
Contribution ID: **127** Type: **Oral**

# Experimental investigation of an L band all cavity axial extraction relativistic magnetron

*Monday, 19 June 2017 12:15 (15 minutes)*

Abstract: Experimental results of an L band all cavity axial extraction relativistic magnetron (RM) working at 1.57 GHz is presented. In this 6-cavity RM configuration, the microwave from two adjacent cavities is coupled into an axially oriented coaxial sector waveguide through radial slots on the cavities. This configuration is more compact because only three sector waveguides are added outside the magnetron cavity without increasing the radial dimension significantly. Simulation results reveal that this tube could generate a microwave power of 700 MW at the frequency of 1.57 GHz, corresponding to a power conversion efficiency of 50 % when employing an electron beam of 350 kV and 4.0 kA. This tube is tested on a compact Marx generator which could generate a pulse power of about 2 GW. In experiment, this tube could generate a microwave power of over 500MW at 1.57 GHz when employing guiding magnetic field of 0.22T and input beam voltage of 345 kV and current of 4.8 kA, with a corresponding efficiency of about 30%. Experimental results reveal that this tube is a preferred configuration for a compact relativistic magnetron with relatively high power conversion efficiency.

1. Dong Wang, Fen Qin, Yu-lin Yang, Yong Zhang, and Sha Xu, Design of L band all cavity axial extraction relativistic magnetron(in Chinese), HIGH POWER LASER AND PARTICLE BEAMS 28, 033013(2016).
2. Brad W. Hoff, Andrew D. Greenwood, Peter J. Mardahl, and Michael D. Haworth, All Cavi-ty-Magnetron Axial Extraction Technique, IEEE Trans. Plasma Sci., 40, 3046(2012).

**Primary author:** QIN, Fen (Institute of Applied Electronics)

**Co-authors:** Ms LEI, Lu-rong (Institute of Applied Electronics, China Academy of Engineering Physics); Dr WANG, Dong (Institute of Applied Electronics, China Academy of Engineering Physics); Ms XU, Sha (Institute of Applied Electronics, China Academy of Engineering Physics); Mr ZHANG, Yong (Institute of Applied Electronics, China Academy of Engineering Physics)

**Presenter:** QIN, Fen (Institute of Applied Electronics)

**Session Classification:** Oral session 3 - High Power Microwave Systems and Sources - Session Chair : Steve Calico

**Track Classification:** High Power Microwaves, RF Sources and Antennas