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**Summary**

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## **KENO Postprocessor Analysis and Plotting Capabilities**

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# KENO Postprocessor Analysis and Plotting Capabilities

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## INTRODUCTION

The Standardized Computer Analyses for Licensing Evaluations (SCALE) [1] computer software system developed at Oak Ridge National Laboratory (ORNL) is widely used and accepted around the world for criticality safety analyses. SCALE includes the well-known KENO V.a and KENO-VI three-dimensional (3-D) Monte Carlo criticality computer codes. Version 5 of SCALE, which contains several new modules and sequences for criticality safety analysis, is scheduled for release in 2003. The purpose of this paper is to present the new postprocessor capabilities for analyzing and plotting KENO V.a and KENO-VI calculational results.

## KMART

KMART (Keno Module for Activity-Reaction Rate Tabulation) is a postprocessor for KENO V.a. KMART reads a KENO V.a restart file and the corresponding working cross-section library to generate nuclide activity tables. KMART6 is a similar postprocessor for KENO-VI.

KMART calculates activities, fluxes, and fission production globally or by group, integrated over the system volume or by unit volume. Activities for particular reaction types are requested by entering the desired nuclide identifier and the MT number corresponding to the reaction rate. The multigroup data can also be collapsed to fewer groups, thus reducing the volume of data.

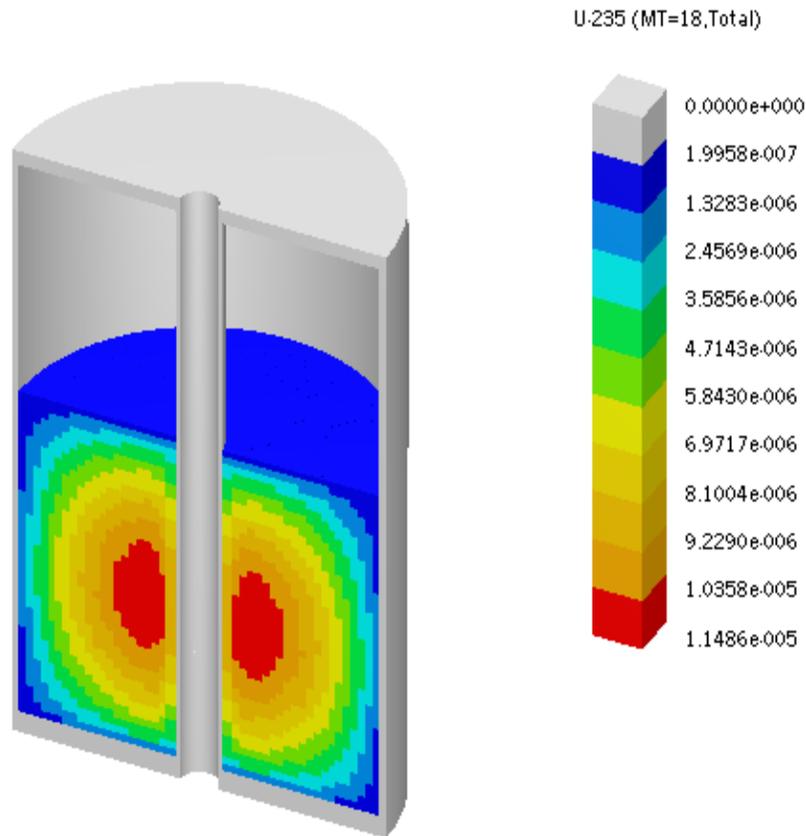
KMART also writes the results to an ASCII output file to allow the results to be plotted with two SCALE visualization and plotting programs, KENO3D [2] and Javapeno.

## KENO3D

KENO3D is a powerful state-of-the-art 3-D visualization tool that displays KENO V.a and KENO-VI geometry models. It can read the KMART data file and overlay the results on the KENO geometry model. Figure 1 displays a KENO3D cutaway view of the SHEBA-II critical experiment with an overlay of the KENO V.a  $^{235}\text{U}$  fission densities as calculated by KMART.

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**Figure 1. KMART plot of the U-235 fission activity.**

## Javapeno

Javapeno (**J**ava **P**lots **E**specially **N**ice **O**utput) is a Java program originally designed to plot data from the SCALE 5 sensitivity sequences SEN1 [Ref. 3] and SEN3 [Ref. 4] as well as the material optimization sequence SMORES [5]. SEN1 and SEN3 perform cross-section sensitivity and uncertainty analyses for a given problem while SMORES performs a material optimization analysis for a system with a given set of materials. Javapeno can also plot group-wise data generated with KMART and KMART6.

Javapeno plots sensitivity, reaction-rate or flux data as a function of energy group normalized by the unit lethargy for each group, thus eliminating the relative group width from the analysis. Figure 2 contains a Javapeno plot of the sensitivity of the computed  $k_{eff}$  to the fission cross section of  $^{235}\text{U}$  and  $^{238}\text{U}$  fission activities as a function of energy in the same region of Sheba-II. Javapeno plots can be printed directly from the software package, or can be exported to a variety of graphics formats to use in reports or presentations. Because of the cross-platform capabilities of Java, Javapeno can execute on any computer for which the Java Runtime Environment is available.

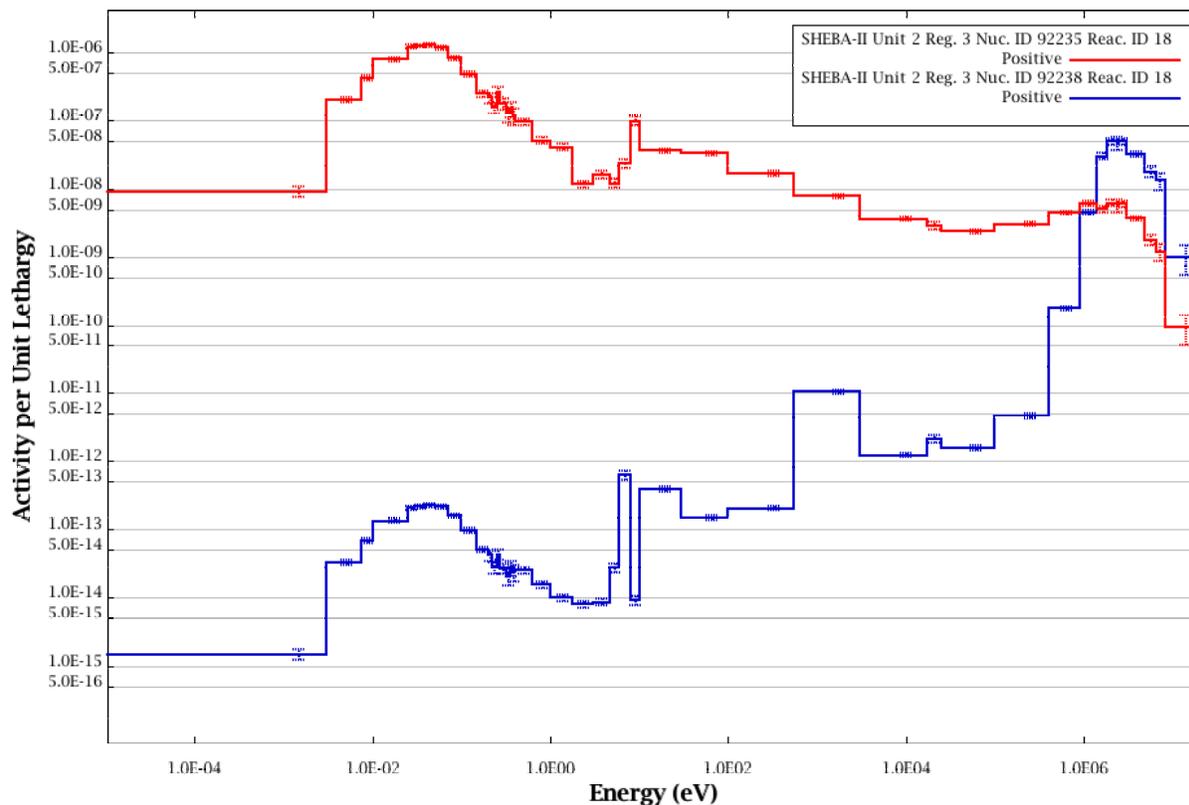


Figure 2. Javapeno plot of U-235 and U-238 fission activities.

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