

## Review of the project

“Research of deep subcritical electronuclear systems and possibilities of their application for energy production, transmutation of radioactive waste and research in the field of radiation material science

### Part 3

## QUASI-INFINITE TARGET

Head: S.I.Tyutyunnikov

This project is devoted to development of the new direction in nuclear power, uses of power of the beam of relativistic particles for driven nuclear reaction in fuel assembly (ADS).

The researches which were carried out in VBLHEP from 2010 to 2013, showed interesting experimental results. There was an experimental set up with a beam of nuclei into NUCLOTRON, which included part of the target "Quinta" from 500 kg of natural uranium, system for monitoring the input beam.

There was developed and implemented a new method for measuring of the neutron generated in the target range, both in the «in situ», and in the passive mode.

There were investigated dependences to the energy yield in the uranium assembly from the energy of incident deuterons, production  $\text{Pu}^{239}$  in the reaction  $\text{U}^{238} (\text{n}, \gamma)$  hardness neutron spectrum of the secondary radiation and neutron leakage spectra were measured on the surface of the installation.

In the offered project II part – the quasi-infinite target, will be created experimental installation on the basis of target assembly from 20 t natural uranium and a complex of measuring devices which will allow to conduct researches of distribution of neutron flux in set up with sizes which exceed the diffusion length, i.e. as show the offered calculations, neutrons leakage will be at the level of by 5-10%.

The project will get the results on the energy output, i.e. to measure the energy multiplication factor of the input beam.

Similar installation is constructed for the first time, both in the Russian Federation, and in Europe and can already serve for study of engineering benchmark in area of ADS-systems.

The work devoted to research in the field of radiation material science is very important too.

I consider it appropriate implementation of the proposed project.

Professor



M.G.Sapozhnikov