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CASSPERR - an Improved Resonant Nuclear Reaction Analysis Detector[1] ARTHUR PALLONE, Murray State University, J. DEREK DEMAREE, U.S. Army Research Laboratory — Although it is a powerful tool, nuclear reaction analysis is not yet widely practiced at ion beam facilities because data is acquired sequentially, i.e. collecting data at incremental energies (depths). Data collection can be improved by increasing the efficiency of detection or reducing the noise. The most commonly used method to reduce the noise is to passively shield the detector from the background (typically cosmic rays or naturally-occurring radioactive elements). The volume of shielding required to decrease the noise from these interfering backgrounds occupies too much space for implementation at most ion beam facilities. Active shielding via coincidence rejection requires that a cosmic ray interact with both the detector and the coincidence shield. The low probability for both interactions to occur limits the effectiveness of this coincidence rejection technique. Sum coincidence spectrometry is a common technique used in nuclear decay studies and in neutron activation analysis. Singru suggested that this technique be applied to (p, γ γ) reactions. The development, testing, and some potential materials research applications of the CAScade SPEctrometer for Resonant Reactions (CASSPERR) based on this technique are presented.

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