

## The High Power Microwave Facility: Orion

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The Orion high power microwave facility was designed and constructed by Physics International (PI), San Leandro, California, USA, to a design specification which arose within the UK. This presentation will provide an overview of the HPM system capabilities.

Orion is capable of generating HPM radiation across a continuous tuneable bandwidth of 1.07GHz to 3.00GHz. This is achieved via four tuneable magnetrons each capable of operating over a 30% bandwidth via a proprietary tuning technique developed by PI. To meet the requirements of the UK specification, Orion is capable of generating typically +300MW of RF power over the entire operating band. With a magnetron efficiency between 10% to 20%, the pulsed power system has been designed to deliver 5GW of electrical power into the 50 ohm magnetron load.

The operational principles of the HPM system will be described, highlighting the versatility of the source in four key areas; frequency of operation, output power, pulse duration and pulse repetition frequency. The key characteristics of the source are listed in table 1.

**Table 1: Specification of the Orion HPM system**

Parameter	Specification
Operating Frequency	Tuneable from 1.07GHz through to 3.00GHz
Modulator Peak Power	5GW
Peak Voltage	500kV (Magnetron)
Impedance	50 ohms
Electrical Pulse Duration	50 to 500ns in 50ns Steps (Modulator)
Pulse Repetition Rate	Single Shot to 100Hz
Burst Duration	10 seconds (Maximum)
Inter Burst Delay	8 minutes (Minimum)
Prime Power	500kW Average

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## SYMPOSIA DISCUSSION – PAPER NO: 26

**Discussor's Name: Unknown**

**Question:**

Magnetrons tuned? Can freqs be changed?

**Author's Name: Kerr**

**Author's Response:**

Tunable, but

**Discussor's Name: Römer**

**Question:**

Pulse duration 500 ns?

**Author's Name: Kerr**

**Author's Response:**

If narrow, 30 ns – 300 ns.