

LCLS-II LINAC 2K Pump-down and Controls Automation

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The SLAC National Accelerator Laboratory's upgrade to the LCLS-II, featuring a 4 GeV superconducting linear accelerator with 37 cryomodels and two extensive helium refrigeration systems supporting 4 kW at 2.0 K, represents a significant advancement in accelerator technology. Central to this upgrade is a sophisticated 2K system with five stages of centrifugal cold compressors, operating across a pressure range from 0.026 mbar suction to 1.2 bara discharge. This paper presents a streamlined approach to automate the intricate processes of pumping down the LINAC from 1.2 bara to 31 mbar with transition to RF operations in 90 minutes, LINAC re-pressurization to 1.2 bara after a trip, alongside an RF compensation technique for uninterrupted RF operations. It provides a comprehensive overview of the automated functions, sequences, control logic, and machine protections integrated into the system, shedding light on the design decisions and experiences gained during its integration and commissioning.

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