Subcritical Assembly in Dubna - Research Program for ADS-Demo Experiment.

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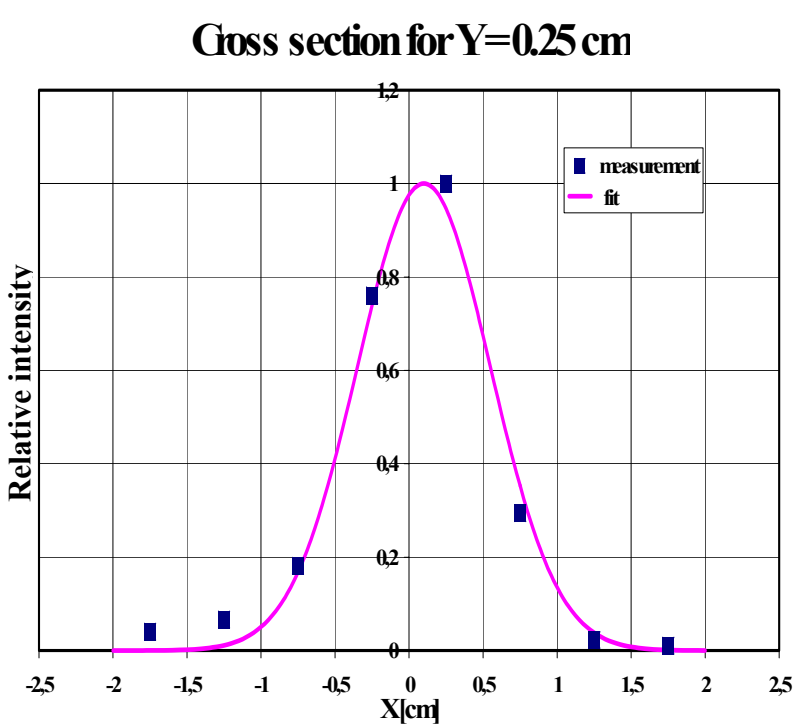
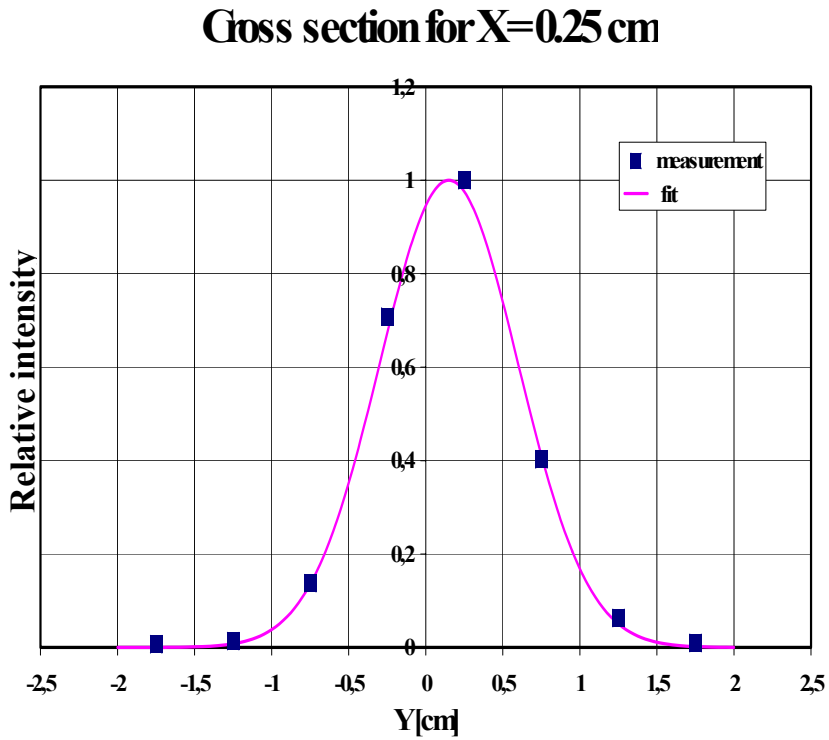
Research Program for ADS-Demo Experiment.

1. Studying the heat generation and neutron flux in the target and experimental channels for different target materials and different position of the target in the subcritical assembly.

Beam profile will be measured with Al activation detectors, matrix of thermoluminescent detectors and profilometer.

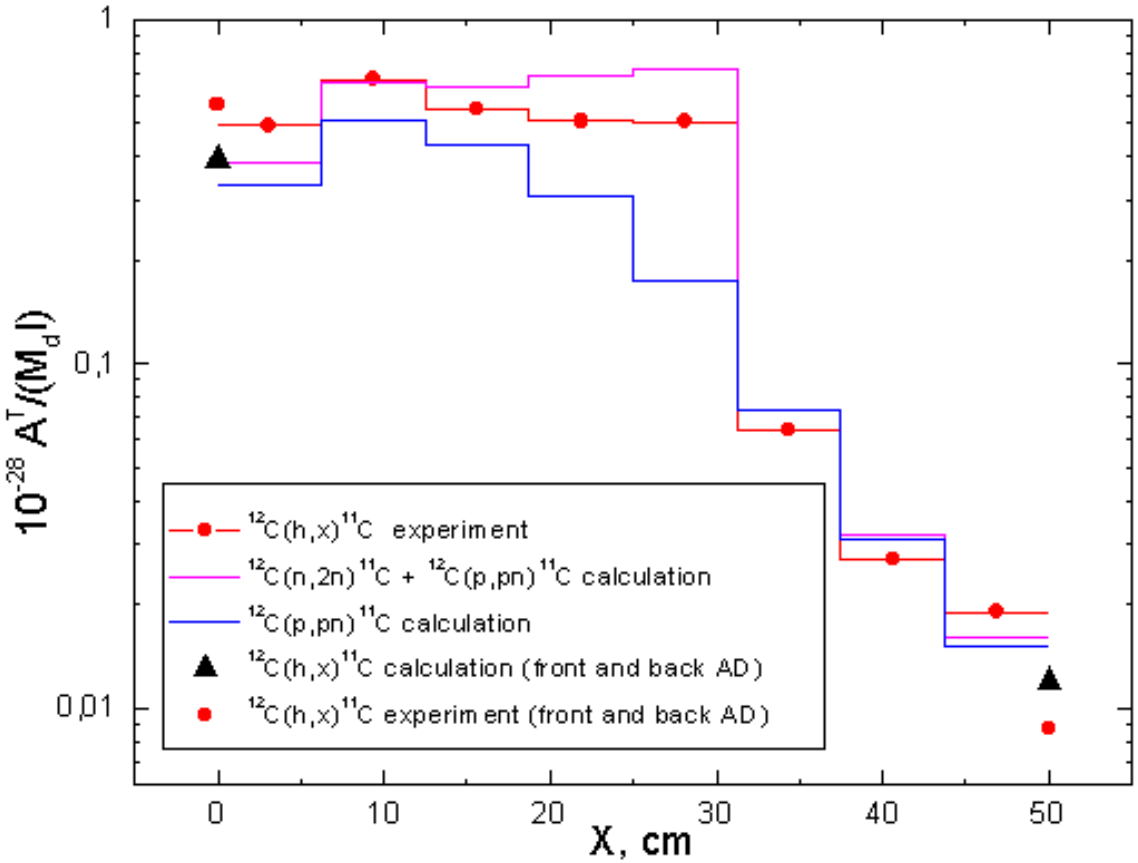




Particular attention will be given to validation of the core power/beam current relationship

- Power level will be monitored by two certified channels with 3 neutron sensors (high sensitivity fission chamber, low sensitivity fission chamber; boron current chamber)
- To investigate neutron field in fast energy region absolute reaction rates will be determined for 12C, 27Al, 59Co,64 Cu, 115In,197Au, 209Bi.

2. Study of distributions of the radionuclides activity induced in the target.



Study of distributions of the radionuclides activity induced in the target.

- SAD will have a replacable spallation target Pb and W options are foreseen with different sizes, changeable proton spot-point and different beam shapes.
- To investigate of proton and neutron field and activity in spalation target reaction rates will be determined for 12C , 27Al, 59Co,64 Cu, 115In, 197Au, 209Bi and target samples, Pb and W.

3. Study of kinetic properties of multiplication coefficient fluctuation of subcritical electronuclear system.

- In SAD scientific program it is proposed to pay attention for experiments on measurements and monitoring of the keff. It is planned to measure keff average value by means of inverse multiplication, asymptotic period and other techniques.

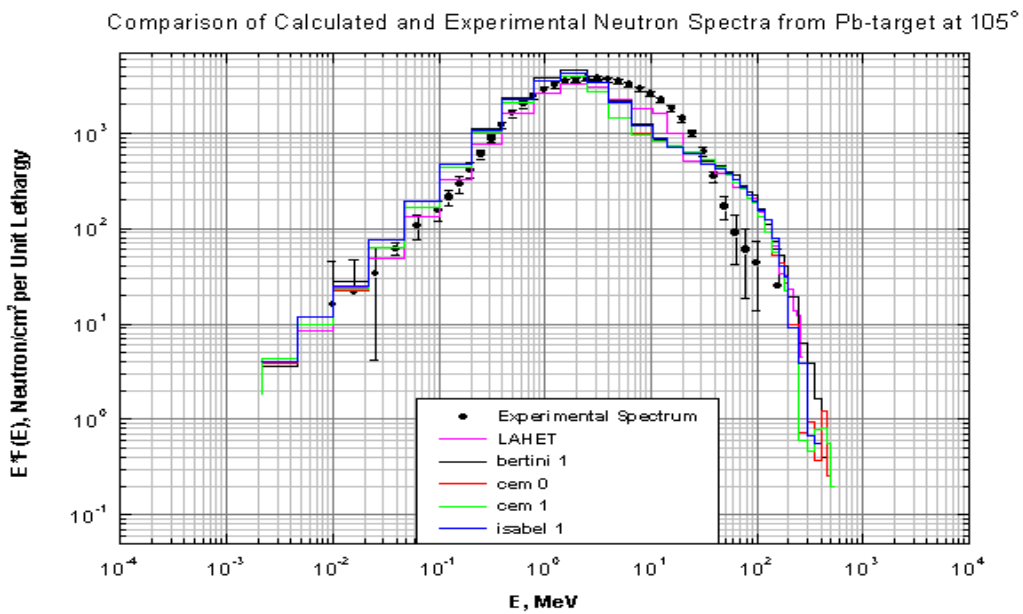
4. Investigation of the neutron spectra and formation of residual nuclei from the radioactive 99Tc, 129I , 135Cs , 237Np, 241Am, 243Am samples.

- Small samples of 99Tc, 129I , 135Cs , 237Np, 241Am, 243Am will be exposed in experimental channels. The (n.γ) and (n,f) transmutation rates will be determined for these nuclides.

5. Investigation of neutron and proton spectrum across and behind lead reflector and concrete shield.

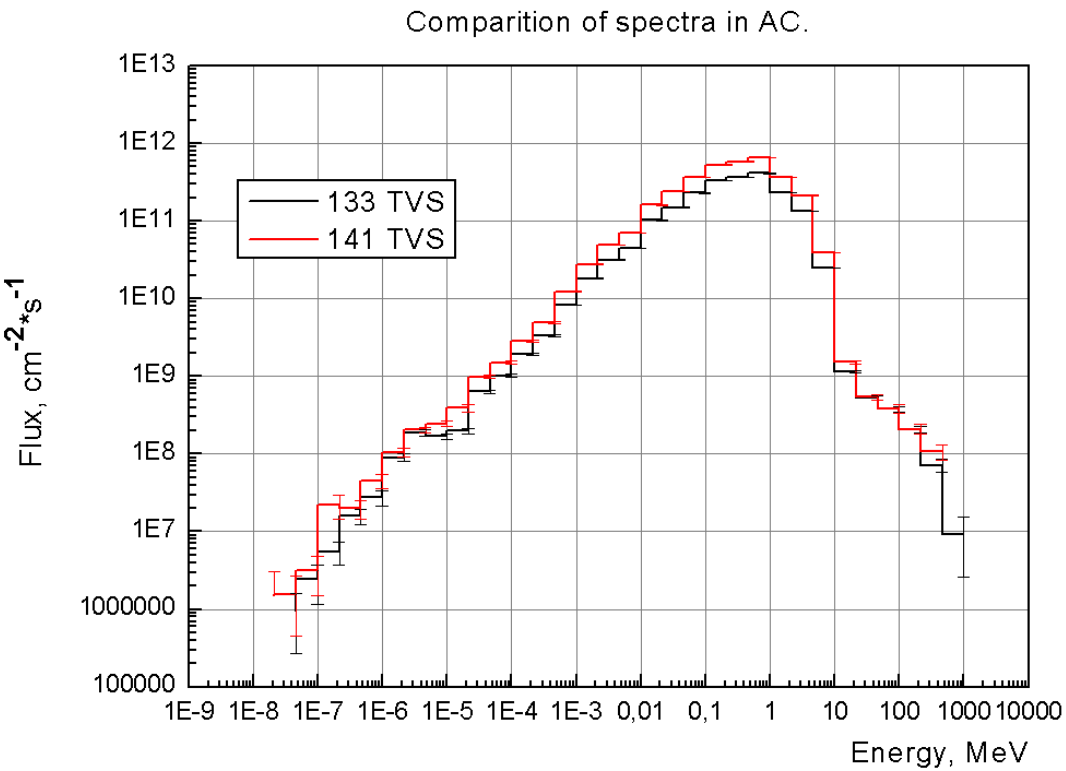
- In the neutron-shielding experiment, we usually use the activation methods using the simple reactions, such as 209Bi(n, xn)209-xBi, 27Al(n, α)24Na and spallation products on 197Au target.

5. Investigation of neutron and proton spectrum across and behind lead reflector and concrete shield.



Comparison of experimental results of the neutron spectra measurements at different angles with computer simulations of LAHET and MCNPX using different options for a high-energy

Comparison of neutron spectra for different Keff (0.952 for 133 TVS and 0.972 for141 TVS) in experimental channel.



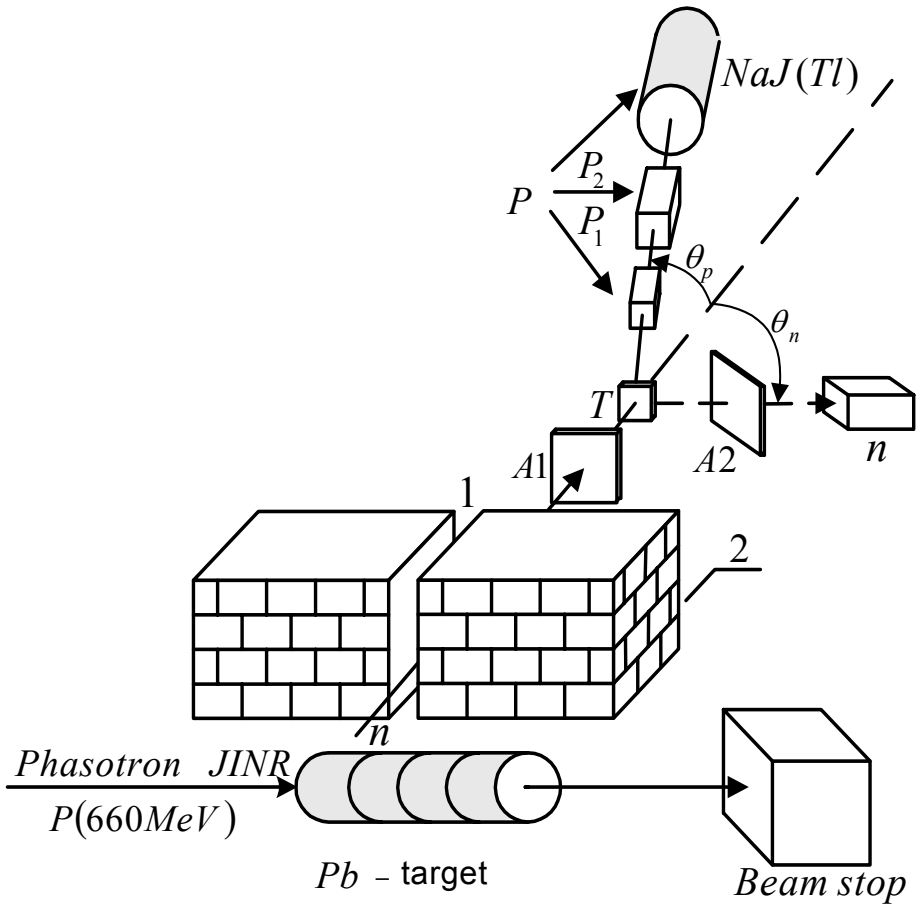
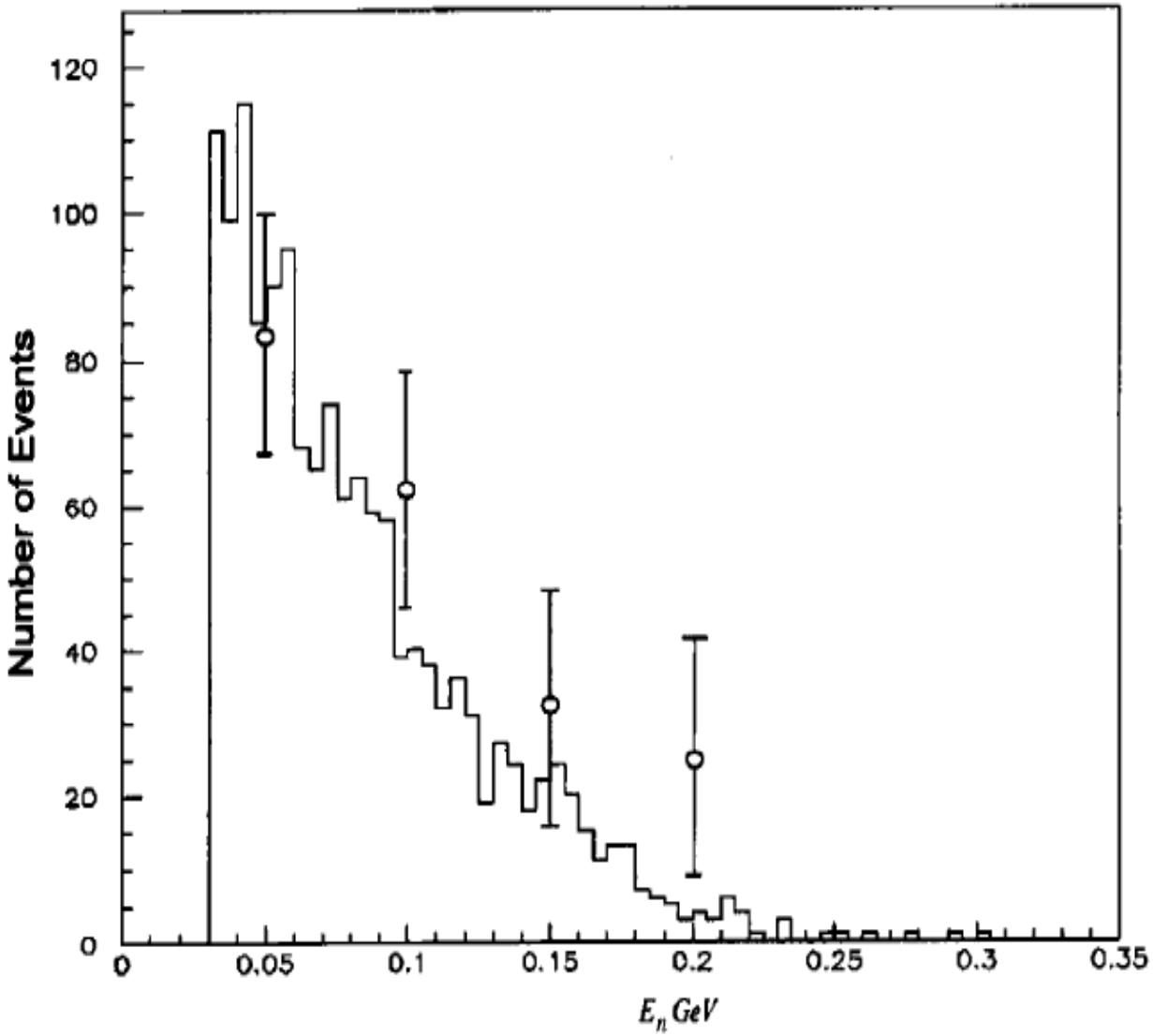


Fig. 2. The experimental set-up.



Energy spectrum of high energy neutrons emitted at 60 deg. from a lead extended target. Open circles-experiment results, histogram-GEANT simulation.