Contribution ID: **2659** Contribution code: **TUPL100** Type: **Poster Presentation**

HPC modelling of a high-gradient C-Band LINAC for applications including hard X-Ray FREE-Electron Lasers

Tuesday, 9 May 2023 16:30 (2 hours)

The production of soft to hard x-rays (up to 25 keV) at XFEL (x-ray free-electron laser) facilities has enabled new developments in a host of disciplines. However, there is great potential for new scientific discovery at even higher energies (42+ keV), such as those provided by MaRIE (Matter-Radiation Interactions in Extremes) at Los Alamos National Laboratory. These instruments can require a large amount of real estate, which quickly escalates costs: The driver of the FEL is typically an electron beam linear accelerator (LINAC) and the need for higher electron beam energies capable of generating higher energy X-rays can dictate that the LINAC becomes longer. State of art accelerating technology is required to reduce the LINAC length by reducing the size of the cavities, which in turn provides for a high gradient of acceleration. Compact accelerating structures are also high-frequency (S, C, and X-bands). Here, we describe using the Argonne Leadership Computing Facility (ALCF)), located at Argonne National Laboratory to facilitate our investigations into design concepts for future XFEL high-gradient LINAC's in the C-band (˜4-8 GHz). We investigate a Disk Loaded Wave Guide (DLWG) and an elliptical traveling wave (TW) structure modeled for operation at f =5.712 GHz at the ALCF using VSim software. We used an existing account under the ALCF LIGHTCONTROL project.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: BOLIN, Trudy (University of New Mexico)

Co-author: BIEDRON, Sandra (University of New Mexico)

Session Classification: Tuesday Poster Session

Track Classification: MC2: Photon Sources and Electron Accelerators: MC2.A06: Free Electron Lasers