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The Active Veto System for the Large Underground Xenon (LUX) Experiment and Underground Muon Signals DOUGLAS TIEDT, SDSMT, LUX COLLABORATION — The Large Underground Xenon (LUX) Experiment successfully finished its operation searching for dark matter at the Sanford Underground Research Facility (SURF) in 2016. The 350 kg liquid xenon time projection chamber (TPC) operated in a large instrumented water shield during its lifespan. Besides passively shielding low energy electromagnetic particles and absorbing thermal neutrons, the water shield worked as an active water Cherenkov detector that registered events associated with high energy muons. Since the same water tank will house the LUX-ZEPLIN (LZ) detector, understanding the expected external background is of special importance. This talk describes the pulse shape discrimination techniques used in LUX to isolate the muon events from in-situ background signals, as well as comparisons to the simulated results in an attempt to understand its accuracy for use in LZ. The overall muon rate agrees within 15% with the simulation. Studies of seasonal variation and events in coincidence with the LUX detector are also presented.

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