Contribution ID: **488** Contribution code: **MOP069** Type: **Poster Presentation**

New ACE3P capabilities and code integration of ACE3P with Geant4 and Lume

Monday 11 August 2025 16:00 (2 hours)

The Advanced Computational Electromagnetic 3D Parallel simulation suite (ACE3P), developed by SLAC National Accelerator Laboratory, is a state-of-the-art multi-physics toolkit designed for virtual prototyping of accelerator and RF components. Leveraging over two decades of development, ACE3P integrates advanced physics modeling, including thermal and structural modeling, capabilities with scalable numerical algorithms to deliver cutting-edge simulations. The suite, comprised of seven application modules, utilizes high-order curved finite element methods to achieve high accuracy while enabling fast simulations for large-scale problems.

Two recent advancements include the integration with Geant4, for radiation studies and positron source generation, and the development of LUME-ACE3P, built on the Python framework of the LUME project*, which streamlines parameter sweeps and optimization tasks. Furthermore, recent code optimizations have increased the performance of ACE3P for large-scale computations on modern supercomputers. We present a real accelerator project study with ACE3P to demonstrate its scalability and efficiency conducted on NERSC supercomputers.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

*: C. E. Mayes et al, “Lightsource unified modeling environment (LUME), a start-to-end simulation ecosystem” , Proc. of IPAC 2021

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Yes

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