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Construction of the BLUE Linear Transformer Driver (LTD) at University of Michigan

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The BLUE linear transformer driver (LTD) system is being constructed in the University of Michigan's Plasma, Pulsed Power, and Microwave Lab. The system will be comprised of four LTD cavities, which were previously part of the 21-cavity Ursa Minor facility at Sandia National Laboratories. The system will be capable of delivering up to 8kJ to a proper load in a 200kA, 100ns pulse. Dual 100kV, 12kW Spellman power supplies theoretically allow rep-rate as high as 1.5 Hz for high-power microwave or gas puff Z-pinch experiments. In addition to the power supplies and some high-voltage Ross relays, several vacuum components have been ordered. These components include custom adapters and a custom 24"OD load chamber. An additional adapter will be needed to mate the cavities to a gigawatt-class, high-power microwave (HPM) load. Meanwhile, assembly of the first cavity is nearly complete. 3D printing has proved invaluable for cheap prototyping and production of non-standard nylon parts. To this end, custom feedthroughs were developed to allow quick disconnection of HV cables at the cavity, so the cavities could be easily moved even if filled with oil. The next challenge is to consider a novel method of switch diagnostics, one that may extend the approach currently used on the existing MAIZE LTD system. With the archetype cavity nearly complete, the three remaining cavities should assemble more swiftly. The custom vacuum components should arrive in a few months. Presented in this poster is the design and current construction progress of the BLUE system.

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