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Effect of afterglow pile-up on the response function of CsI(Na) detectors GABRIEL MOREAU, Michigan State Univ, STEVEN HAYWOOD, None, OSCAR NAVILIAT-CUNCIC, Michigan State Univ — Precision measurements in nuclear spectroscopy require the characterization of detectors used for experiments. Instrumental effects from detectors and associated electronics can adversely impact measurements. A known effect in the detection of nuclear radiation is the superposition of signals from independent events which are detected within a given time window, called pile-up. Methods are available to correct measured spectra for pile-up effects when the two signals occur within a time window comparable to the duration of the signal. For some detectors based on inorganic scintillators, signals have a long-lasting and weak component called afterglow. This component lasts longer than the prompt part of the signal, so the probability for a second signal to pile up on this component is large and can affect measurements. There are no known standard methods available to correct for this effect. This presentation summarizes a study of pile-up effects with CsI(Na) scintillation detectors. It involves measurements of the energy of gamma radiation from radioactive sources as a function of counting rates. The effects on the detector's response due to afterglow pile-up is compared to a change in the detector's gain.

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