PATTERNS OF PEAK POWER AND ENERGY OF ULTRA-WIDEBAND PULSE RADIATION FROM APERTURE ANTENNAS

V.M. Fedorov, V.Ye. Ostashev, A. V. Ul’yanov

Joint Institute for High Energy Densities of RAS.
13/2, Izhorskaya str., Moscow, 127412, Russia, vmfedorov@ihed.ras.ru

Angular spatial distributions of peak power and energy are analyzed for ultra-wideband pulsed (UWB) radiation which is produced by aperture antennas of TEM-horn type. Application of two patterns of peak power and energy for description of the UWB radiation is necessary to use because waveforms of radiated field are change for various directions at far distance. The subjects of this research are the UWB radiators which have been constructed in our laboratory. High power radiators were created with the TEM-horn antennas exciting by sub-nanosecond unipolar pulses of high voltage generators. Quantitative relation is analyzed between the energetic directivity factor $D$ of antenna and the angle $\Delta \theta(0.5P_{\text{max}})$ of characteristics for the pattern of peak power of radiation flow. We provide comparisons of results with use experimental data and results of calculations. One model is like Huygence unidirectional radiators excited by modified voltage pulse of the high power generator after transmission of the pulse through model filter.

SIMULATION OF COMPRESSION IN THE CAVITY OF THE MICROWAVE PULSES WITH OUTPUT ENERGY OF THE OSCILLATIONS TRANSFORMATION

V.S. Igumnov$^1$, V.A. Avgustinovich$^1$, S.N. Artemenko$^1$, S.A. Novikov$^1$, Yu.G. Yushkov$^1$

$^1$ Tomsk Polytechnic University, Physical-Technical Institute, 30 Lenina str., Tomsk, 634050, Russia, igumnov@tpu.ru

The results of experimental studies of the interaction modes of communication on the window of a multimode waveguide resonator with a short train are presented. The experimentally determined dependence of the mode coupling parameters of the plume and windows due to the loop resonator.
Based on these experiments, the model of the process of energy transfer from mode to mode in the microwave compressor with the output power fluctuations in the transformation of the resonator box with a train. Model describing a relation between the parameters of output pulses and the parameters of the compressor device mode coupling, which qualitatively agrees well with experimental data.

**DESIGN OF L BAND 20 KW HIGH POWER SOLID STATE AMPLIFIER FOR TARLA / TAC PROJECT**

O.Karsli, O.Yavas\(^\text{1}\), M. Dogan\(^\text{2}\)

_Institute of Accelerator Technologies, Ankara University, Gölbaşı, Ankara, karsliozlem@yahoo.com  
\(^\text{1}\) Department of Physics Engineering, Ankara University, Tandoğan, Ankara, yavas@ankara.edu.tr  
\(^\text{2}\) Department of Control Engineering, Dogus University, Kadıkoy, Istanbul, mustafa.dogan@gmail.com_

The Turkish Accelerator Center (TAC) Project is proposed as a national center that will contain MeV and GeV scale electron and proton accelerators. The Turkish Accelerator and Radiation Laboratory at Ankara (TARLA) is, an IR FEL oscillator and Bremsstrahlung facility and planned as a first facility of the TAC project. The buildings of TARLA facility and Institute of Accelerator Technology of TARLA have been constructed in Gölbaşı Campus area of Ankara University at Ankara. Currently, TARLA facility is ready for the installation of the accelerator and oscillator components. TARLA will consist of two optical cavity system to produce 2-250 µm oscillator FEL in infrared region and Bremsstrahlung radiation using 10-40 MeV electron beam energy. It will compose of two superconducting electron accelerator modules having two 1.3 GHz TESLA RF cavities for each. Thermionic DC gun is manufactured as an electron source in Ankara and its installation is still in progress. Two superconducting modules and He cooling system are currently under production. High power RF system of TARLA will have four RF stations controlling by low level RF unit to transmit equal amount of RF power into the superconducting modules simultaneously. It is proposed that TARLA will be operated by 20 kW solid state power amplifiers. The RF power transmitted into the TESLA RF cavities will be net 16 kW. Since there is no available