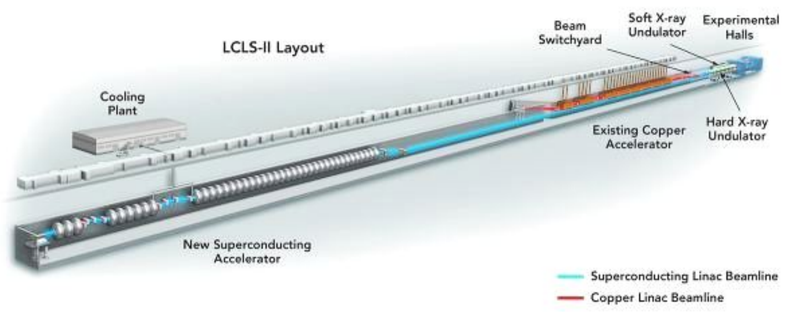
A Mock Archiver for Offline Development and Testing of the LCLS-II Superconducting LINAC Operator Displays

Sandy Paez Olivarez[1,2], Liza Zacarias[2]

[1] College of Engineering, San Jose State University, San Jose, CA, USA

[2] SLAC National Accelerator Laboratory, Menlo Park, CA, USA



MOTIVATION

Archiver require SLAC network access	→	Generates realistic simulated data offline
Current set-up uses deprecated library **lcls_tools**	→	Project is more self-contained
Changes must be tested on a real machine or require test-file development	→	Testing with simulated data catches errors before testing on the real machine

BACKGROUND

⇨ **EPICS Process Variables (PVs)** represent measurements or control values such as cavity RF phase and cavity RF gradient

⇨ **Archiver Appliance** stores the history of the LINAC's PV values over time

APPROACH & DESIGN

⇨ **Explicit Control:** mock archiver is only used when **SC_ARCHIVER_MOCK = 1** environment variable is set

⇨ **Two Interception Points:** some functions required specific routing to use mock or real archiver. Other functions intercept PyDM's HTTP call to the real archiver

⇨ **Data Generation:** Per-PV values ranges and configurable trends

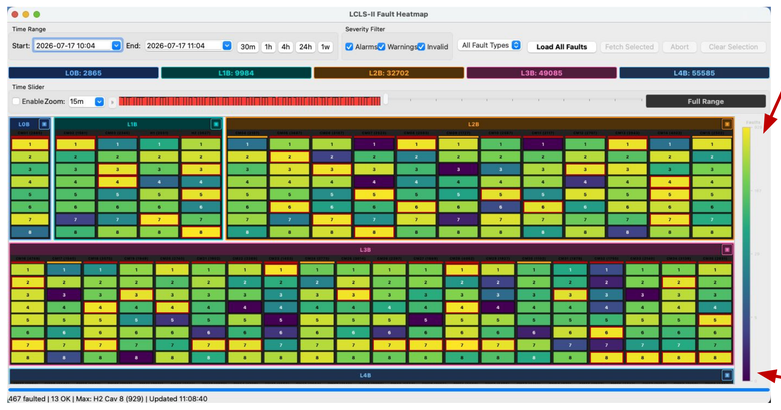
- Deterministic seeding mirror the real archiver
- realistic fault patterns

FUTURE WORK

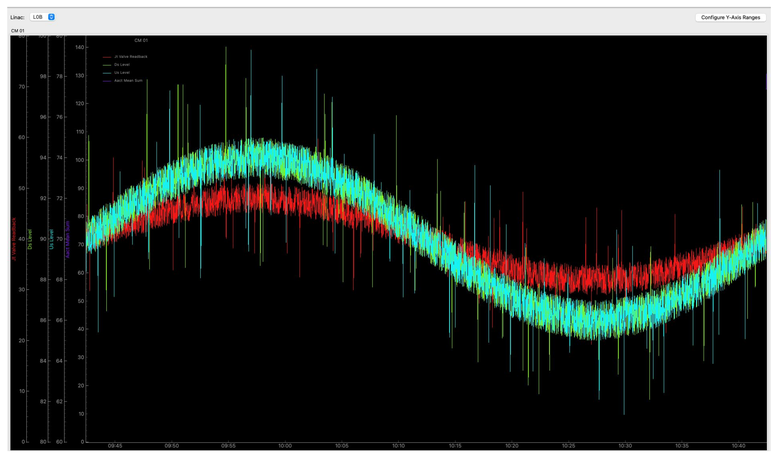
⇨ Extend mock archiver coverage to support additional displays and PV types

⇨ Allow live fault injection and signal changes to test display response behavior

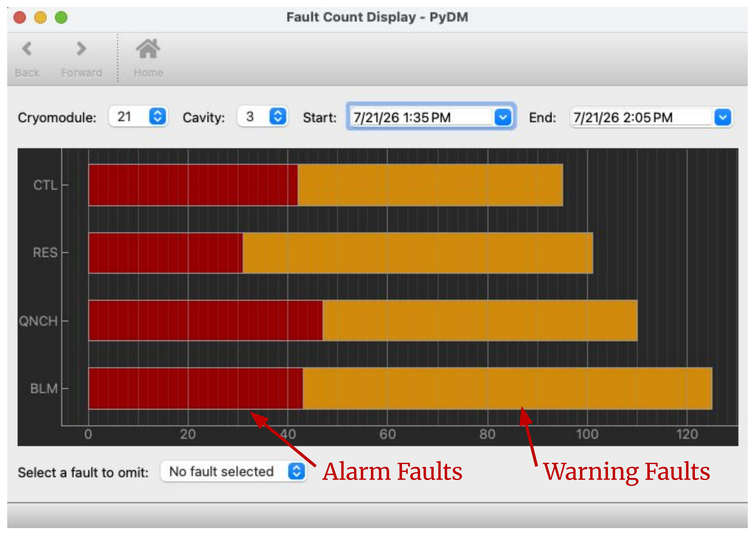
RESULTS



⇨ Demonstrates that the simulated fault patterns render correctly across the full display grid



⇨ Generated signals are realistic enough to test display rendering and scaling and can be customized to test different trends



⇨ Per-cavity fault totals for a time range, populated entirely by the mock archiver

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