



Contribution ID: 21

Type: **Invited talk**

Integrated simulation of cavity design and radiation transport codes (ACE3P + Geant4)

Thursday, 3 October 2024 09:30 (30 minutes)

A simulation workflow has been developed to study dark current (DC) radiation effects using ACE3P and Geant4. The integrated workflow interfaces particle data transfer and geometry between the electromagnetic (EM) cavity simulation code ACE3P and the radiation code Geant4, targeting large-scale problems using high-performance computing. The process begins by calculating the operating mode in the vacuum region of an accelerator structure and tracking field-emitted electrons influenced by the EM fields of the mode calculated by ACE3P. It then transfers particle data at the vacuum-wall interface for subsequent radiation calculations within the wall enclosure materials through Geant4 calculation. The whole integrated simulation workflow will be demonstrated through large-scale dark current radiation calculations for the KEK 56-cell traveling-wave structure, and the efficiency of performing these simulations on the NERSC supercomputer Perlmutter will be presented.

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Presenter: GE, Lixin

Session Classification: Sessions in Living Room 1+2

Track Classification: F-1 Code Development, Status and Comparison with Measurements