

Conception of Secure Atomic Energy Plant With Subcritical Reactor and 100 MeV Proton Accelerator, A. GLAZKOV, A. DIDENKO,

A. KOLJASKIN, MEPhI; G. HORASANOV, PhEI; V. KALANTAROV, ISDAR - One of the perspective tendencies in creation of secure atomic energy plants is a hybrid nuclear reactor-neutron type system investigation. Reactor is in slightly subcritical regime in which a chain reaction is supported only by extra neutrons injected into active zone of reactor from neutron generator. A security of this system is ensured by the possibility to swiftly switch-out generator and to create the lack of neutrons for the short time and to stop the reaction. This paper presents the results of the preliminary researches on the feasibility to realize the neutron generator with the proton beam accelerated to energy essentially lower than 1 GeV. We decided on 1.0×10^{18} 1/sec neutron flux corresponding to reactor electrical power 100 MW. The analysis shows that said flux may be achieved with proton energy 100 MeV and continuous beam current 160 mA. The proton beam with the said parameters may be created by the RF linear accelerator (without superconductivity) and 100% duty factor. The accelerator length and input RF power may be estimated as 50 m and 27 MW if shunt impedance is 100- 200 MOhm/m.