



5 – 9 March 2018

OECD/NEA Data Bank, Boulogne-Billancourt (Paris), France

SCALE/Polaris Lattice Physics, Depletion, and Uncertainty Analysis (2000 EUR)

Polaris is a new 2-dimensional (2-D) lattice physics capability in the SCALE code system for LWR analysis. Polaris provides an easy-to-use input for defining lattice geometries, material compositions, and reactor state conditions. Other features of Polaris include a new resonance self-shielding implementation based on the novel embedded self-shielding method (ESSM), a new 2-D method of characteristics (MOC) neutron transport solver, and the integration of the ORIGEN depletion and decay solver for depleting material compositions. For the first three days of this five days course, attendees will learn how to model typical PWR and BWR assemblies (VVER currently not supported): develop geometry models, perform depletion simulations, setup branch and history calculations to generate few-group cross sections for full-core nodal diffusion analysis (.t16 file), and perform reflector calculations.

Sampler is a new uncertainty analysis capability in SCALE that propagates uncertainties in nuclear data and input parameters to estimate the resulting uncertainty in calculated responses for most codes and sequences within the SCALE code system. Using stochastic sampling to generate perturbed calculation models, Sampler can automate multiple runs (i.e. samples) of a calculation model and then post-process the outputs to quantify the uncertainty in user-selected quantities of interest. In the final two days of this course, attendees will learn how to use Sampler with Polaris to quantify the uncertainty in lattice physics quantities of interest (reactivity, nodal cross sections, isotopic inventories) from a broad range of input uncertainty sources (nuclear data, geometry, composition, and reactor condition).

Additional topics for this course include overviews of several modeling scenarios for Polaris (control blade, IFBA, spacer grid, thermal expansion, and detector modeling); how to generate depleted material composition data files (.f71 file) for subsequent use in ORIGEN calculations; and how to utilize Sampler/Polaris outputs for uncertainty analysis for full-core nodal calculations.

No prior knowledge of SCALE is required.