

269th Regular Open Seminar (2021 /07 /21)

Title : Microwave Power Transmission with Magnetrons

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Related RISH mission : Mission 2 (Advanced Development of Science and Technology towards a Solar Energy Society)

Abstract :

The magnetrons are widely used in microwave oven. It is also applied to industries such as industrial microwave heating and radar. This year marks the 100th anniversary of the invention of the magnetron. This seminar will explain the new application of magnetrons in microwave wireless power transmission (MWPT) technology and the space solar power station (SSPS) related to this technology.

We are conducting research on high-power MWPT systems that are deeply involved in 5.8 GHz power-variable phase-controlled magnetron (PVPCM). A phased array system with four PVPCMs was built for the experiments demonstrated the properties of microwave beam forming and WPT. The received DC power reaches 142 W at a distance of 5 m when the output microwave power of the magnetron phased array is 1304 W. In addition, The magnetrons also can be used to perform amplitude, phase, and frequency modulations. the magnetron phased array system was demonstrated for the high power simultaneous wireless information and power transfer. Furthermore, the microwave oven was succeeded in developing a wireless TV system with 3.5 m transmission distance.

We look forward the high-power MWPT system to make more devices work in power wirelessly. The MWPT system with magnetrons has high efficiency, large power, low cost, and light weight, which is expected to applied for the SSPS.

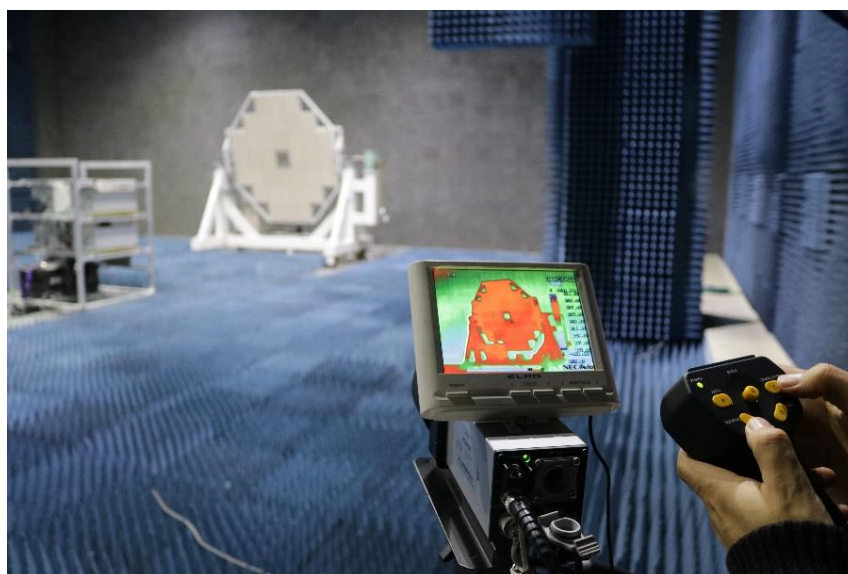


Fig.1 Microwave power transmission experiment with magnetron phased array