

The MARS15 Code System Course

SLAC, Stanford Linear Accelerator Center, December 1-3, 2004

Topics:

- * Lectures on the new MARS15 code system: physics, materials, geometries, tracking, tallies, interfaces, visualization, beam line builder.
- * Tutorials on input, output, user routines, histograming and computing efficiency.
- * Solving problems in accelerator, detector and shielding applications.

Date: December 1 (Wednesday) -- December 3 (Friday), 2004

Place: Stanford Linear Accelerator Center, Computer Center, Building 50, room 111.

Instructor: Dr. Nikolai Mokhov (FNAL, MARS author)

Program:

December 1 (Wednesday)

08:30--9:30 Verifications of MARS15 on SLAC computers.

9:30 – 12:30 Lecture: MARS15 code, Part 1: Physics, tracking, materials.

(Lunch break)

14:00--17:30 Lecture: MARS15 code, Part 2: Geometries, tallies, histograming, tagging, visualization, getting started.

Content:

The MARS code is used worldwide in numerous accelerator, detector, shielding and space applications. It is now being applied to help design several systems at SLAC and future International Linear Collider, focusing on radiation shielding, induced activity, radiation environment, collimation and damage to critical components. In first two lectures Dr. Mokhov will introduce the newest MARS15 version and describe in details its enhanced features that further increase the code reliability, applicability and user friendliness. This includes an extended list of elementary particles and arbitrary heavy ions, their interaction cross-sections, event generators, photo-nuclear interactions, electromagnetic interactions, enhanced geometry, histograming, tagging and visualization options.

December 2 (Thursday)

08:30--12:30 Tutorial, Part I

This is focused on the input files to the MARS15 code. All participants can have an exercise in constructing geometry for their own interest and running MARS15.

(Lunch break)

14:00--16:00 Lecture: MARS15 code, Part 3: Interfaces, beam line builder, parallelization, computing efficiency.

Content:

In this lecture, the interfaces to MCNP, DPMJET, MAD, STRUCT and ANSYS are described. Details are given on a new enhanced MAD-MARS Beam Line Builder. Running the code on MPI-based parallel clusters is described. A strategy to achieve a high computing efficiency is also described.

16:00--17:30 Tutorial, Part II

This is focused on the output files, histogramming, beam lines, and shielding deep penetration problems. Participants will practice with maximizing the output usefulness and achieving the highest computing efficiency in various applications.

December 3 (Friday)

08:30--12:30 Tutorial, Part II (cont'd). Help and optimization in solving specific problems with MARS15.

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