OPTIMIZATION OF A PHOTONEUTRON W-Be-SOURCE OF THERMAL NEUTRONS

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The design of a photoneutron source based on the 8 MeV electron linac LUE-8 of INR RAS is considered. The source consists of tungsten bremsstrahlung converter, beryllium neutron-producing target, polyethylene neutron moderator and radiation shielding.

A computer model of the source was built. The optimization of the source construction and its parameters was performed by means of the MCNP5 (Monte-Carlo-N-Particle) code which simulates the processes of interaction of electrons, photons and neutrons with structural elements of the source.

The optimal parameters of tungsten converter and a beryllium target were chosen. The values of the flux of thermal and fast neutrons and gamma rays inside and outside the source were obtained at various dimensions of the moderator and the radiation shielding. The obtained results indicate the possibility to achieve the thermal neutron flux density of ~ 10^8 n/cm^2/sec in the irradiation cavity of the source.