulse-height weighting technique. These measurement techniques are generally applicable, however, shortcomings limit the achievable accuracy to a  $\approx 5\text{-}15\%$  uncertainty level.

---

\*This work supported by the U.S. Department of Energy.