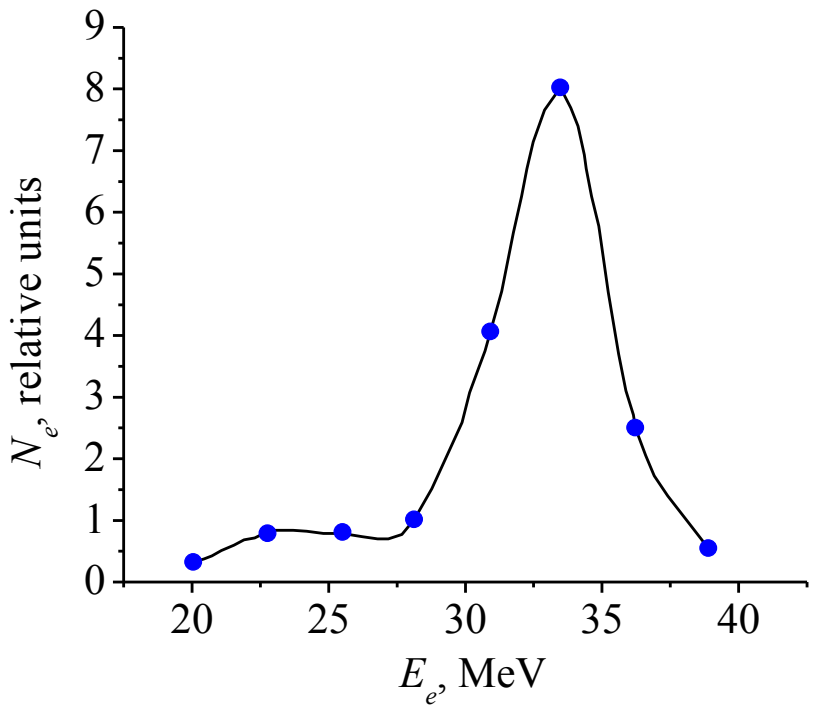
Measurements of the energy spectra of photoneutron reaction Ga (γ, n) in the giant dipole resonance

Mitrofanov K.V., Egorov A.S., Piksaikin V.M., Zolotarev K.I., Gremyachkin D.E., Samylin B.F.

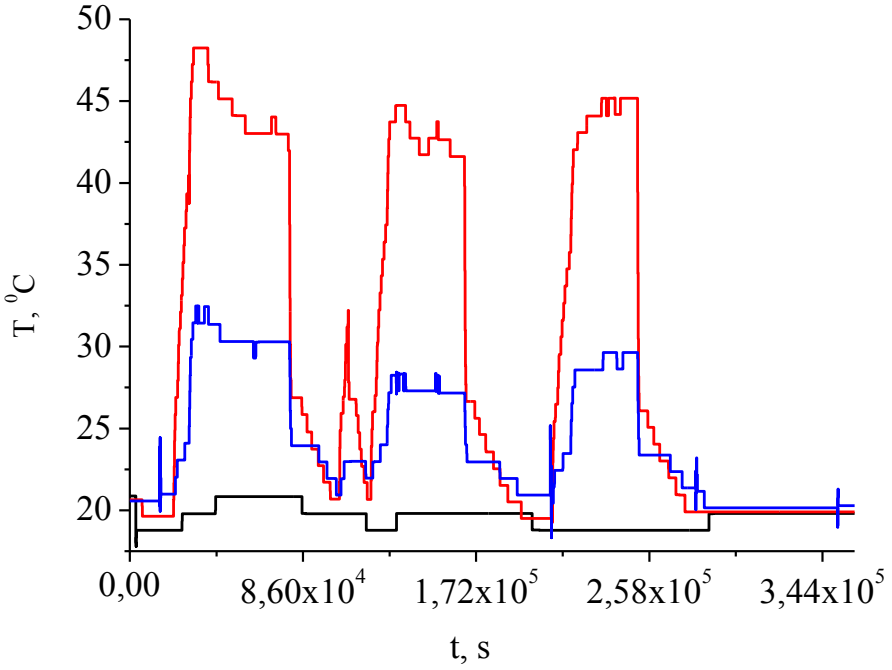
State Scientific Center of Russian Federation

Institute of Physics and Power Engineering, Obninsk, Russia

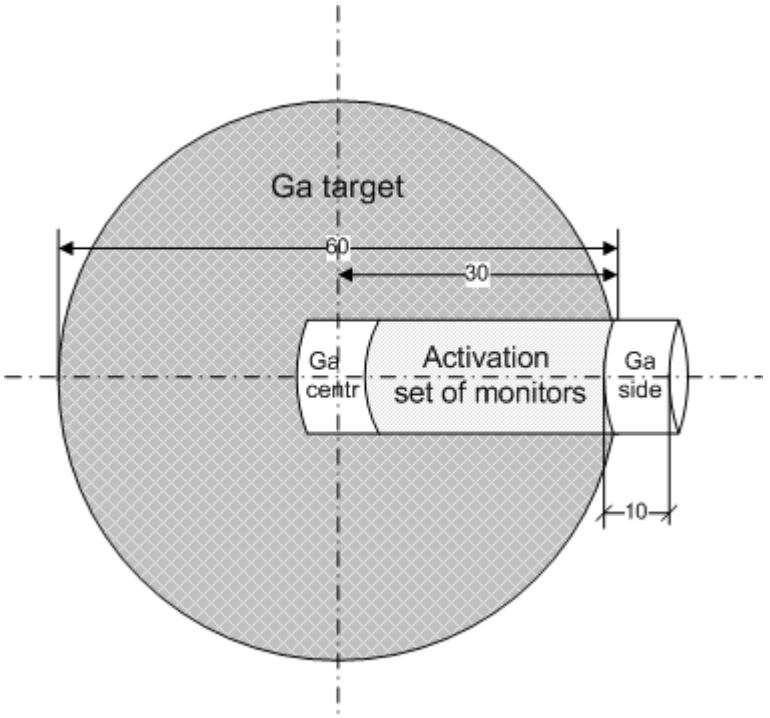
IREN Facility



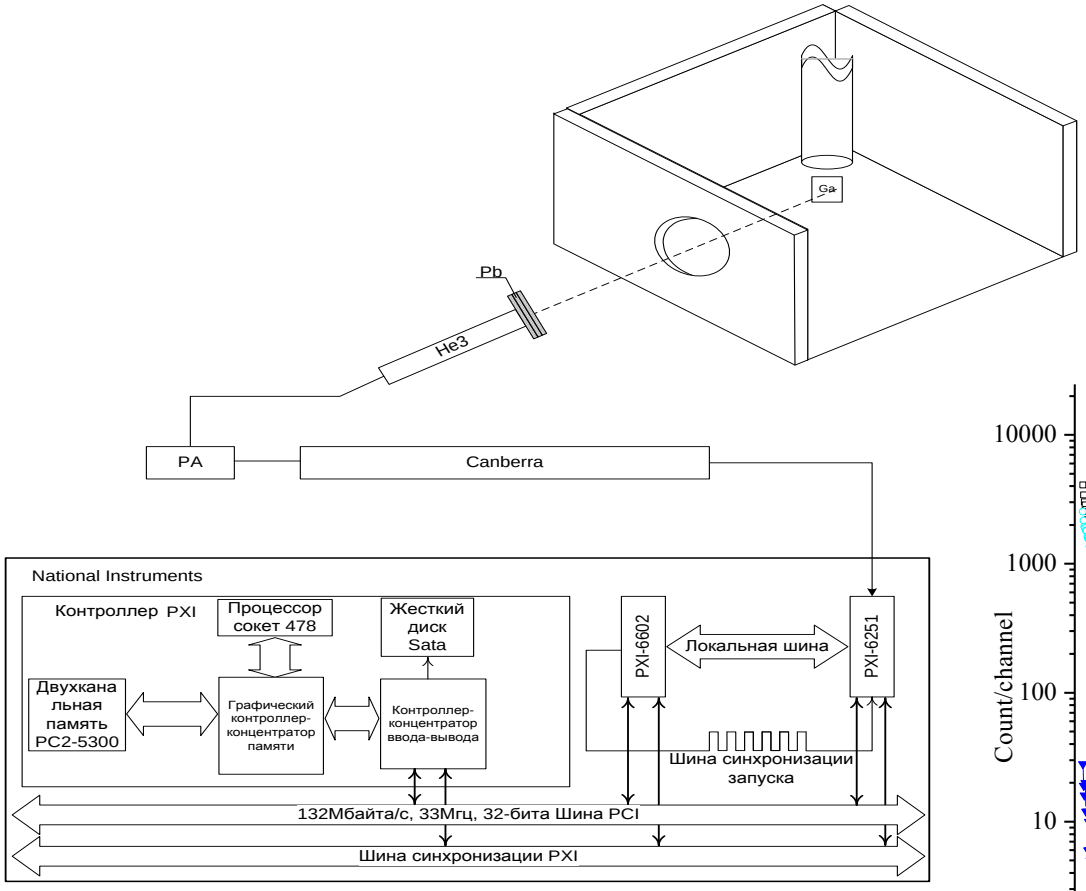
Energy of electrons pulse - 33.58 MeV
Pulse width - 0.1 ms
Current in the pulse - 1 A
Pulse repetition rate - 25 Hz

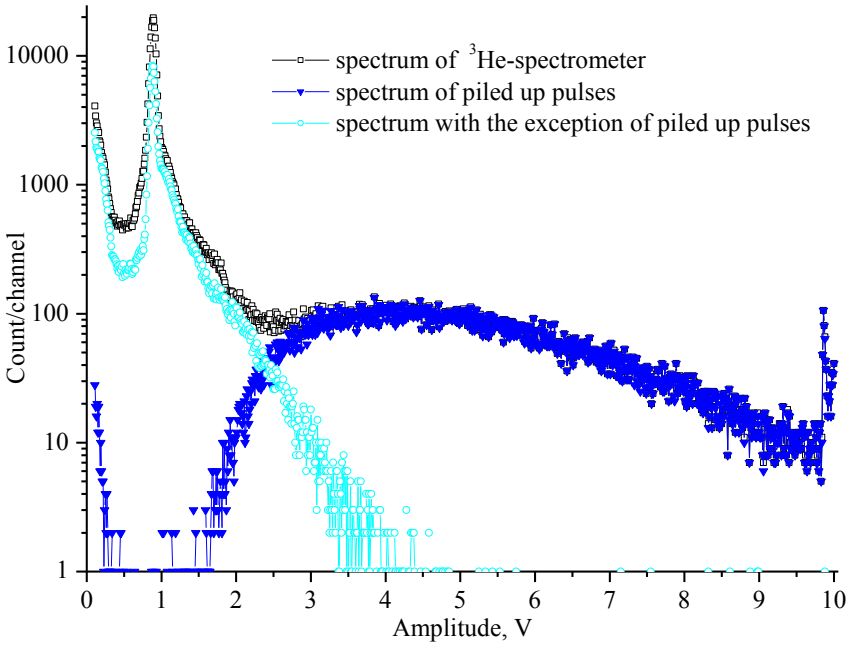


Ga target


Ga target
60
30
Ga
centr
Activation
set of monitors
Ga
side
10

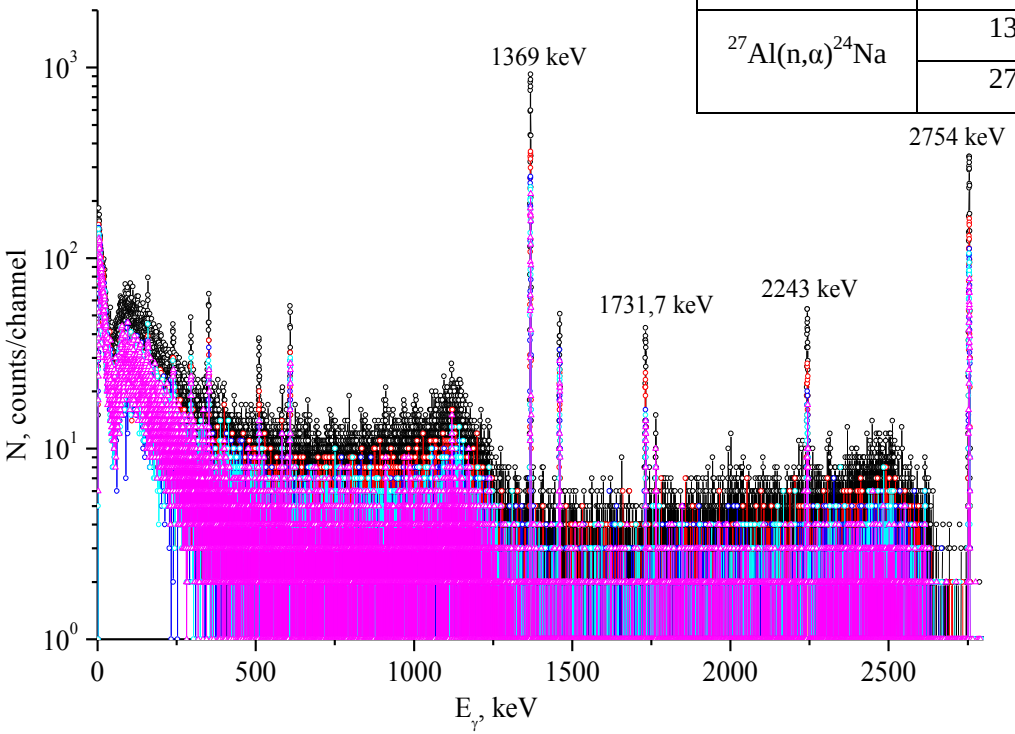
^{3}He-spectrometer



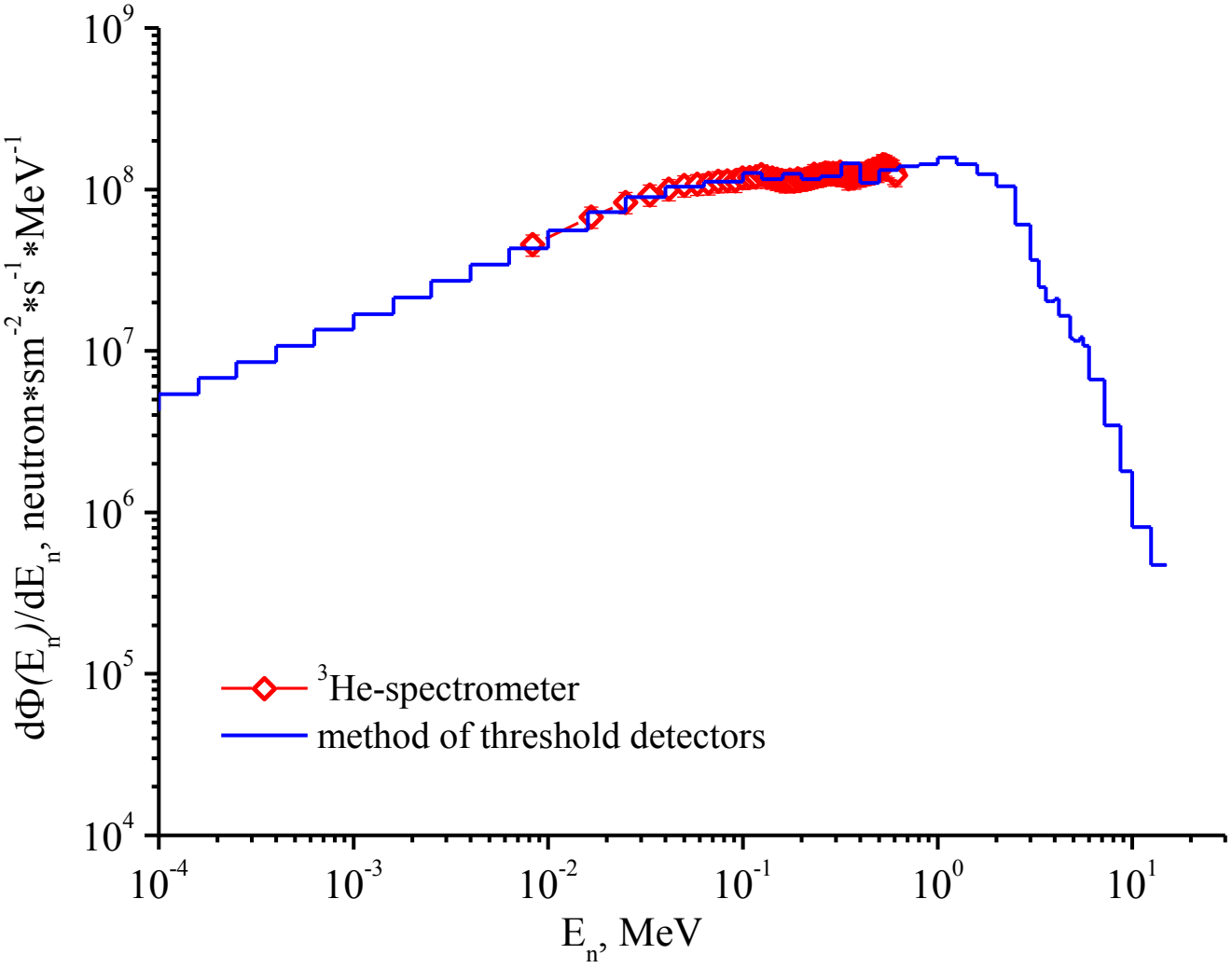


Activation monitors

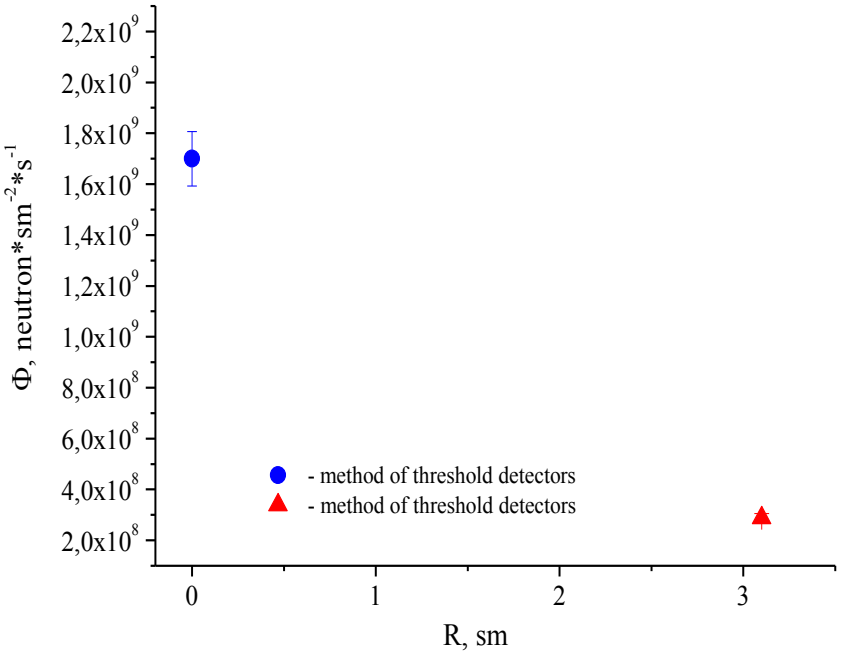
Reaction	Eγ, keV	R1, act/sec·nuclei	σ1, %	R2, act/sec·nuclei	σ2, %
$^{56}Fe(n,p)^{56}Mn$	847	$8.027 \cdot 10^{-19}$	16.9	$4.284 \cdot 10^{-19}$	8.3
$^{58}Ni(n,p)^{58}Co$	811	$1.381 \cdot 10^{-17}$	5.7	$1.362 \cdot 10^{-17}$	4.1
$^{63}Cu(n,\gamma)\ ^{64}Cu$	511.16	$3.27 \cdot 10^{-17}$	1	$2.477 \cdot 10^{-16}$	1
	1345.93	$4.426 \cdot 10^{-17}$	10	$3.13 \cdot 10^{-16}$	8.3
$^{113}In(n, \gamma)^{114m}\ In$	190.64	$2.95 \cdot 10^{-15}$	3.1	$3.805 \cdot 10^{-16}$	2.5
	558.56	$3.333 \cdot 10^{-15}$	2.9	$4.165 \cdot 10^{-16}$	7.4
	725.28	$3.277 \cdot 10^{-15}$	3.2	$4.192 \cdot 10^{-16}$	8.1
$^{115}In(n,n')^{115m}In$	336.53	$1.042 \cdot 10^{-16}$	2.2	$2.827 \cdot 10^{-17}$	4
$^{27}Al(n,\alpha)^{24}Na$	1369	$5.745 \cdot 10^{-19}$	4.4	$3.084 \cdot 10^{-19}$	12.6
	2754	$5.791 \cdot 10^{-19}$	6	$2.943 \cdot 10^{-19}$	17.9

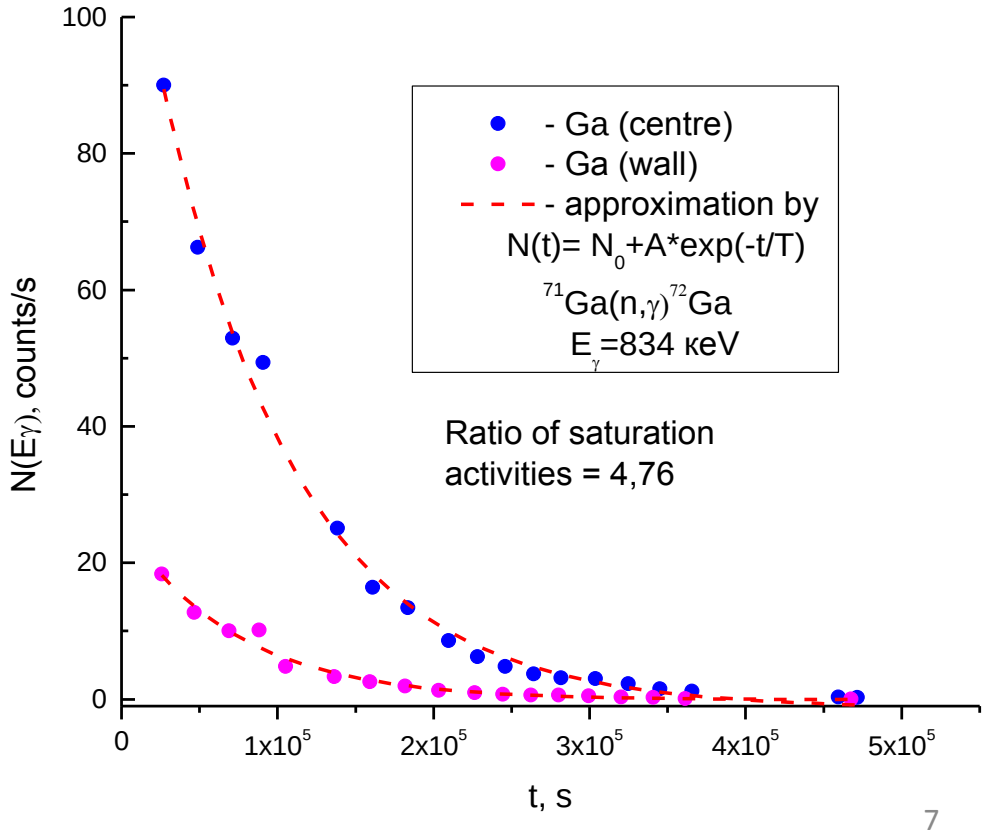


Energy dependence of the flux density



Radial flux density distribution





Conclusion

- Neutron flux density - $1.7 \cdot 10^{9}$ neutron$\cdot$cm$^{-2}\cdot$s^{-1} for the average electron current of 2.5 mA

- Average energy of photoneutrons – 2.17 MeV

- Background level on the surface of the irradiated gallium target is achieved within 4.77 days.

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THANK YOU FOR YOUR ATTENTION!!!