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Adaptation of GEANT-4 to Criticality Calculations for Nuclear Reactors

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GEANT-4 is well suited for criticality calculations in nuclear reactors, thanks to its ability to track particles, in this case neutrons, in time as well as in space. This sets it apart from traditional Monte Carlo codes such as MCNP, which treat neutrons on a generation-by-generation base. The latter gives inherently incorrect results, in particular for systems that are far from critical. This presentation will describe a GEANT-4 based code, G4-STORK, which was developed to model nuclear reactors. Features such as population control, Doppler broadening of absorption resonances and treatment of delayed neutrons will be discussed. Comparisons with MCNP will be shown.

Author: BUIJS, Adriaan (M)

Presenter: BUIJS, Adriaan (M)

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