

Abstract Submitted  
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**Slow Control and Test Systems for Commissioning of LZ Dark Matter Detector**<sup>1</sup> COREY HERR, M. CARMEN CARMONA-BENITEZ, LUIZ DE VIVEIROS, Pennsylvania State Univ, LUX-ZEPLIN COLLABORATION COLLABORATION — The LUX and ZEPLIN dark matter experiments have merged to construct a 7 tonne two-phase xenon detector, known as LUX-ZEPLIN or LZ, that will push the search for weakly-interacting dark matter particles to unprecedented sensitivity. This is achieved thanks to its larger mass of xenon, a new outer detection system, and lower radioactive backgrounds. A powerful cryogenic system based on a nitrogen gas thermosyphon is used to cool and liquefy the large xenon mass, and a xenon circulation system will constantly run the xenon through a purifier to keep background event rates to a minimum. Both the liquid xenon circulation system and thermosyphon components for the LZ detector need to be tested before implementation in the main detector. I retrofitted the instrumentation from the thermosyphon-based cryogenic system previously used in LUX for use in a cryogenics workbench at Penn State, which we can use to test these systems. I used LabVIEW to design the software for the Slow Control System using state machine based logic, and AutoCAD Electrical for the piping and instrumentation diagrams. This slow control system will allow operation of test systems being developed at Penn State.

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