

STATUS OF THE MERCURY PULSED –POWER GENERATOR, A 6-MV, 360-KA, MAGNETICALLY-INSULATED INDUCTIVE VOLTAGE ADDER*

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Mercury is a 6-MV, 360-kA, 2.2-TW magnetically-insulated inductive voltage adder (MIVA) that is being assembled at the Naval Research Laboratory (NRL). Mercury was originally known as KALIF-HELIA, and was located at the Forschungszentrum in Karlsruhe, Germany[1]. At NRL, Mercury will be used as a test bed for high-power e-beam and ion-beam diodes. Applications include source development for high-resolution flash radiography, nuclear weapons effects simulation, and transport research for heavy-ion fusion. This talk will review the progress of various activities associated with getting Mercury operational at NRL. These activities include disassembly and shipping to NRL, site preparation, and re-assembly. They also include studying the results from KALIF-HELIA[1] to benchmark the circuit model so that changes to the pulsed-power design can be made that are expected to increase the energy delivered to the load to a level near the design point[2]. The water-switch jitter and resistance while conducting appear to be of critical importance. In addition, we are reviewing magnetically-insulated transmission line theory and carrying out PIC simulations to improve the elements used in the circuit modeling, to better understand and optimize the vacuum power flow, and to maximize coupling to the load [3,4].

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2. R.J. Allen, et al., “Electrical Modeling of Mercury for Optimal Machine Design and Performance Estimation,” these proceedings.
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