COMET™/COMET PLUS™

Advanced Reactor Kinetics Models

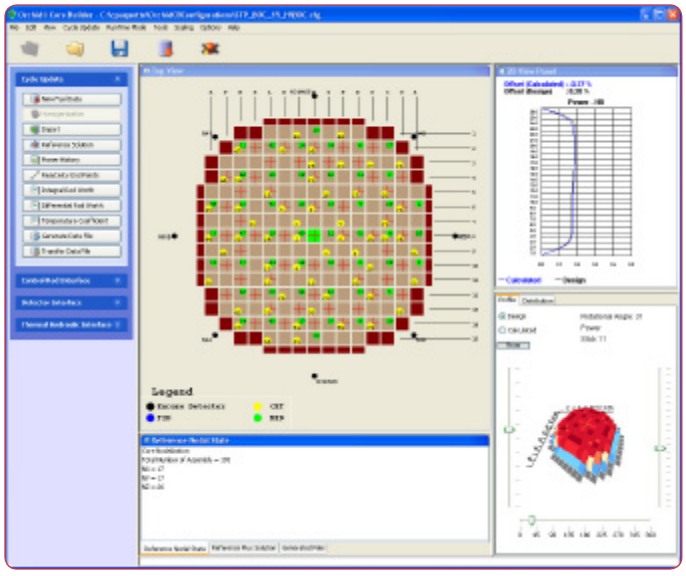
L3 MAPPS' Comet™ and Comet Plus™ are advanced models for the simulation of reactor neutron kinetics based on a rigorous application of first principle physics and advanced numerical techniques. The models have been installed worldwide on numerous simulators currently certified for training.

L3 MAPPS' Comet™ and Comet Plus™ are advanced models for the simulation of reactor neutron kinetics based on a rigorous application of first principle physics and advanced numerical techniques. The models have been installed worldwide on numerous simulators currently certified for training.

Comet™, primarily applied to the simulation of heavy water reactors (PHWRs), solves diffusion equations by using the Mesh-Centered Finite Difference (MCFD) method modified by the application of the Generalized Equivalence Theory in the calculation of homogenized parameters.

Comet Plus™, used for simulating light water reactors (LWRs) and gas-cooled reactors (AGRs), solves the diffusion equations by using the Nodal Expansion Method (NEM). The NEM represents the flux by a fourth-order polynomial and yields unprecedented accuracy.

Both Comet™ and Comet Plus™ are true three-dimensional models. A minimum of one radial node per fuel assembly/channel is used. The neutron diffusion equations are solved at each node at each time step without relying on approximate methods based on a space-time factorization.



Each node takes into account:

- Xenon, Iodine, Samarium and Promethium concentrations
- Six delayed neutron groups for LWRs and 15 for PHWRs
- Decay heat calculations are carried out using a set of 23 decay heat precursors
- Neutron source strength
- Fuel burn-up, Plutonium build up and depletion of burnable poisons, if applicable

Control rods are treated as individual entities and shadowing effects are fully simulated. Variable enrichment fuel and other modern fuel designs can be accounted for.

The calculation of the flux at the in-core detector locations is achieved by reconstructing the flux, as a function of the local nuclear properties, in the nodes where detectors are present. Very localized effects, such as the effect of movements of neighboring rods on detector responses, are fully simulated.

Cycle-specific parameters are calculated by Orchid® Core Builder (Orchid® CB). This powerful tool features a user-friendly graphical interface in order to maximize ease of use. For example, adding a detector or changing the real-time model nodalization can easily be done graphically. Orchid® CB also provides features allowing the user to rapidly validate the input lattice code neutronic data as well as the output real-time model parameters. Orchid CB® accepts plant data from several typical lattice and fuel design codes such as CASMO, SIMULATE-3, ANC, SCIENCE and others. Finally, Orchid® CB facilitates implementation of Recommendation 6 of INPO's SOER 96-02 to provide cycle-specific simulator training.

Complementing L3 MAPPS' Orchid® Total Development and Simulation Environment, Comet™ and Comet Plus™ are high-performance models that demonstrate L3 MAPPS' long-term commitment to excellence and innovation.

MAPPS

L3 MAPPS
8565 Côte-de-Liesse
Montréal, Québec
Canada, H4T 1G5
Tel: +1-514-787-5000
Fax: +1-514-788-1442
Email: power.mapps@L3T.com
www.L3T.com/MAPPS
LinkedIn: L3 MAPPS