Object-Oriented Developments in MARS15 Code*

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The object-oriented modules – recently developed and implemented into the MARS15 code - are described. These include the powerful ROOT-based geometry and visualization; the ROOT-based beam line builder that interfaces the MARS code to the MAD lattice description; integration of MARS and the MAD-X code system; highly-efficient handling of large databases used for DPA, electromagnetic processes and nuclear interactions below a hundred MeV; as well as input data reading and histogramming with the 32-bit limitations removed. Design study examples, that demonstrate the capabilities and flexibility of the new modules, are given: the Fermilab Booster and LBNE experiment, LHC high-luminosity upgrade, and Muon Collider Higgs Factory.

Summary

Motivated by accelerator applications needs, new object-oriented modules were developed in implemented in the MARS15 code. Examples of use and performance of the new modules are given for several accelerator projects.

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