Public Abstract

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Department:Nuclear Engineering

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Title:DEVELOPMENT OF MURR FLUX TRAP MODEL FOR SIMULATION AND PREDICTION OF SAMPLE LOADING REACTIVITY WORTH AND ISOTOPE PRODUCTION

   University of Missouri Research Reactor (MURR) is the highest power university research reactor in America. It is the only facility to provide reactor-based radioisotopes besides DOE reactors and has been successfully supplying various radioisotopes for more than 20 years. MURR uses the high neutron flux from flux trap, which locates at the center island of reactor core, for sample irradiating. For both safety and economical reasons, it is very important for the MURR to be able to predict the reactivity worth of sample loading in the flux trap, as well as the production of specific isotopes.

   This research develops MURR Flux Trap Model (MFTM) which simulates the reactor core and flux trap area using Monte Carol method. The model solves the neutron transport equation and burnup and decay equation to predict the loading worth and the isotope production. The model has been benchmarked with the experimental data provided by the MURR. The discrepancy between the model and the corresponding measurement data has been analyzed in the research. The original model has been refined to yield better predictions approaching the experimental values. Visual Basic language is used to develop an automated package for convenient use of the model. The program has been successfully run on the MURR MCNP Server.