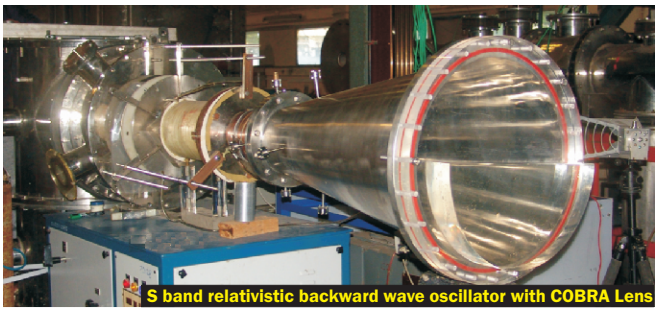
S band relativistic backward wave oscillator with COBRA Lens

Microwave and X-Rays

Amitava Roy


X-band IEMI system with Compact Marx generator

Intentional Electromagnetic Interference (IEMI) Generator

A pulsed 1 Gigawatt peak power microwave source in S band, based on a relativistic backward wave oscillator (RBWO) has been designed and operated in BARC. The microwave source has been operated using KALI 30 GW pulsed power system at 600 kV beam voltage and 6.5 kA beam current to produce 1.2 GW peak microwave power at 3.28 GHz at a guiding magnetic field of 0.6 T. As part of IEMI studies, APPD, BARC has developed a RBWO based compact Marx generator driven microwave system, which is capable of producing 1000 MW peak microwave power at 9.22 GHz (X-band) frequency. The system consists of a Coaxial 20 Stage Marx Generator capable of producing a 600 kV, 7 kA pulsed electron beam for 60 ns (FWHM) duration. A pulsed magnetic field of 3 Tesla has been used to guide the electron beam inside the RBWO cavity. A serpentine mode converter transforms the mode of operation from TM01 to TE11 to provide maximum electron field in the direction of the bore site. The electron beam diode is evacuated with a TMP which is backed by a rotary pump to 1×10^{-5} mbar vacuum level. The IEMI is radiated through a Conical Horn antenna of 21 dB gain. Presently, work is underway to make the system more robust by using a 0.74 T permanent magnet system.

Four Channel Flash X-ray System for Dynamic Radiography

A four channel Flash X-ray (FXR) system has been designed and developed for dynamic radiography. The system is capable of generating 4 FXR pulses within a time interval that can be varied between 1 microsecond and 1 ms, and synchronized to capture dynamic events of microsecond time scale. By virtue of its portable design, the FXR tube head can be carried to the test site with a greater ease. The cumulative dose measured at 1 m distance from the X-ray tube window was 25 mR. A penetration depth of 18 mm in stainless steel at 2.5 m distance was achieved. The system has been installed at VSSC, Trivandrum and dynamic radiography of detonator firing event was radiographed with good resolution.

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