



Contribution ID: 1785 Contribution code: THPG14

Type: **Poster Presentation**

Automation upgrade of the CXLS photoinjector

Thursday, 23 May 2024 16:00 (2 hours)

The automation upgrade of the photoinjector for the Compact X-Ray Light Source (CXLS) at Arizona State University is described. As the accelerator vault of the CXLS is only 10 meters long, the photoinjector drive laser is located in an enclosure inside the vault. Since ionizing radiation is present in this room during operations, it necessitates remote control of all devices used to optimize the laser spot. This includes multiple shutters, Galil motors, picomotors, a mirror flipper, LEDs, and remote lens controllers. To actuate these devices, a GUI was created with the use of MATLAB AppDesigner which communicates with the hardware through EPICS (Experimental Physics and Industrial Control System). Challenges with this GUI are described, along with the team's efforts to finalize the control software. After these upgrades, the photoinjector laser characteristics can be adjusted remotely during operation and changes to the drive laser's position, shape, and intensity can be made without interrupting beam time.

Footnotes

Funding Agency

This work supported by the NSF Bio Directorate under midscale RI-2 award 2153503

Paper preparation format

Word

Region represented

North America

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Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback, and Operational Aspects:
MC6.T04 Accelerator/Storage Ring Control Systems