



Contribution ID: 10

Type: Oral presentation

# Solid State RF Amplifier Development at the Advanced Photon Source

*Thursday, 23 June 2016 16:00 (30 minutes)*

Solid state rf amplifier development is underway at the Advanced Photon Source at two operating frequencies. A new 9.77-MHz solid state driver amplifier was designed and built to replace existing obsolete driver amplifiers presently used in the Advanced Photon Source accumulator ring rf systems. The amplifier design uses a single 1.25kW LDMOS push-pull transistor output device operating at 30 volts. It achieved very high efficiency, which provided the option of forced-air cooling. “Cut and try” techniques were used in the design phase of the amplifier due to the lack of accurate device models at low frequencies. The design and construction of a compact 352-MHz, 12kW cw solid state demonstration amplifier system is also underway. The system consists of six 2kW power amplifier modules supplying rf power to a resonant combining rf cavity. The 2kW amplifier design utilizes a single push-pull LDMOS output device operating at 60 volts, and an efficient cooling system is used to maintain safe transistor die temperature while operating at power levels exceeding normal device specifications. The combining rf cavity consists of a compact rf structure utilizing water cooling, a single resonance-control tuner, six input ports, and one WR2300 waveguide output port. The design process, performance data, and implementation of the new amplifiers will be discussed.

## Summary

**Primary author:** Mr HORAN, Douglas (Argonne National Laboratory)

**Co-authors:** Mr GOEL, A. (Argonne National Laboratory); Mr NASSIRI, A. (Argonne National Laboratory); Mr BROMBEREK, D. (Argonne National Laboratory); Mr WALDSCHMIDT, G. (Argonne National Laboratory); Mr SUTHAR, K. (Argonne National Laboratory)

**Presenter:** Mr HORAN, Douglas (Argonne National Laboratory)

**Session Classification:** Solid state amplifiers 3