Contribution ID: **503** Contribution code: **WEP032** Type: **Poster Presentation**

High power 805 MHz solid state amplifiers using GaN on SiC HEMT for LANSCE CCL

Wednesday 13 August 2025 16:00 (2 hours)

The Los Alamos Neutron Science Center uses a coupled-cavity linac (CCL) to accelerate H- ions from 100 to 800 MeV. It is powered by forty-four 1.25 MW 805 MHz klystrons of older design. Continued supplies of identical klystrons for the linac operation beyond 2050 are uncertain. We have embarked on a feasibility study for a replacement RF amplifier without vacuum electron tubes, that fits in the space of one klystron. Commercial silicon LDMOS transistors have reduced power above 600 MHz and are limited by the maximum drain to source breakdown voltage. We selected high voltage Gallium Nitride (GaN) on Silicon Carbide (SiC) high electron mobility transistors (HEMT) to reduce the number of active devices and the complexity of power combing smaller amplifiers. They are able to operate at higher channel temperature and voltage ratings compared to silicon transistors. We have tested devices with 3.6 kW of saturated power at 100 volts, and are planning for 5 kW HEMTs for the final design. Outphasing modulation schemes allow higher efficiency and lower thermal dissipation than class AB linear amplifiers. Power supplies and combining technology are also under study for this system.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

Work was performed under the auspices of the US Department of Energy by Triad National Security, LLC, under contract 89233218CNA000001

I have read and accept the Privacy Policy Statement

Yes

Author: LYLES, John (Los Alamos National Laboratory)

Co-authors: VEGA, Javier (Los Alamos National Laboratory); VALLADARES, Jesus (Los Alamos National Laboratory); BRADLEY, Joseph (Los Alamos National Laboratory); SANCHEZ BARRUETA, Maria (Los Alamos National Laboratory); BROWN, Michael (Los Alamos National Laboratory); VAN ROOY, Paula (Los Alamos National Laboratory); RUSSELL, Steven (Los Alamos National Laboratory); KWON, Sungil (Los Alamos National Laboratory); HALL, Wesley (Los Alamos National Laboratory)

Presenter: LYLES, John (Los Alamos National Laboratory)

Session Classification: Wednesday Poster Session

Track Classification: MC7 –Accelerator Technology and Sustainability