МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ
ФАКУЛЬТЕТ ІНОЗЕМНОЇ ФІЛОЛОГІЇ
ТА СОЦІАЛЬНИХ КОМУНІКАЦІЙ

СОЦІАЛЬНО-ГУМАНІТАРНІ АСПЕКТИ РОЗВИТКУ СУЧАСНОГО СУСПІЛЬСТВА

МАТЕРІАЛИ ВСЕУКРАЇНСЬКОЇ НАУКОВОЇ КОНФЕРЕНЦІЇ ВИКЛАДАЧІВ, АСПІРАНТІВ, СПІВРОБІТНИКІВ ТА СТУДЕНТІВ

(Суми, 21-22 квітня 2016 року)

Суми
Сумський державний університет
2016

At the same time the coach is a person with strong will and rigidity of mind. The teacher-trainer must lead his team or athlete through all the obstacles, difficulties and failures during a lot of years to achieve the goal. A true athlete will continue his training after the defeat in some competitions with redoubled energy under the guidance of the coach, striving to achieve good results, where the highest manifestation of such liability is successful performance in international competitions and Olympic Games. During the years of training the coach has to be a sensitive partner to his pupils and he should know their needs and aspirations. Very important characteristic of the coach is his ability to forecast the process of training, to identify ways of development of any sport and to regulate long training process appropriately. Having all these skills the coach has the possibility to increase the success of each athlete, and he can say what changes should be done in terms of the preparation of every sportsman. To solve this problem the coach needs to determine precise quantitative assessment of the main parameters of the strongest athletes. The establishment of model characteristics is very responsible and difficult task, but it is used as a reference model of training of an athlete.This model characteristics can be targeted to manage the process of training.

The coach must constantly improve his professional knowledge, explore domestic and foreign literature and summarize the experience of training of leading coaches and athletes for successful educational activities with high skilled sportsmen. He must use the best selection of talented athletes who will undoubtedly become a reliable guarantee of the successful performance at important international competitions.

DESIGN OF RECTANGULAR TO CIRCULAR WAVEGUIDE TRANSITION FOR MULTIBAND DNP SYSTEM

Y.A. Rybalko *–group ASP-53pm*
(Sumy State University),
A.M. Diadechko – *EL Adviser*
(Sumy State University)

The wide availability of microwave devices and rapid increase in computational power for the calculation of complex electromagnetic systems has allowed the creation of numerous solutions for the transportation of microwave energy from the microwave source to the sample in the nuclear magnetic resonance (NMR) probe [1]. In the dynamic nuclear polarization (DNP) application the circular waveguide is the most common type of waveguide for the transmission of the electromagnetic wave. The dominant mode in the circular waveguide is TE_{11} [2,3]. The bandwidth associated with these TE_{11} mode circular waveguides is narrower than a typical rectangular waveguide in the same general frequency range. However, standard microwave sources have rectangular waveguide output.

A multiband transition from a rectangular waveguide (W, D, G bands) to a circular waveguide (Q band) for the DNP applications is presented. The transition is compact, and provides high return loss (~40 dB) and low insertion loss (S_{21}) ~0.2 dB at high frequency can potentially solve the challenges of transition design such as an efficiency of energy transmission from microwave source to the sample for multiband DNP systems. The dimensions of the transitions were optimized in a full-wave simulator. Properties of the window for DNP applications such as dimensions, mounting place and dielectric losses at different frequencies are presented. To verify the design and simulation results the prototype of scaled transition is realized and tested experimentally in K band.

[1] F. D. Doty, "Probe Design and Construction," 2007.
[2] N. Marcuvitz, Waveguide Handbook. IET, 1951.
[3] W. A. Huting, "Rectangular-to-Circular Waveguide Transitions for High-Power Circular Overmoded Waveguides," Sep. 1989.

SPATAL-DISPERSION CHARACTERISTICS OF TWO-DIMENSIONAL PHOTONIC CRYSTALS

V.S. Shubnikov, *ASP -53fm*
(Sumy State University),
A.M. Diadechko, *ELA*
(Sumy State University)

In recent years the list of application fields of devices based on photonic crystal technology is increasing. They are getting especially popular in such fields as basic electronics, optical fiber information transfer, laser technology. That makes theoretical and experimental studies of such systems relevant.

In this paper the method of decomposition into plane waves dispersion and spatial characteristics of two-dimensional crystals of the type of air-dielectric triangular configuration that can be used as waveguide and resonance systems in the wavelength range from millimeter to optical were analyzed by means of numerical simulation of the task on eigenvalue for stationary Helmholtz equation. The theoretical model includes two artificial crystals with the rod and hole structure in which the stacking factor is normalized to the period varied in the range from 0.1 to 0.5.