

# Charger 1: A New Facility for Z-Pinch Research

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**Abstract:** Charger 1 is a multipurpose pulsed power laboratory located on Redstone Arsenal, with a focus on fusion propulsion relevant experiments involving testing z-pinch diodes, pulsed magnetic nozzle and other related physics experiments. UAH and its team of pulsed power researchers are investigating ways to increase and optimize fusion production from Charger 1

Currently the team has reached high-power testing. Due to the unique safety issues related to high power operations the UAH/MSFC team has slowed repair efforts to develop safety and operations protocols. The facility is expected to be operational by the time DZP 2017 convenes.

Charger 1 began life as the Decade Module 2, an experimental prototype built to prove the Decade Quad pinch configuration. The system was donated to UAH by the Defense Threat Reduction Agency (DRTA) in 2012. For the past 5 years a UAH/MSFC/Boeing team has worked to refurbish, assemble and test the system. With completion of high power testing in summer 2017 Charger 1 will become operational for experimentation.

Charger 1 utilizes a Marx Bank of 72 100-kV capacitors that are charged in parallel and discharged in series. The Marx output is compressed to a pulse width of ~200 ns via a pulse forming network of 32 coaxial stainless steel tubes using water as a dielectric. After pulse compression a set of SF6 switches are triggered, allowing the wave front to propagate through the output line to the load.

Charger 1 is capable of storing 572-kJ of energy and time compressing discharge to less than 250 ns discharge time producing a discharge of about 1 TW of discharge with 1 MV and 1 MA peak voltage and current, respectively. This capability will be used to study energy yield scaling and physics from solid density target as applied to advanced propulsion research.

(Check one of the following)

- Oral Session  
 Poster Session



Figure 1. Charger 1 Facility at UAH.