

Abstract Submitted  
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**A Controlled Filament Non-Local Discharge (CFND) Plasma Z-Pinch**<sup>1</sup> HUGO LEON, GEORGE MILEY, LINCHUN WU, University of Illinois — A new type of pinch, the Controlled Filament Non-local Discharge (CFND) [1], is described. The CFND employs a unique cathode design with a “spiked” surface and built-in ballast resistors to stabilize the electron filaments generated during pulsed operation. As in the wire cage Z-pinch, the magnetic fields in the CFND consist of an overall poloidal field around the entire discharge and individual fields around each filament. This configuration is, then, analogous to a wire cage Z-pinch without physical wires. Thus, it exhibits enhanced stability during a pulse like the wire cage version. However, now the filaments are formed in the plasma discharge without requiring metallic wires, allowing simple rapid pulsing. Gradual erosion of the electrode spikes can limit the electrode lifetime, but methods to reduce this are being investigated. Data will be presented for hydrogen discharges along with a discussion of potential applications for radiation generation and fusion. [1] G. H. Miley, “CFND for Pulsed Electric Discharge Lasers and Plasma Chemistry Reactors” AIAA Plasmadynamics and Lasers Conference, Seattle WA, June 2008.

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