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Xenon circulation and liquid-level stability in the LUX-ZEPLIN dark matter experiment DYLAN TEMPLES, Northwestern University, LUX-ZEPLIN COLLABORATION — Two-phase noble element time projection chambers are easily scaled to large target masses, and thus are used in dark matter direct detection experiments. In the liquid state, the xenon must be continuously purified, both to limit backgrounds and to provide a long electron lifetime. Maintaining a stable liquid level while simultaneously cycling the liquid into and out of the detector presents a challenge due to the size of the liquid surface and high xenon flow rates needed for a dark matter search. The height of the liquid surface partially determines the amount of light produced in the gas phase by extracted electrons (electroluminescence) and thus plays a role in both background discrimination and energy resolution. In this talk, I will discuss the efforts at the LUX-ZEPLIN (LZ) system test to study the relation between liquid level stability and xenon circulation geometry. I will also outline the near-term plans for LZ circulation tests at the Sanford Underground Research Facility and the circulation system for LZ.

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