SAND2025-01086A

ZNetUS - The first year of experimental campaigns

Jens Schwarz[1], Farhat Beg[2], Keith LeChien[3], Bruce Kusse[4], Roberto Mancini[5], and Ryan McBride[6]

[1]*Sandia National Laboratories, Albuquerque, NM 87123*
jschwar@sandia.gov
[2]*Center for Energy Research, UC San Diego, La Jolla, CA 92093*
[3]*Pacific Fusion, Fremont, CA*
[4]*Laboratory of Plasma Studies, Cornell University, Ithaca, NY 14853*
[5]*ZEBRA Pulsed Power Lab, Physics Depertment, University of Nevada, Reno, NV, 89557*
[6]*University of Michigan, Ann Arbor, MI, 48109*

ABSTRACT

ZNetUS is a consortium of researchers from academia, national laboratories, and private industry, dedicated to advancing pulsed magnetic science, technology, and high energy density physics for energy and national security applications with a special focus on creating the pipeline of next-generation scientific leaders.

The National Nuclear Security Administration (NNSA) has recently established a pilot User Facilities program through ZNetUS. This initiative represents a significant stride in fostering academic-led collaborations aimed at enhancing the field of pulsed magnetic science and technology (PMS&T).

Participating User Facilities include CESZAR [1] at UC San Diego, MAIZE [2] at the University of Michigan, MYKONOS [3] at Sandia National Laboratories, COBRA [4] at Cornell University, and ZEBRA [5] at the University of Nevada. The pulsed power architecture of the first three facilities is based on Linear Transformer Driver (LTD) technology, delivering about 1 MA at current rise-times of 100-200 ns. The last two drivers are based on traditional Marx bank technology, delivering around 1 and 1 (1.6) MA and rise-times of 100-200 ns and 100 ns respectively.

ZNetUS successfully launched its User Facilities program in 2024 awarding twelve research groups experimental time on the User Facilities. In this presentation we will provide a research summary for the first full year of campaigns. We will also discuss how to start collaborations and how to apply for time at the ZNetUS.

SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.
This work was supported by the National Nuclear Security Administration through the Support for Academic Programs contract 89233121FNA400377.

References

[1] Conti, F. *et al. MA-class linear transformer driver for Z-pinch research*, Phys. Rev. Accel. Beams 23, 090401.

[2] Gilgenbach, R.M. *et al. MAIZE: a 1 MA LTD Driven Z-Pinch at The University of Michigan*, AIP Conf. Proc. 1088, 259-262.

[3] Schwarz, J. *et al. Mykonos: A pulsed power driver for science and innovation*, HEDP 53, 101144.

[4] Greenly, J.B. *et al. A 1MA, variable risetime pulse generator for high energy density plasma research*, Rev. Sci. Instrum. 79, 073501.

[5] Bauer, B.S. *et al. Two-terawatt Zebra Z-pinch at the Nevada terawatt facility*, Proc. of IEEE International Conference on Pulsed Power (1999).