

ABSTRACT

In 1980 the multilevel multichannel R-matrix code SAMMY was released for use in analysis of neutron-induced cross section data at the Oak Ridge Electron Linear Accelerator. Since that time, SAMMY has evolved to the point where it is now in use around the world for analysis of many different types of data. With the incorporation of charged-particle capabilities, SAMMY is no longer limited to incident neutrons, but can also be used for incident protons, alpha particles, or other charged particles; likewise, Coulomb exit channels can be included. Corrections for a wide variety of experimental conditions are available in the code: Doppler and resolution broadening, multiple-scattering corrections for capture or reaction yields, normalizations and backgrounds, to name but a few. The fitting procedure is Bayes' method, and data and parameter covariance matrices are properly treated within the code. Pre- and post-processing capabilities are also available, including (but not limited to) connections with the Evaluated Nuclear Data Files. Though originally designed for use in the resolved resonance region, SAMMY also includes a treatment for data analysis in the unresolved resonance region.

This document serves as a users' guide for SAMMY and many of its auxiliary codes.

Citations:

Citations for use of the SAMMY code should refer to this manual as

N. M. Larson, *Updated Users' Guide for SAMMY: Multilevel R-Matrix Fits to Neutron Data Using Bayes' Equations*, ORNL/TM-9179/R8, Oak Ridge National Laboratory, Oak Ridge, TN, USA (2008). Also available as ENDF-364/R2.

In addition, the paper presented at the ND2004 Nuclear Data Conference may be cited as

N. M. Larson, "Upgrades to the R-Matrix Code SAMMY," ND2004 (International Conference on Nuclear Data for Science and Technology, Sept. 26–Oct. 1, 2004).