Neutron emission from D2 gas in magnetic field under low temperature

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Contents

- 1: Before works
- 2: Experimental
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- 5: Discussion

Experimental study

- Neutron during electrolysis
- Transmutation material
- Isotopic Change
- Neutron from alternative treatment in heavy water and light water
- Neutron from pure deuterium gas

Reports for neutron emission

- Chicea, D. and D. Lupu, *Low-intensity neutron emission from TiDx samples under nonequilibrium conditions.* Fusion Technol., 2001. **39**: p. 108.
- Choi, E., H. Ejiri, and H. Ohsumi, *Application of a Ge detector to search for fast neutrons from DD fusion in deuterized Pd.* Jpn. J. Appl. Phys. A, 1993. **32A**: p. 3964.
- Choi, E., et al., *Search for time-correlated fast neutrons from DD fusion at room temperature.* Jpn. J. Appl. Phys. A, 1996. **35**: p. 2793.
- Cisbani, E., et al., *Neutron Detector for CF Experiments.* Nucl. Instrum. Methods Phys. Res. A, 2001. **459**: p. 247. No neutron
- Claytor, T.N., D.G. Tuggle, and H.O. Menlove. *Tritium Generation and Neutron Measurements in Pd-Si Under High Deuterium Gas Pressure.* in *Second Annual Conference on Cold Fusion, "The Science of Cold Fusion"*. 1991. Como, Ita: Societa Italiana di Fisica, Bologna, Italy.
- Jones, S.E., et al. *Neutron Emissions from Metal Deuterides*. in *Tenth International Conference on Cold Fusion*. 2003. Cambridge, MA:
- Oya, Y., et al. *Material Conditions to Replicate the Generation of Excess Energy and the Emission of Excess Neutrons*. in *The Seventh International Conference on Cold Fusion*. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT.
- Shyam, A., et al. *Observation of High Multiplicity Bursts of Neutrons During Electrolysis of Heavy Water with Palladium Cathode Using the Dead-Time Filtering Technique*. in *5th International Conference on Cold Fusion*. 1995. Monte-Carlo, Monaco: IMRA Europe, Sophia Antipolis Cedex, France.

Neutron emission during electrolysis (1995)

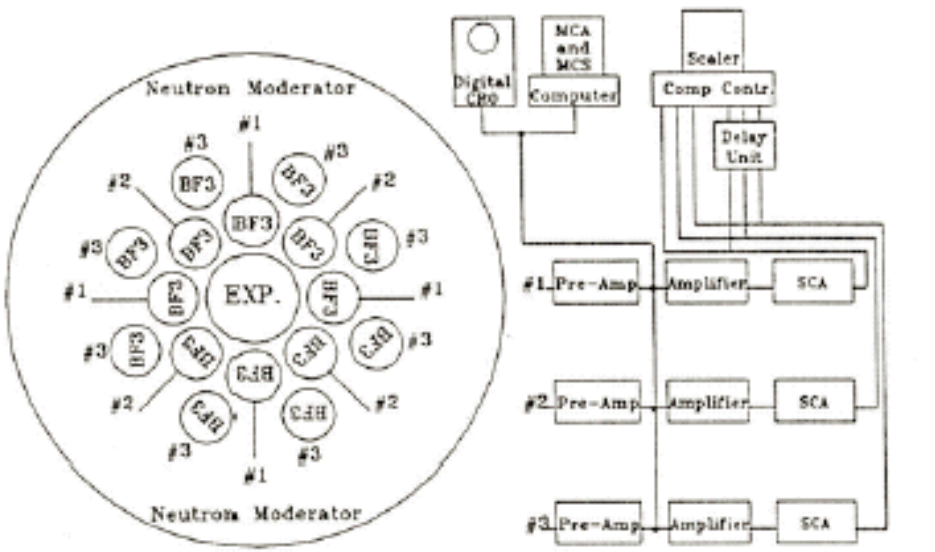
(Pd–D_2O)

Observation of High Multiplicity Bursts of Neutrons During Electrolysis of Heavy Water with Palladium Cathode Using the Dead-Time Filtering Technique

A. SHYAM, M. SRINIVASAN, T. C. KAUSHIK and L. V. KULKARNI

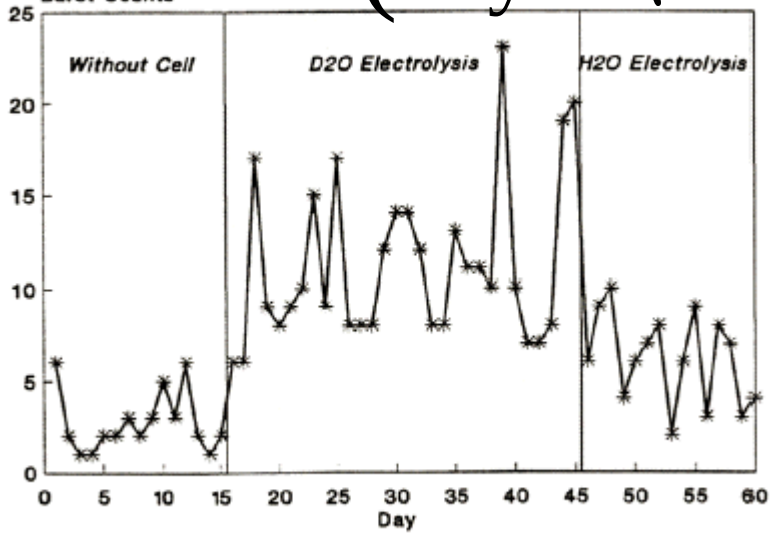
Neutron Physics Division,
Bhabha Atomic Research Centre
Trombay, Bombay 400 085, India.

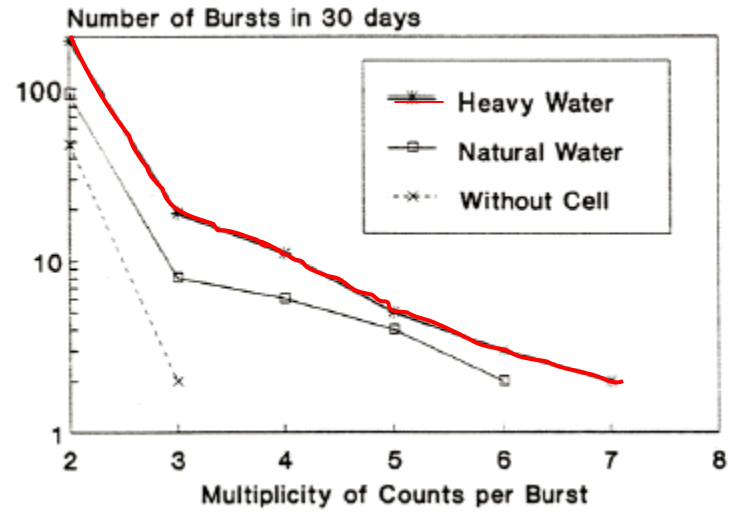
Measurement system



Schematic of Neutron Detection Setup

Results (Shyam、1995)





Heat and neutron during electrolysis (1998)

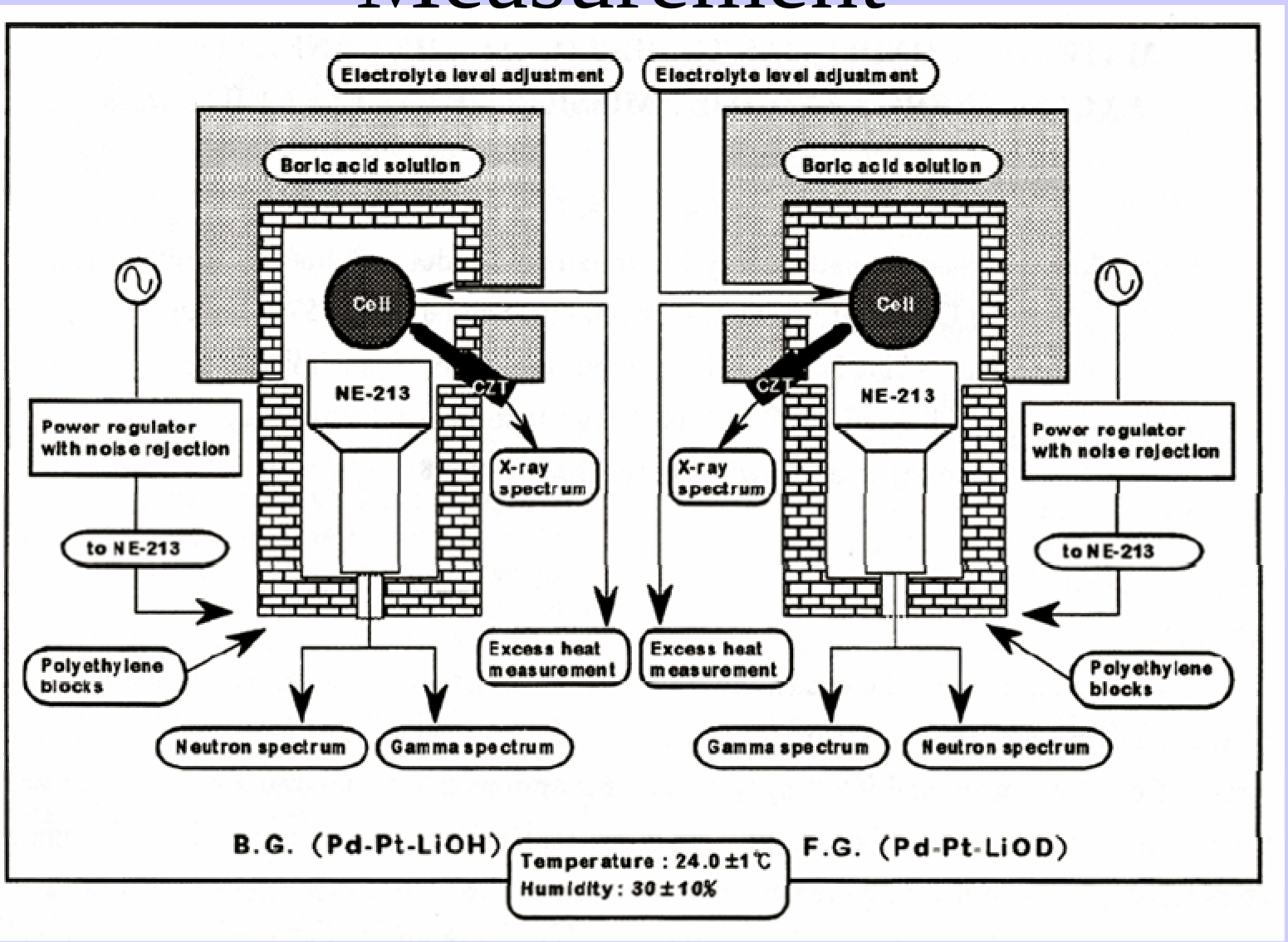
Pd-LiOD

The Seventh International Conference on Cold Fusion. 1998. Vancouver, Canada:, ENECO, Inc., Salt Lake City, UT. : p. 285.

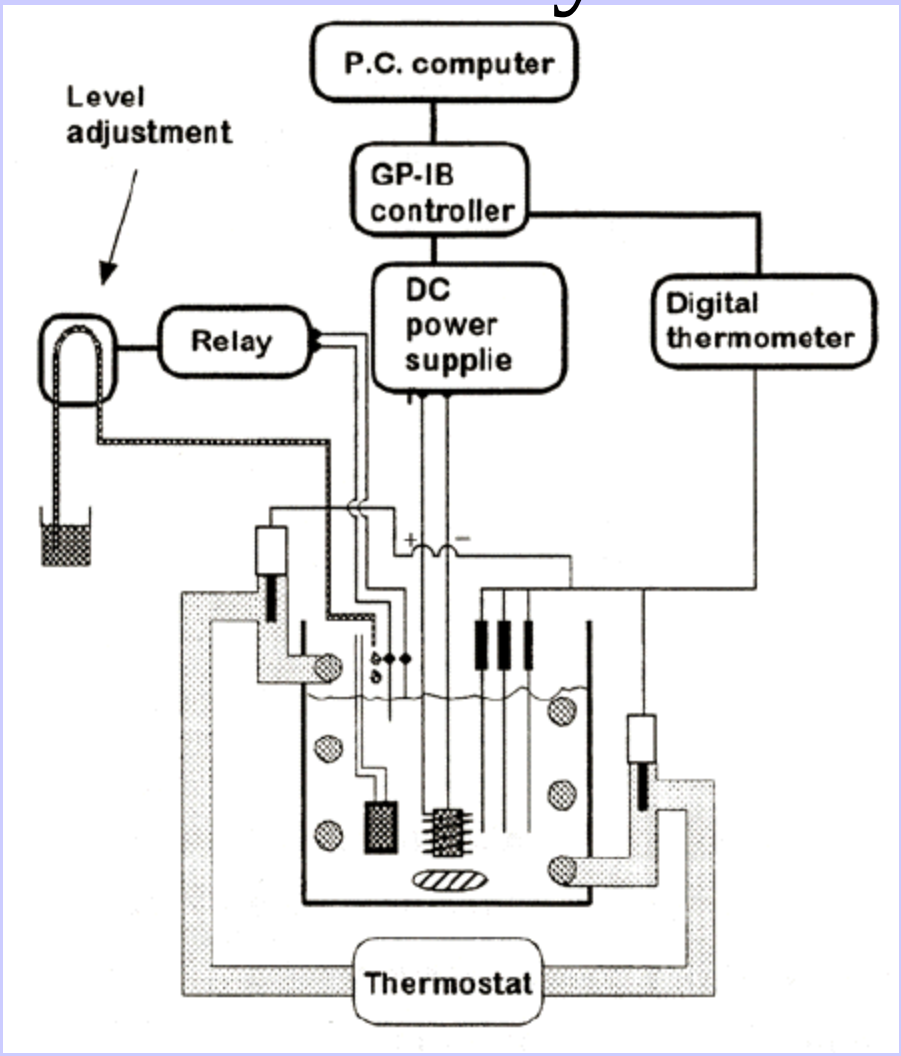
MATERIAL CONDITIONS TO REPLICATE THE GENERATION OF EXCESS ENERGY AND THE EMISSION OF EXCESS NEUTRONS

Y. Oya, H. Ogawa*, M. Aida*, K. Iinuma and M. Okamoto Dept. Quantum Science and Energy Engineering, Graduate School of Engineering,
Tohoku University, Aramaki, Aoba-ku, Sendai, 980-8579, Japan
Phone/Fax: +81-22-217-7911, E-mail: mokamoto@qse.tohoku.ac.jp
*Res. Lab. Nucl. Reactors, Tokyo Institute of Technology,
Ookayama, Meguro-City, Tokyo, 152-8550, Japan

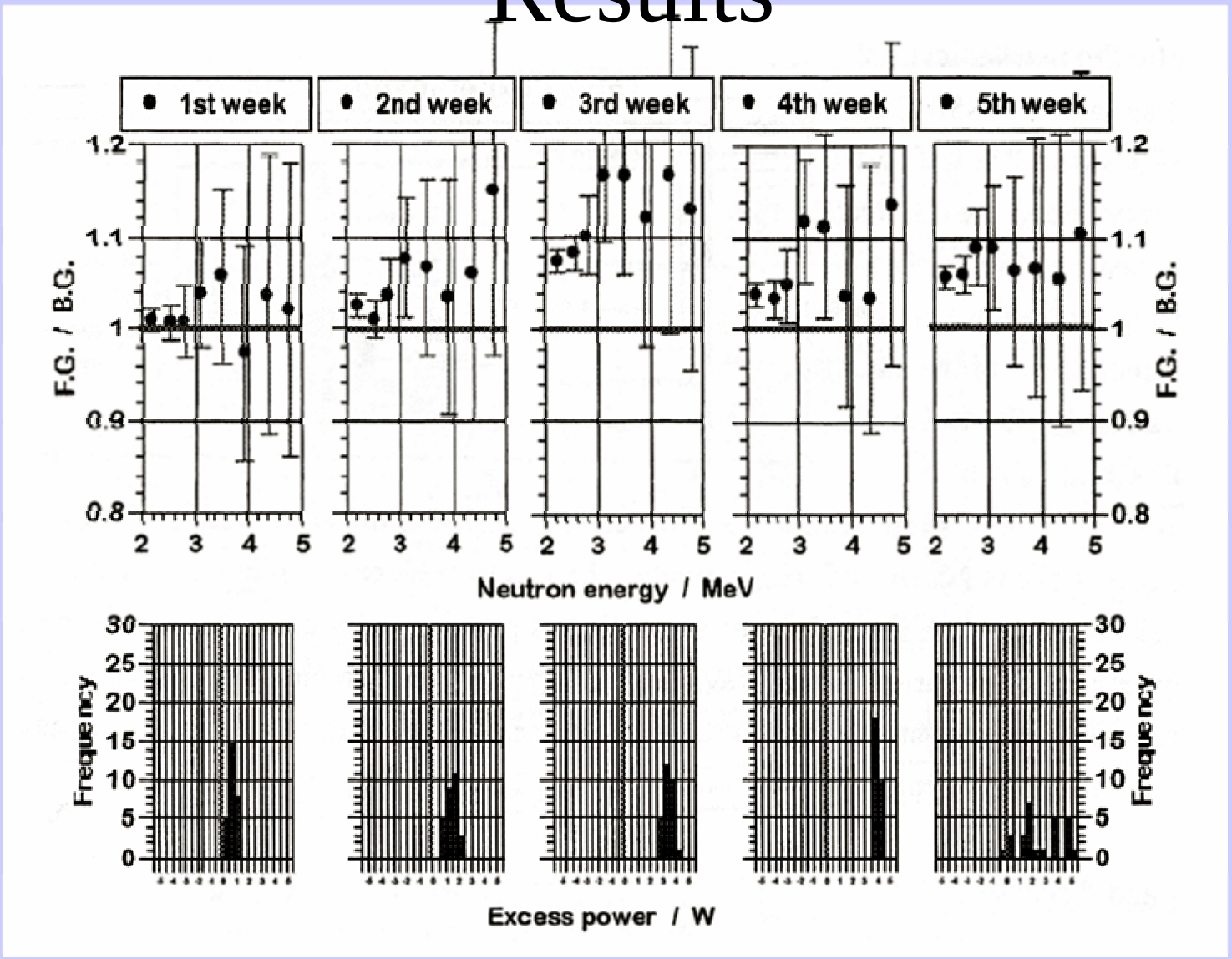
Measurement



electrolysis



Results


1st week
2nd week
3rd week
4th week
5th week
F.G. / B.G.
Neutron energy / MeV
Frequency
Excess power / W

Neutron emission by phase transition (2001)

(Ti–D2)

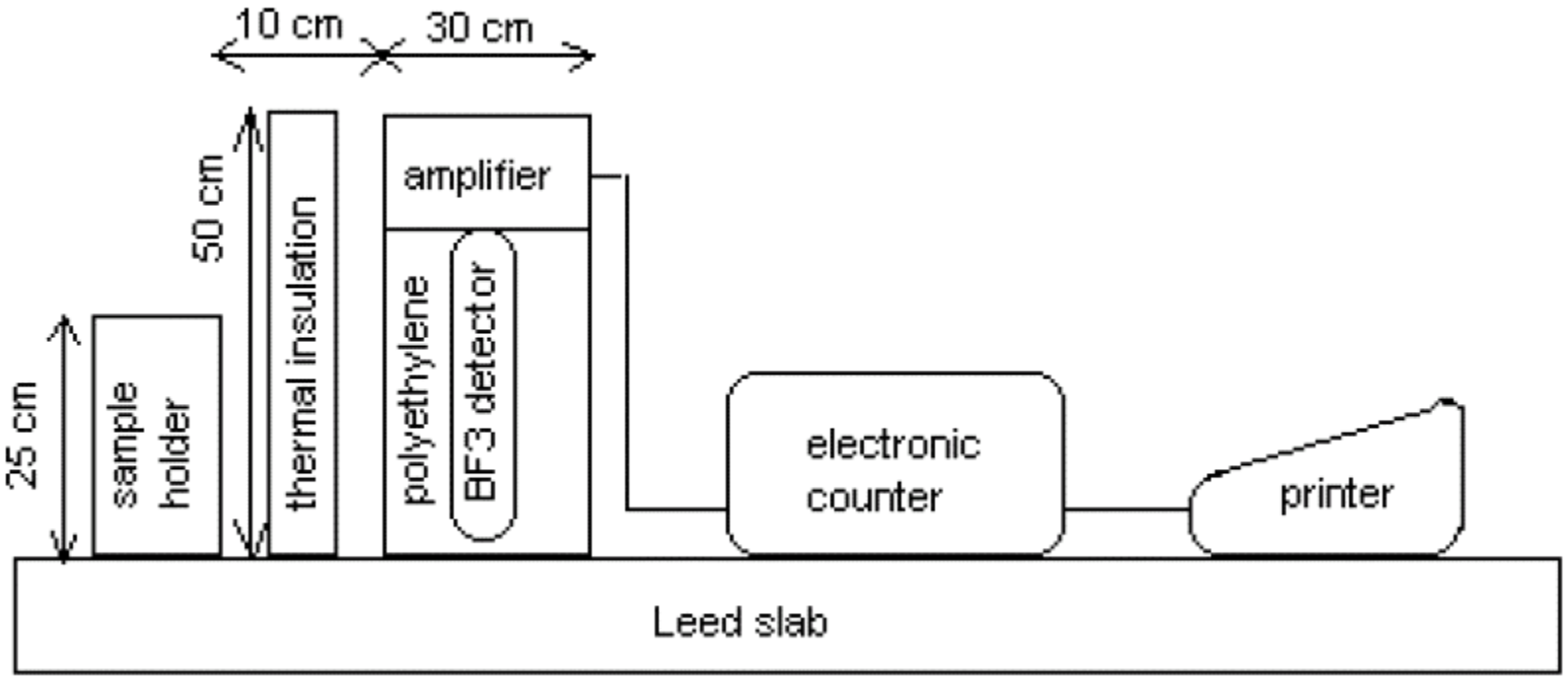
ON LOW INTENSITY NEUTRON EMISSION FROM TID_X SAMPLES UNDER NON-EQUILIBRIUM CONDITIONS

Dan Chicea, Physics Dept, University Lucian Blaga of Sibiu, Romania (E-mail: dchicea@jupiter.ulbsibiu.ro)

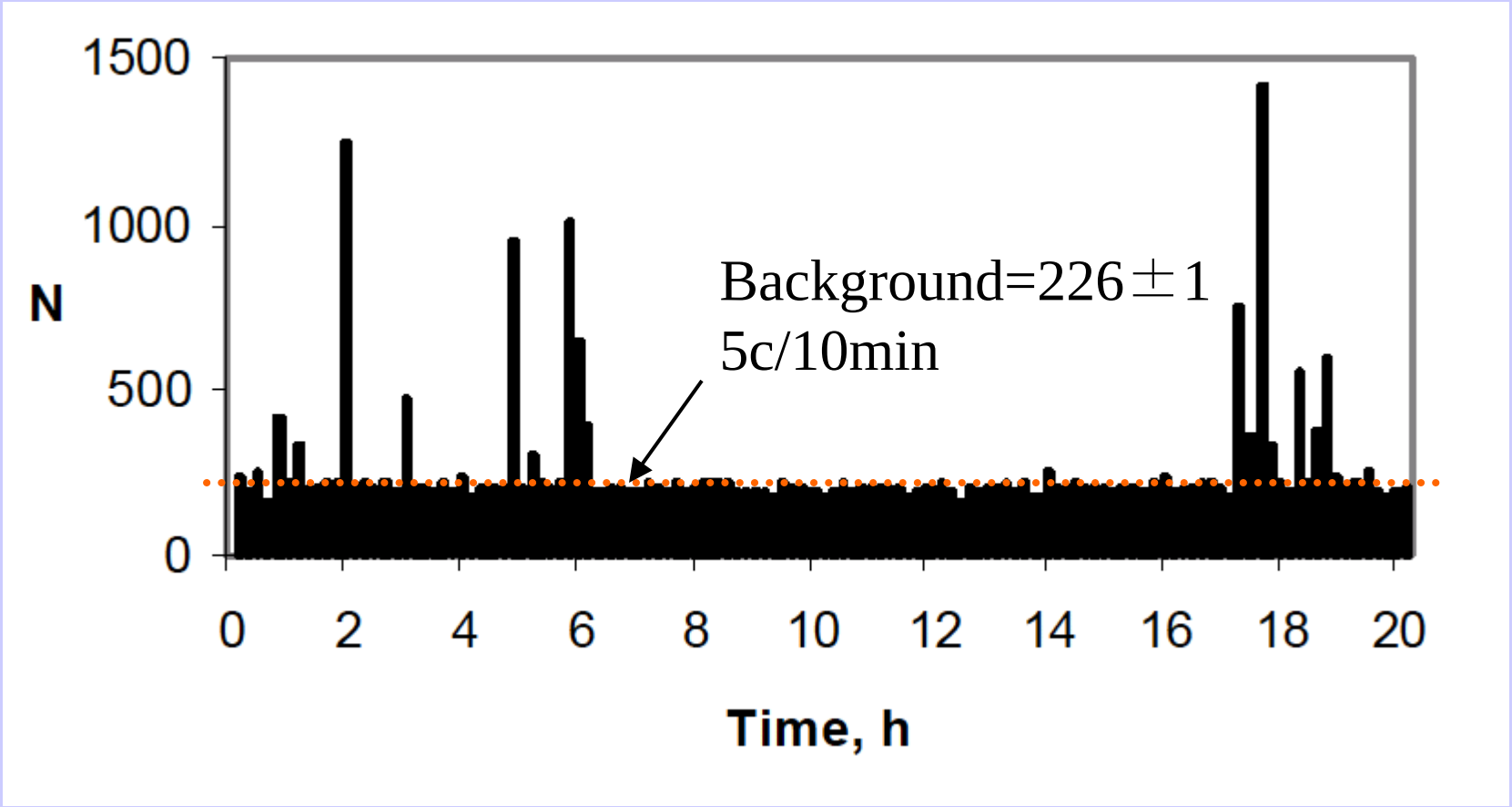
Dan Lupu, Institute of Isotopic and Molecular Technology, Cluj-Napoca, Romania

(article published in **Fusion Technology**, volume 39, issue 1, pp. 108-113, January 2001)

Experimental system



Results (Chicea,2001)



Neutron emission from TiD (2003)

(Ti-D2)

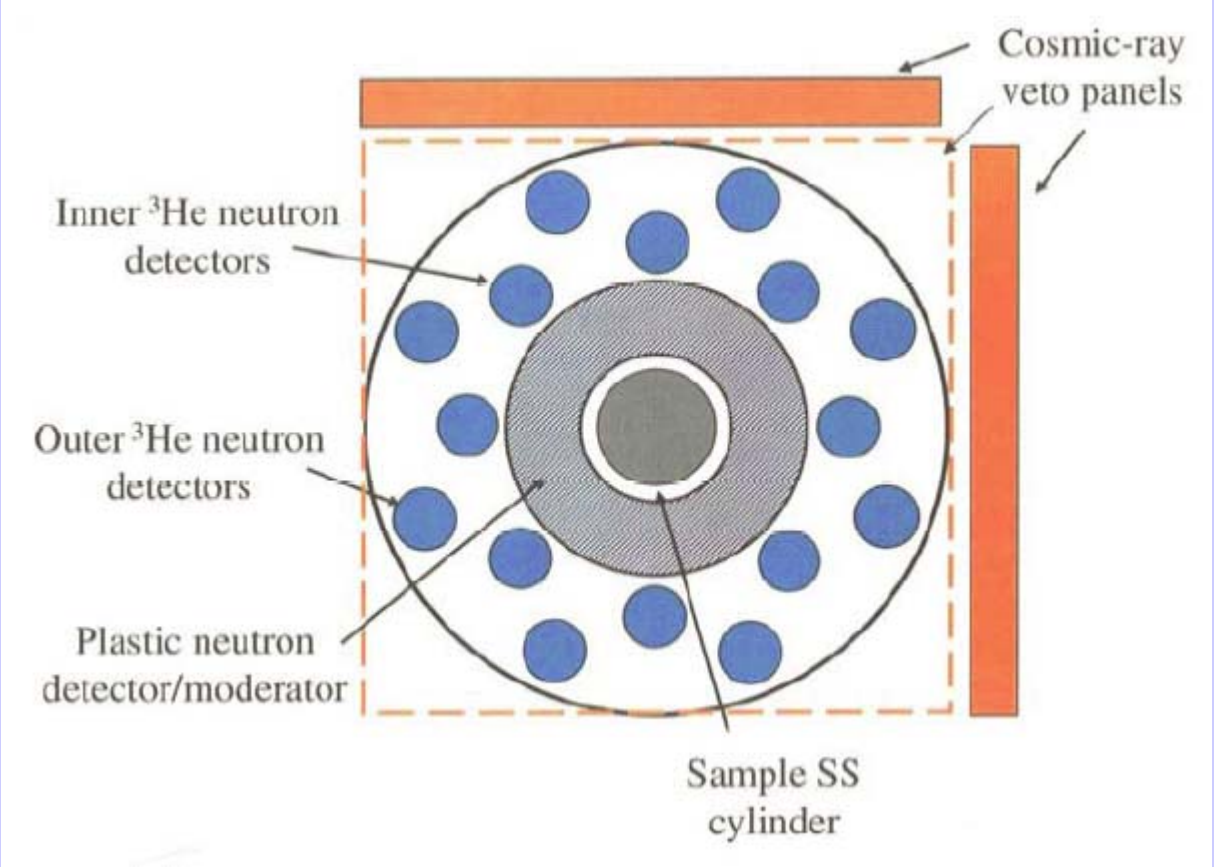
Jones, S. E., et al. *Neutron Emissions from Metal Deuterides*. in *Tenth International Conference on Cold Fusion*. 2003. Cambridge, MA: LENR-CANR.org. This paper was presented at the 10th International Conference on Cold Fusion. It may be different from the version published by World Scientific, Inc (2003) in the official Proceedings of the conference.

Neutron Emissions from Metal Deuterides

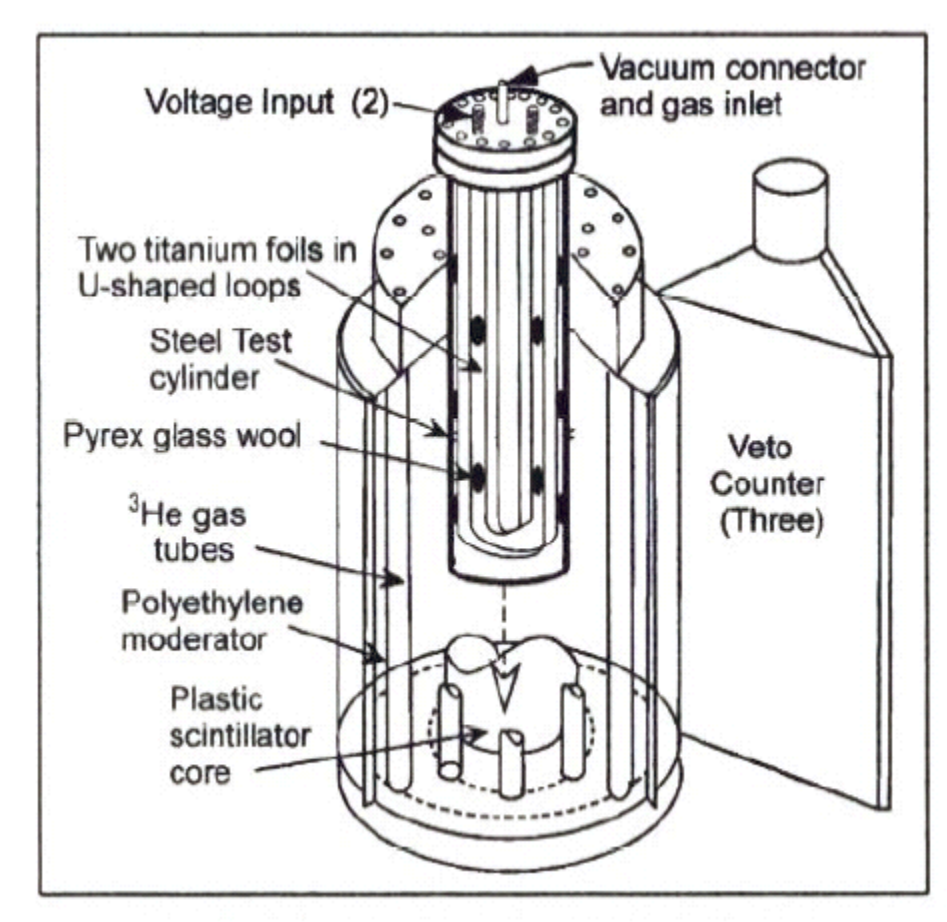
S. E. Jones[1], F. W. Keeney[2], A. C. Johnson[2], D. B. Buehler[2],
F. E. Cecil[3], G. Hubler[4], P. L. Hagelstein[5], J. E. Ellsworth[1], M. R. Scott[1]

[1] Department of Physics and Astronomy, Brigham Young University, Provo, UT 84604
[2] Particle Physics Research Co., LLC, 2000 Linda Flora Dr., Los Angeles, CA 90077
[3] Department of Physics, Colorado School of Mines, Golden, CO 80401
[4] U.S Naval Research Laboratory, Code 6370 Washington, D.C. 20375
[1] Dept. of Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA 02139

Measurement

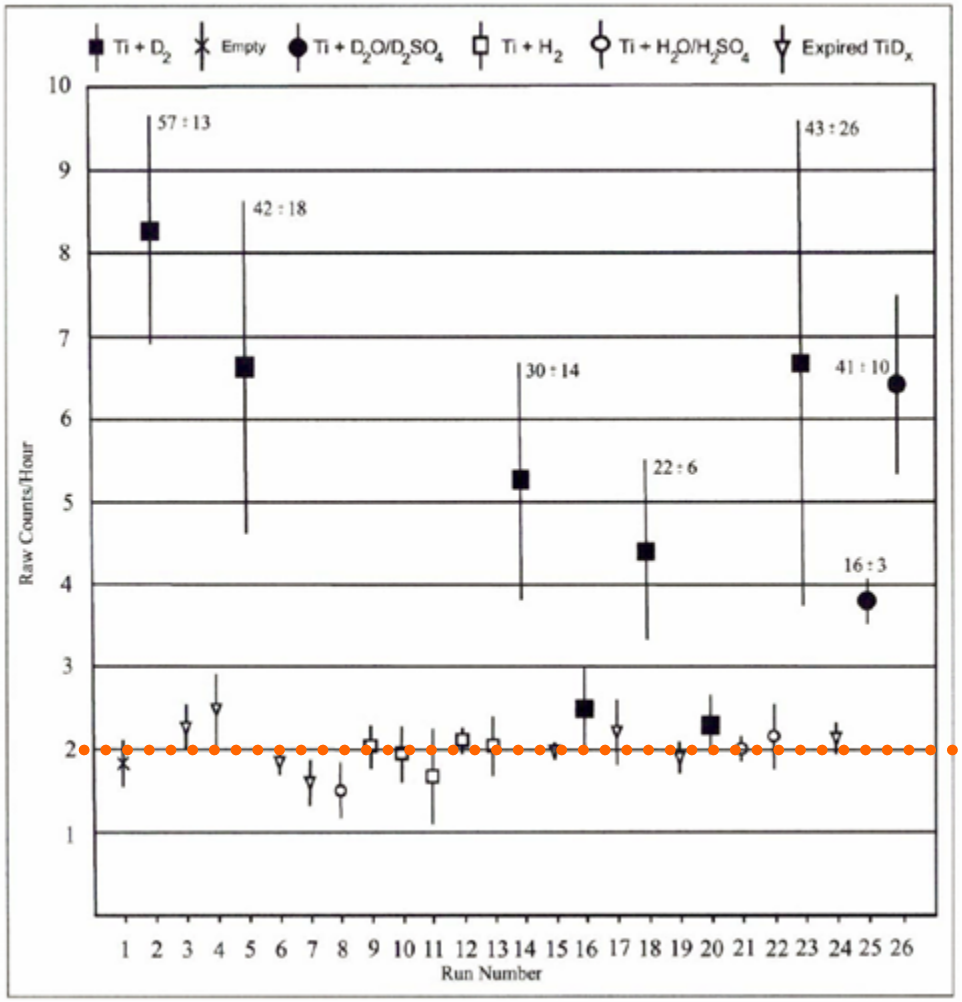


Cell


Voltage Input (2)
Vacuum connector and gas inlet
Two titanium foils in U-shaped loops
Steel Test cylinder
Pyrex glass wool
^{3}He gas tubes
Polyethylene moderator
Plastic scintillator core
Veto Counter (Three)

Results(Jones)

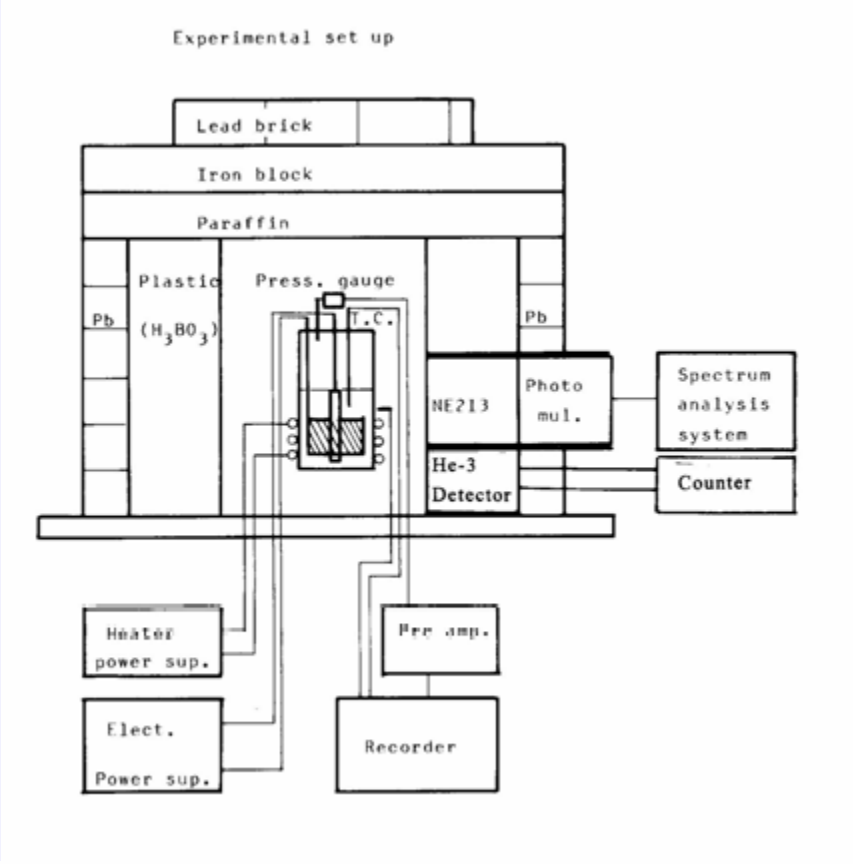
The data show that the background is well behaved and due primarily to cosmic rays with an average of 2.0 ± 0.2 counts/hour (cts/h).



Background=
2.0±0.2c/h

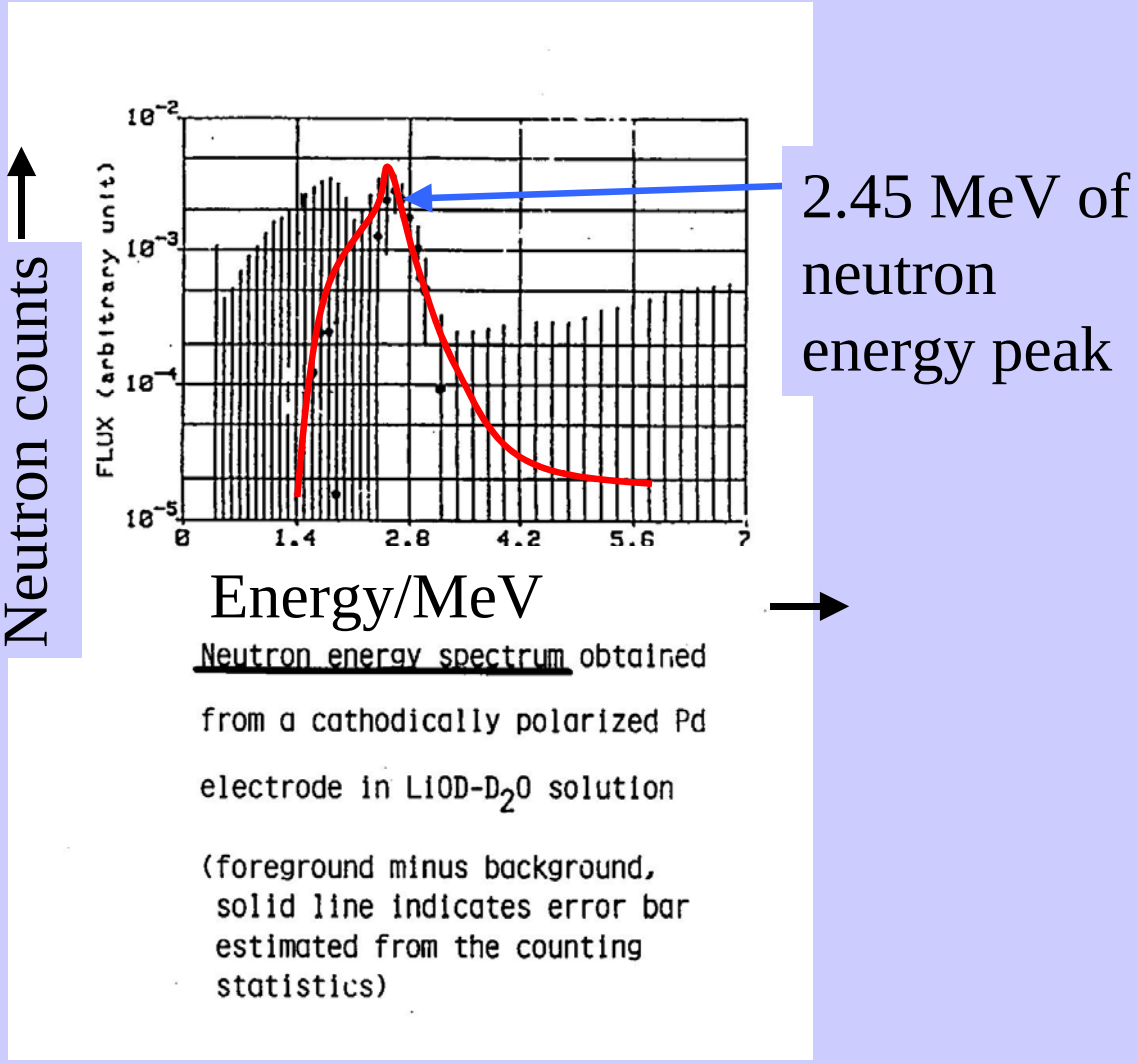
Fig. 3. Observed neutron yields from a series of deep underground experiments.

First method
neutron measurement system



Closed cell

Result


Neutron counts
FLUX (arbitrary unit)
10^{-2}
10^{-3}
10^{-4}
10^{-5}
0
1.4
2.8
4.2
5.6
7
Energy/MeV
2.45 MeV of neutron energy peak
Neutron energy spectrum obtained from a cathodically polarized Pd electrode in LiOD-D_2O solution
(foreground minus background, solid line indicates error bar estimated from the counting statistics)

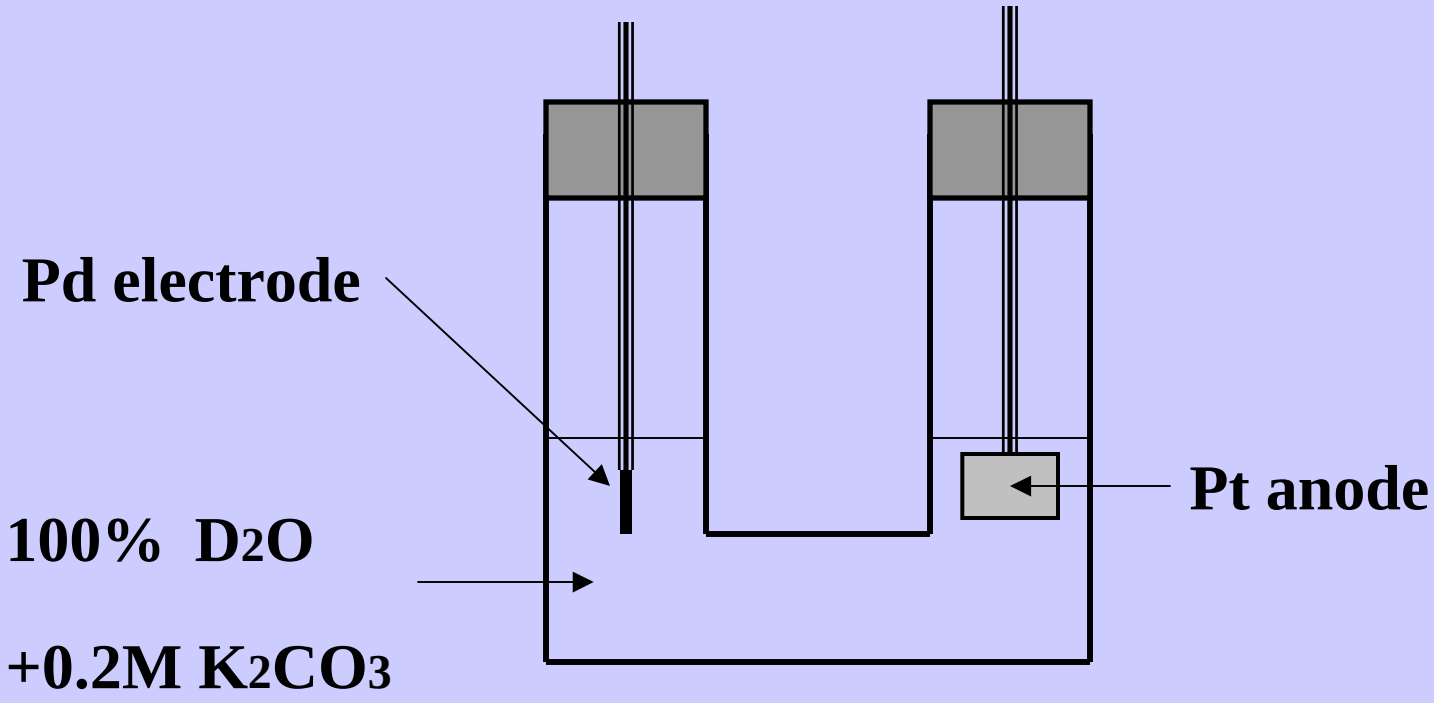
Result from the first method

- Heat , transmutation elements and neutron
- Rate of neutron emission: $\sigma = 10^{-23}$/d-d·s
- Difference between light and heavy water
- Difference between electrode material
- Theory

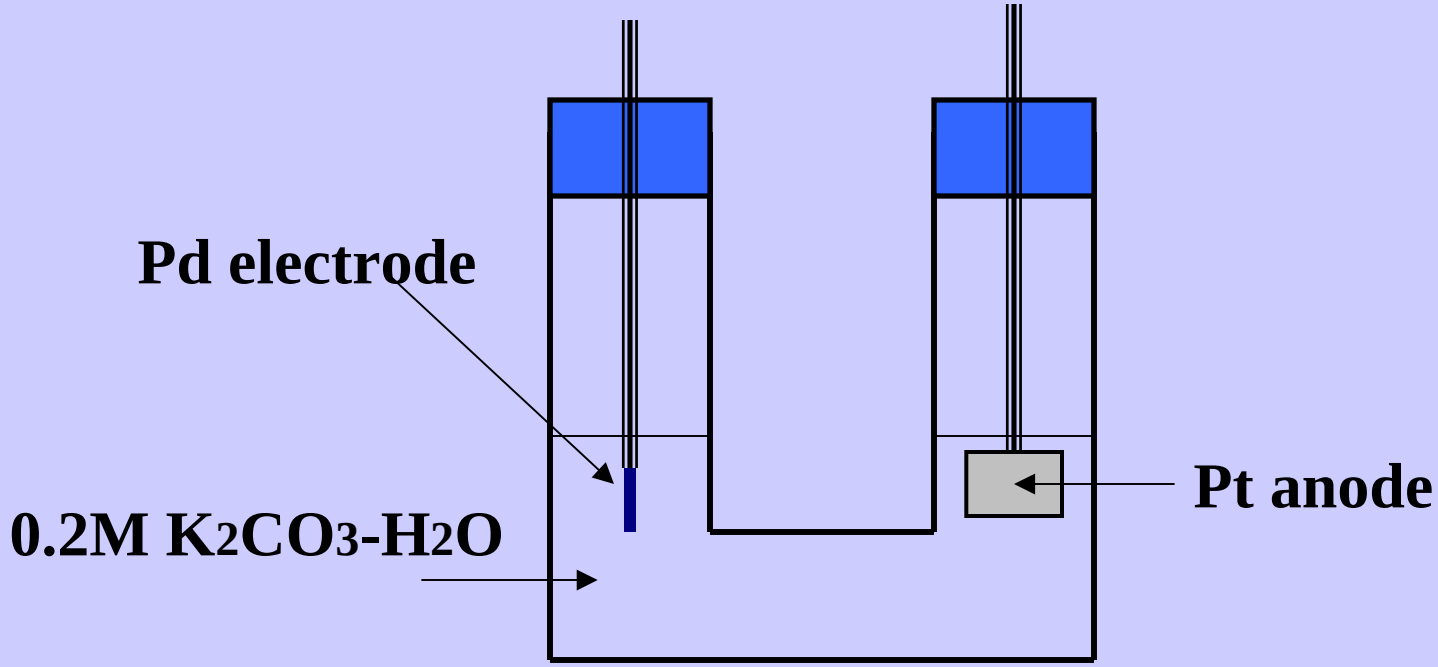
Variety of reaction method

- Electrolysis method (Pd, Pt, Ti, Ni electrode)
- Electrolysis by molten salt (KCl-LiCl-LiD)
- Electrolysis of solid electrolyte
- Discharge in D_2 gas
- Irradiation by deuteron ion
- Irradiation by ultra sonic sound
- D_2 gas absorption
- Plasma electrolysis
- Phase transitions

Second method
D2 absorption



Hydrogen absorption

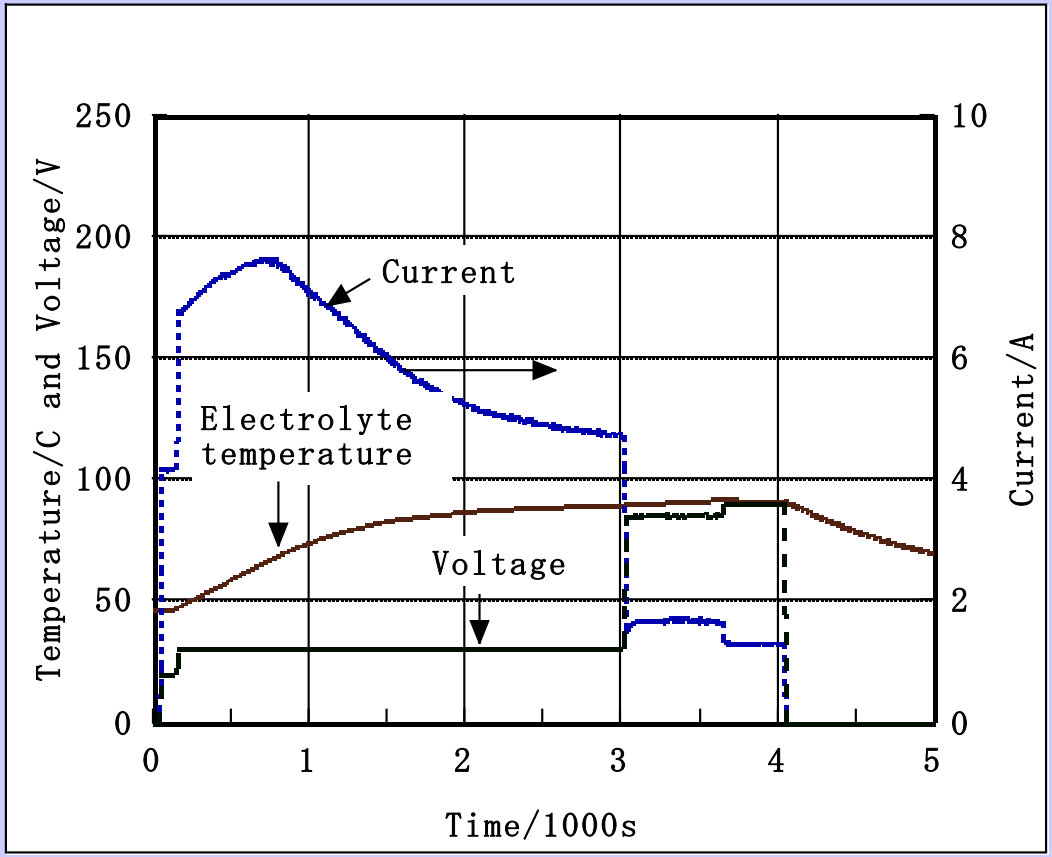


Electrolyte and sample

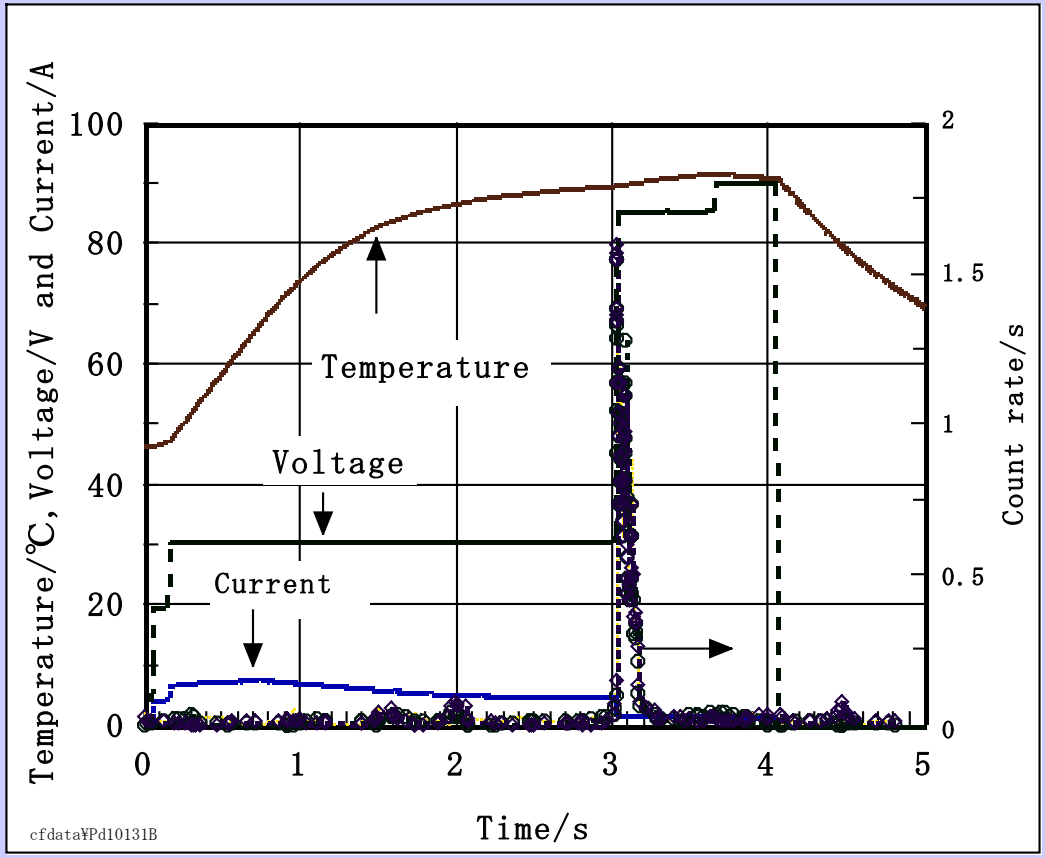
- Pd wire; Nilaco 99.95%, 1.0mmΦ×30mm
- D_2O; Acros Organic Co., 100%
- K_2CO_3 ; Kanto chemical Co., 99.5%

He3 detector

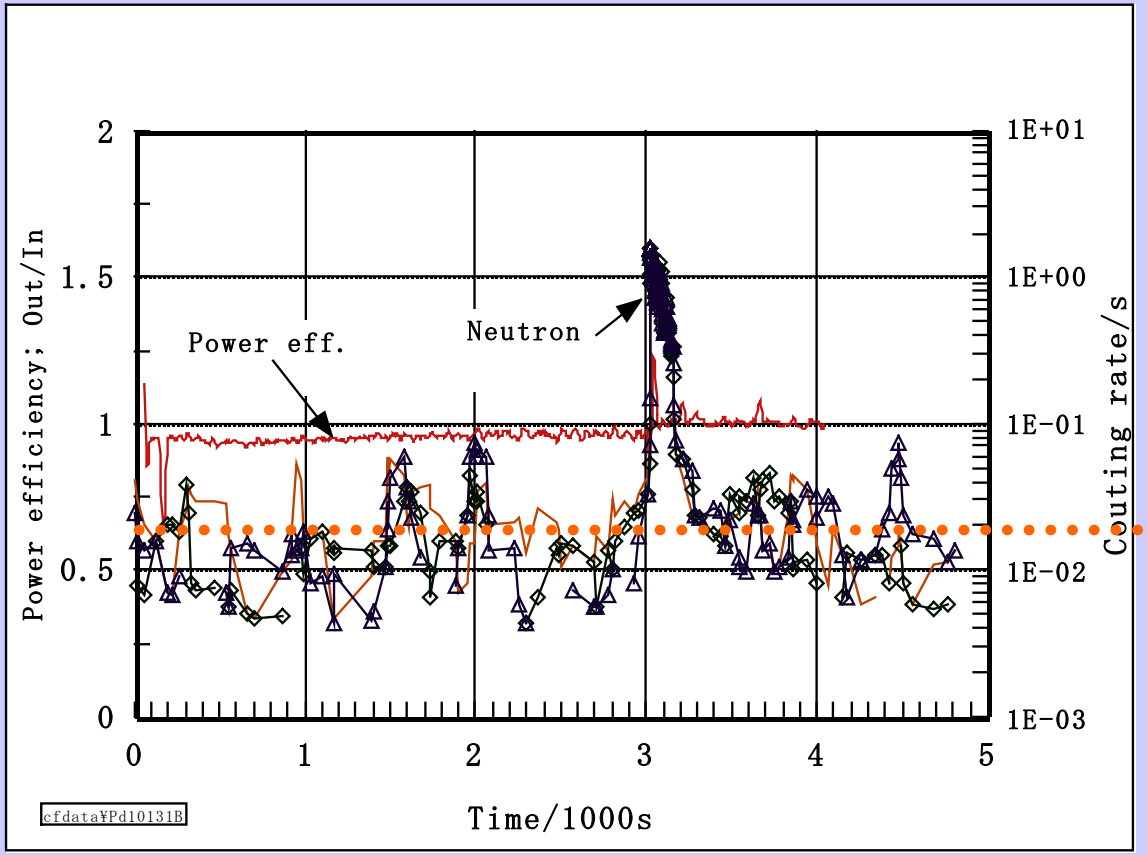
Voltage change in light water solution



Neutron emission

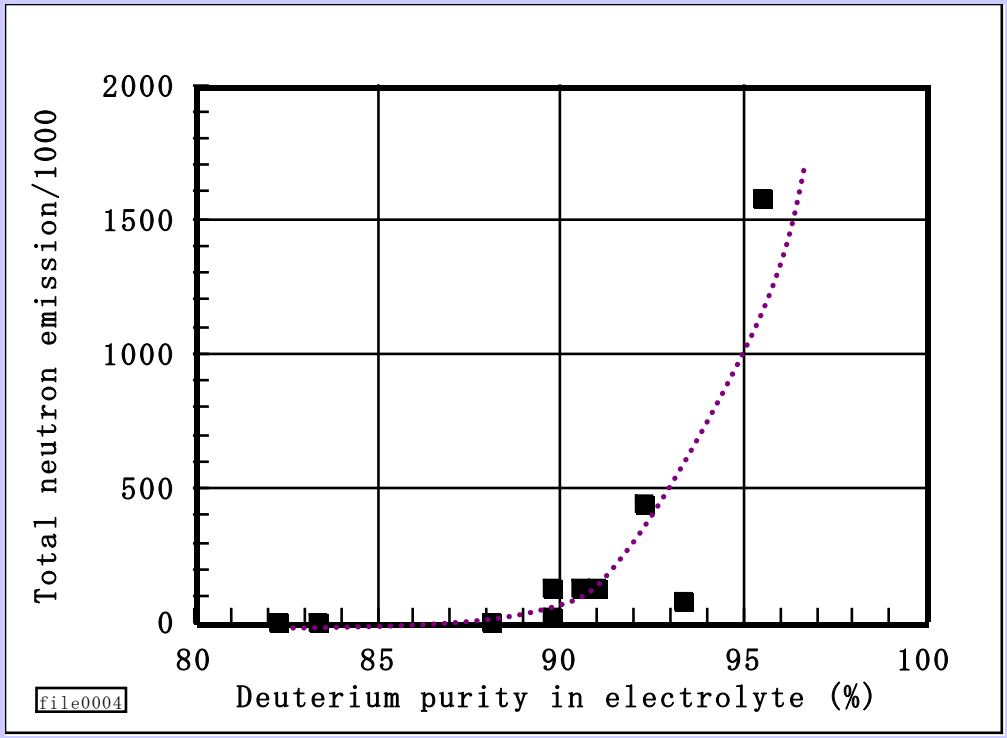


Log presentation for neutron



Background= 0.002±0.001 c/s

Neutron emission was depended on the concentration of deuterium in heavy water



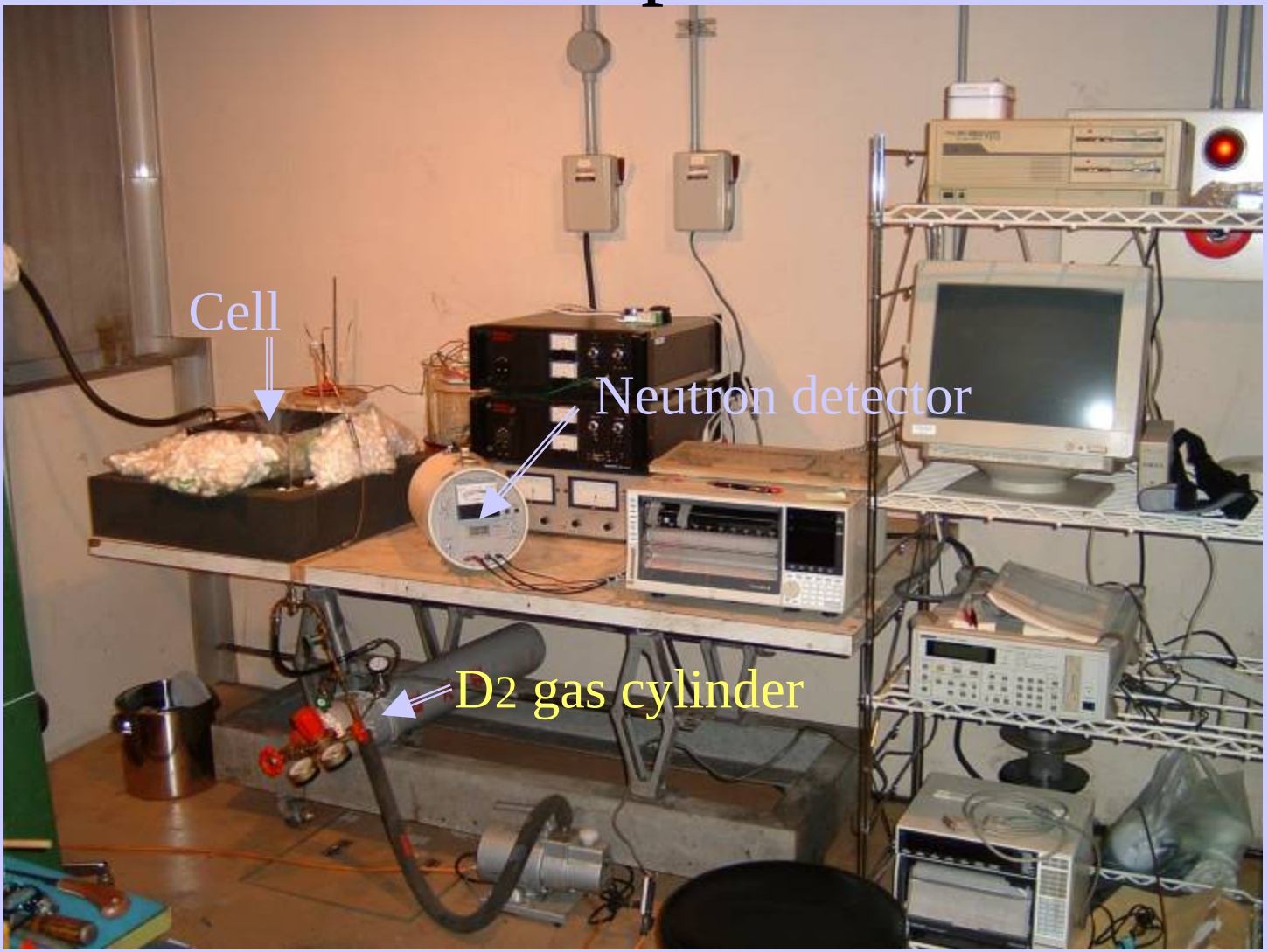
Results obtained by the second method

- Neutron emitted 5 in 10 test.
- Total number of neutron were $10^5 \sim 10^6$.
- Rate of neutron emission;
- $\sigma = 1.5 \times 10^{-17}$/d-d·s
- Neutron emission was depended on the purity of heavy water.

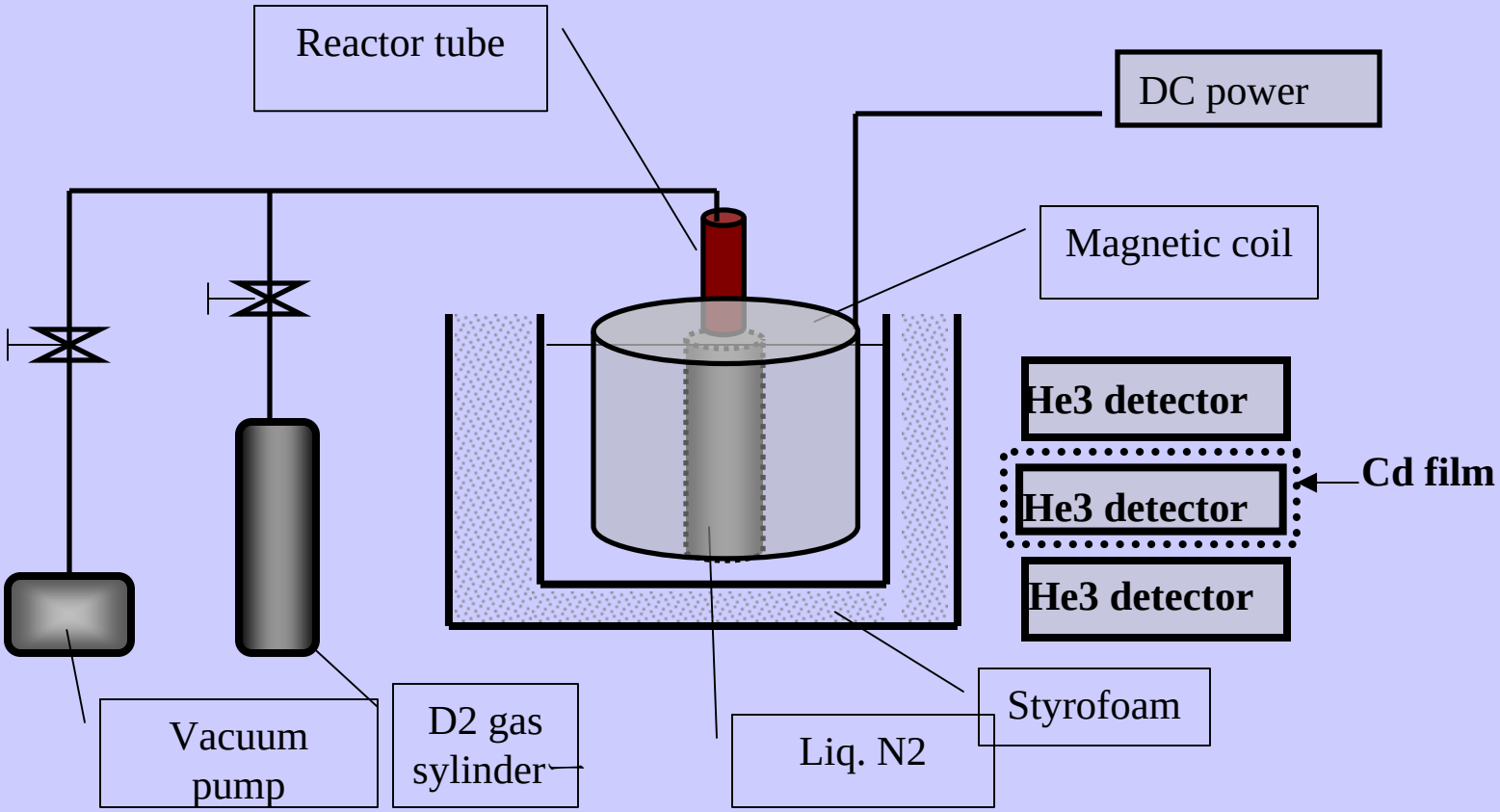
Third method

- D_2 gas
- Temperature; -196℃.
- Magnetic field
- Reacted materials, neutron,Q-mass analysis.

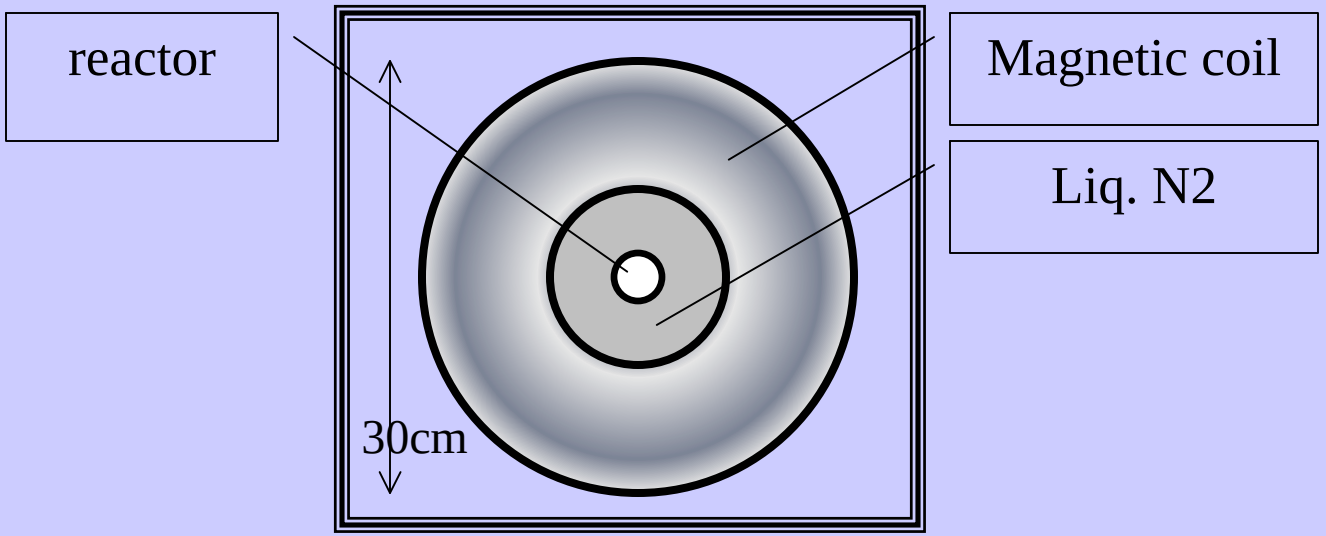
View of experimental



Schematic representation for measurement system



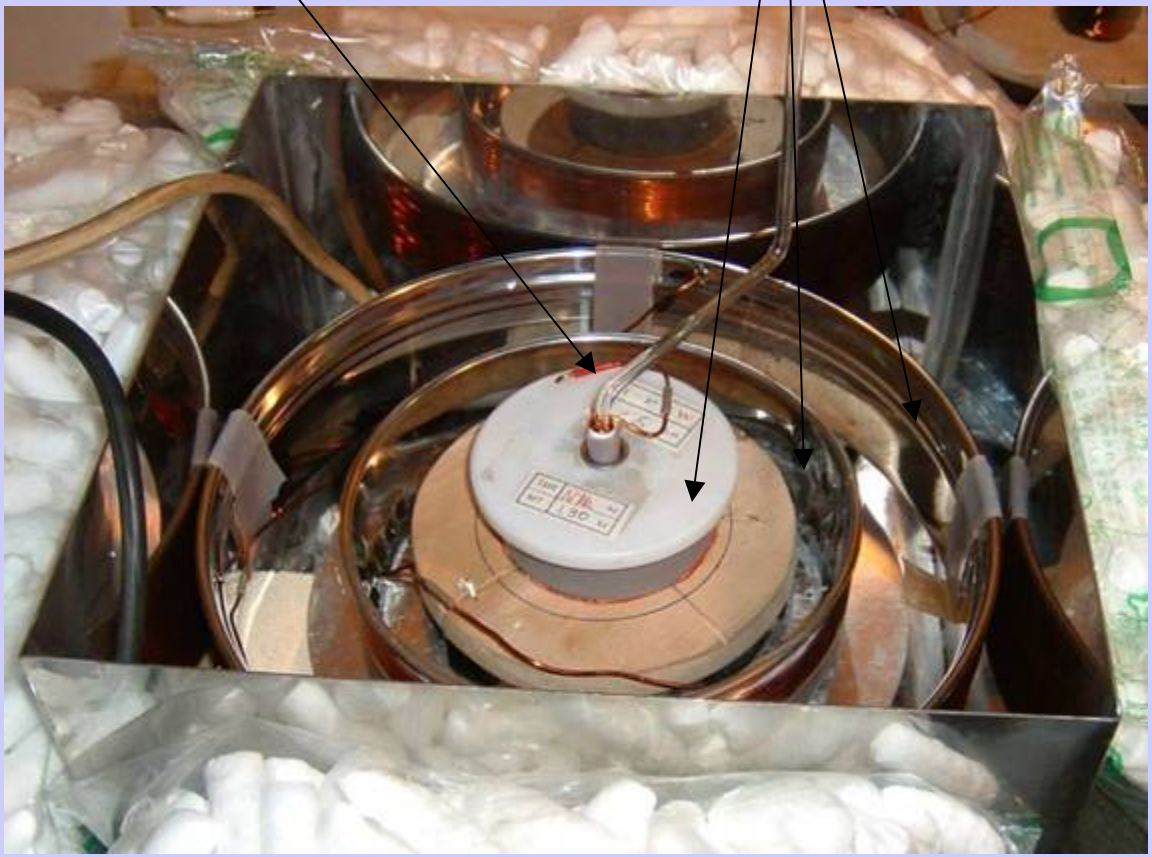
Reactor tube



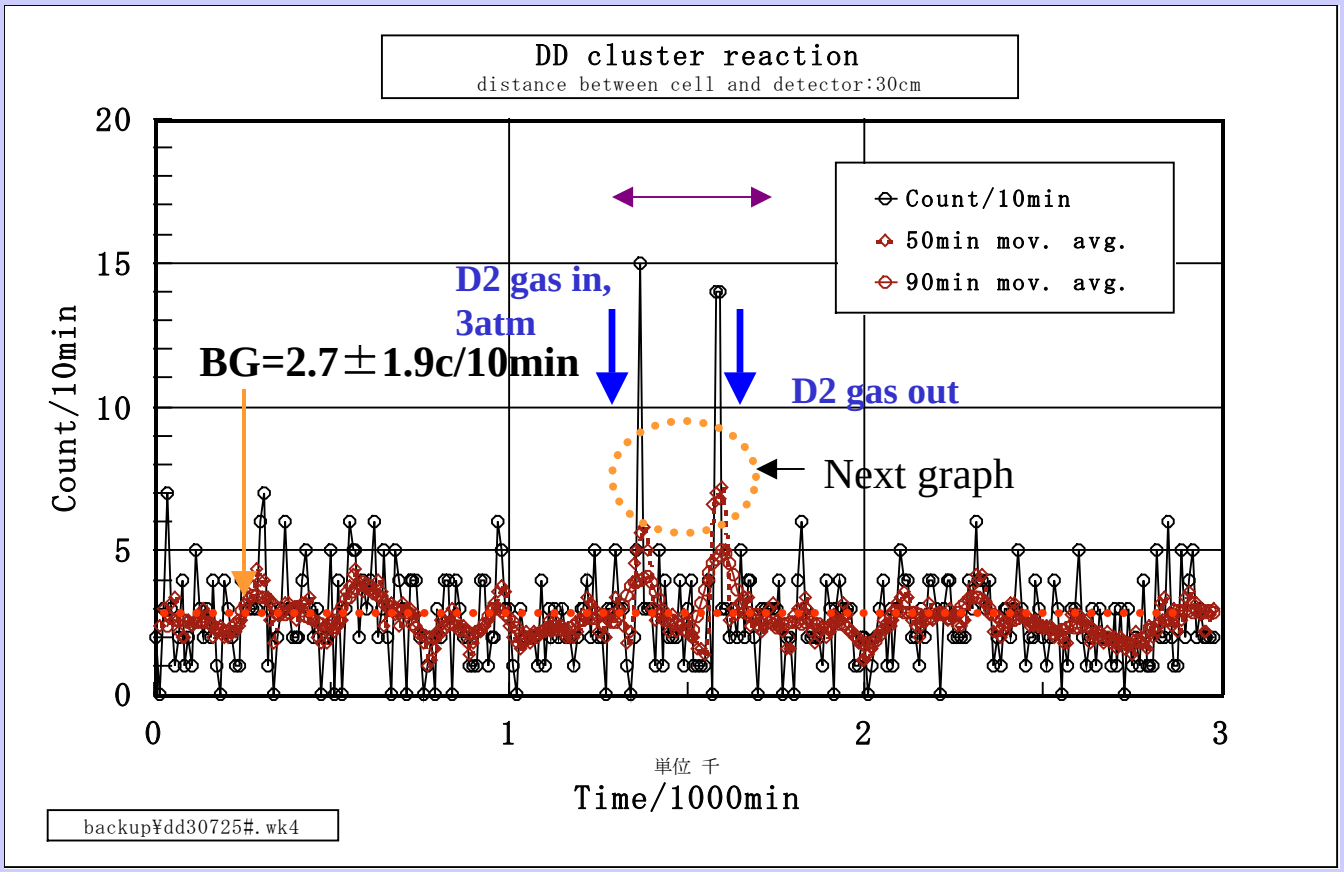
reactor

Reactor tube

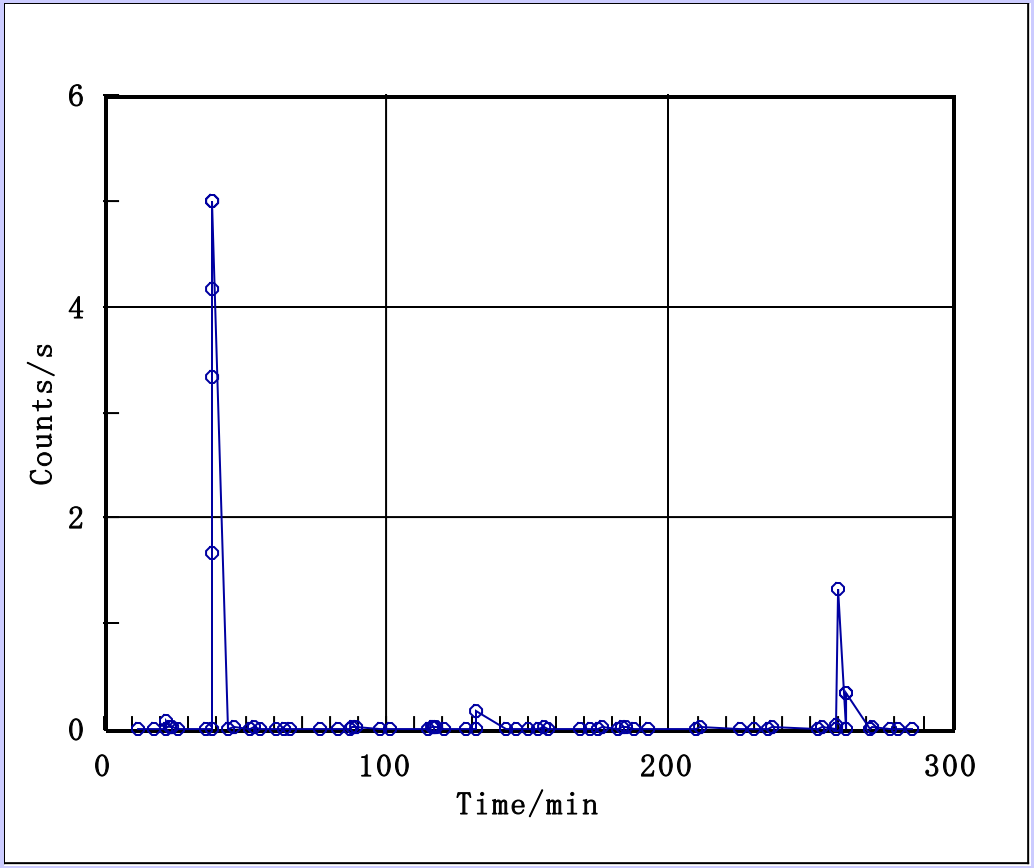
magnetic coil



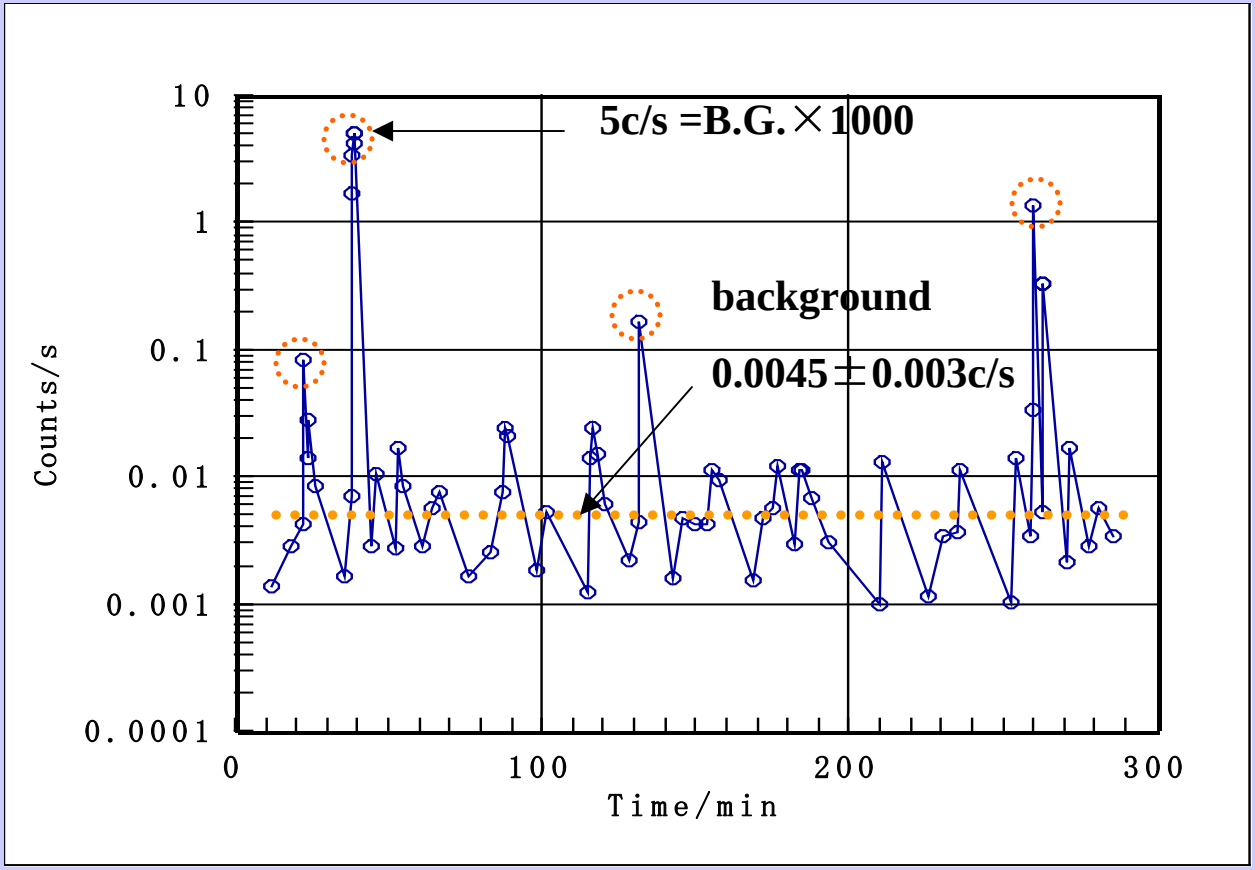
Neutron emission average value in 10min



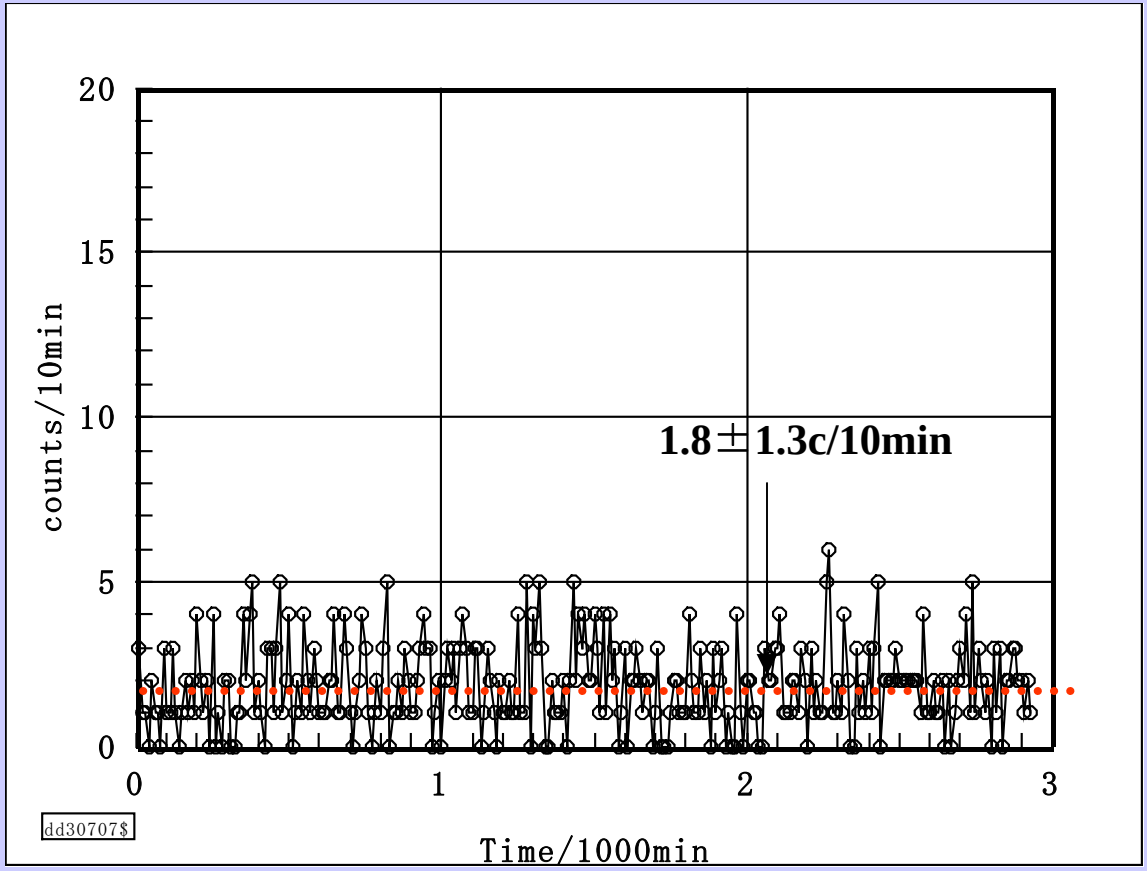
Neutron emission



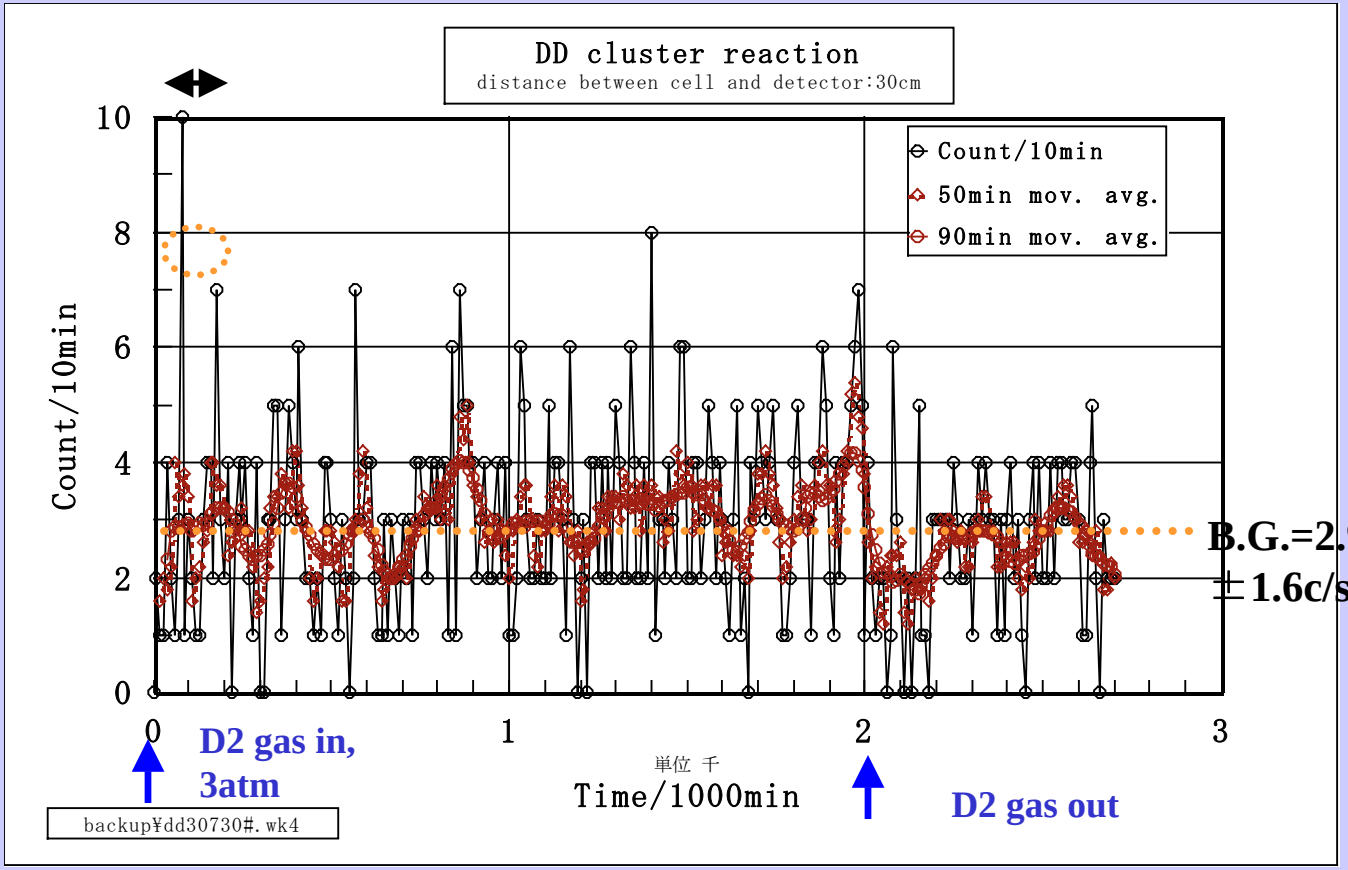
Neutron emission real time



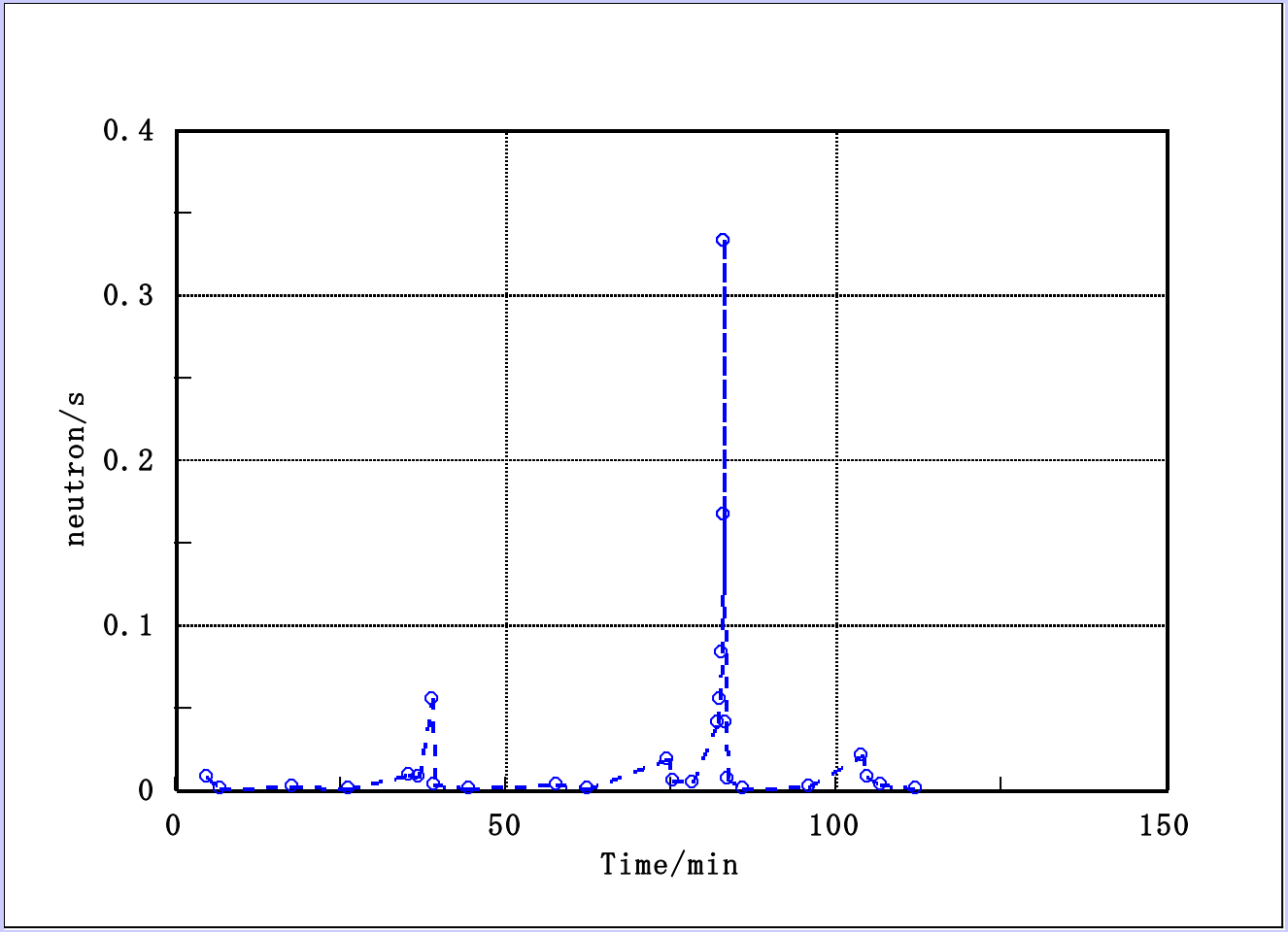
Change for background count



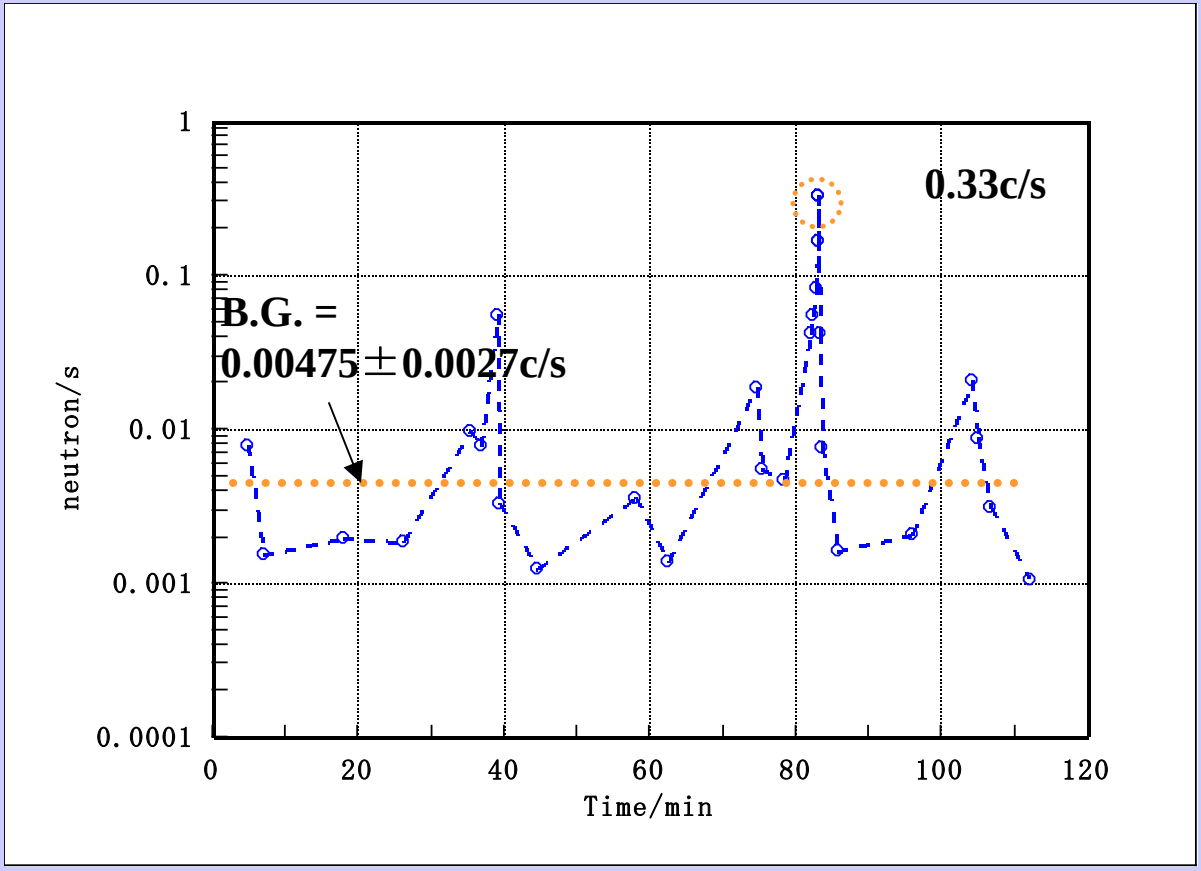
Neutron emission



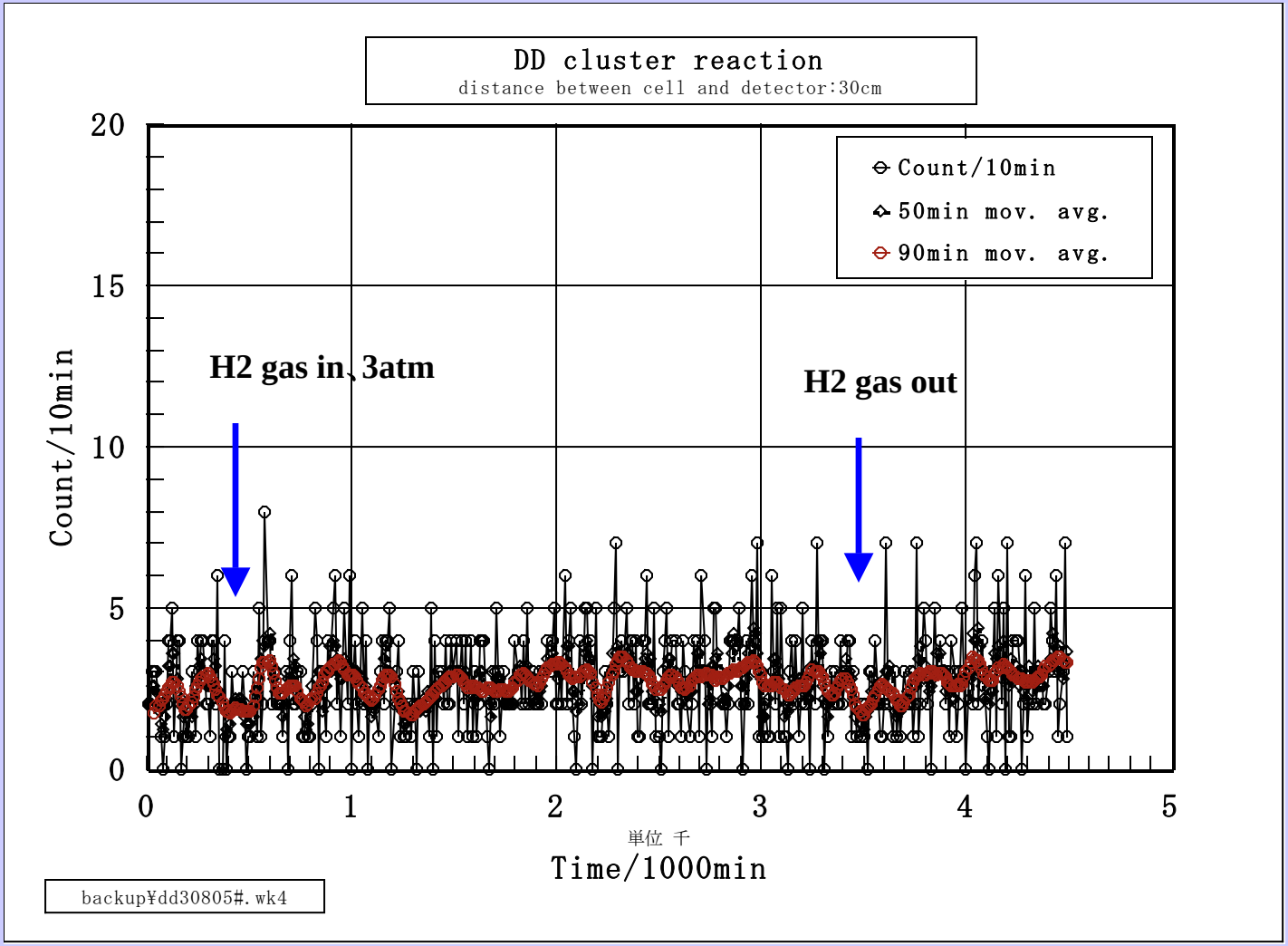
Neutron emission



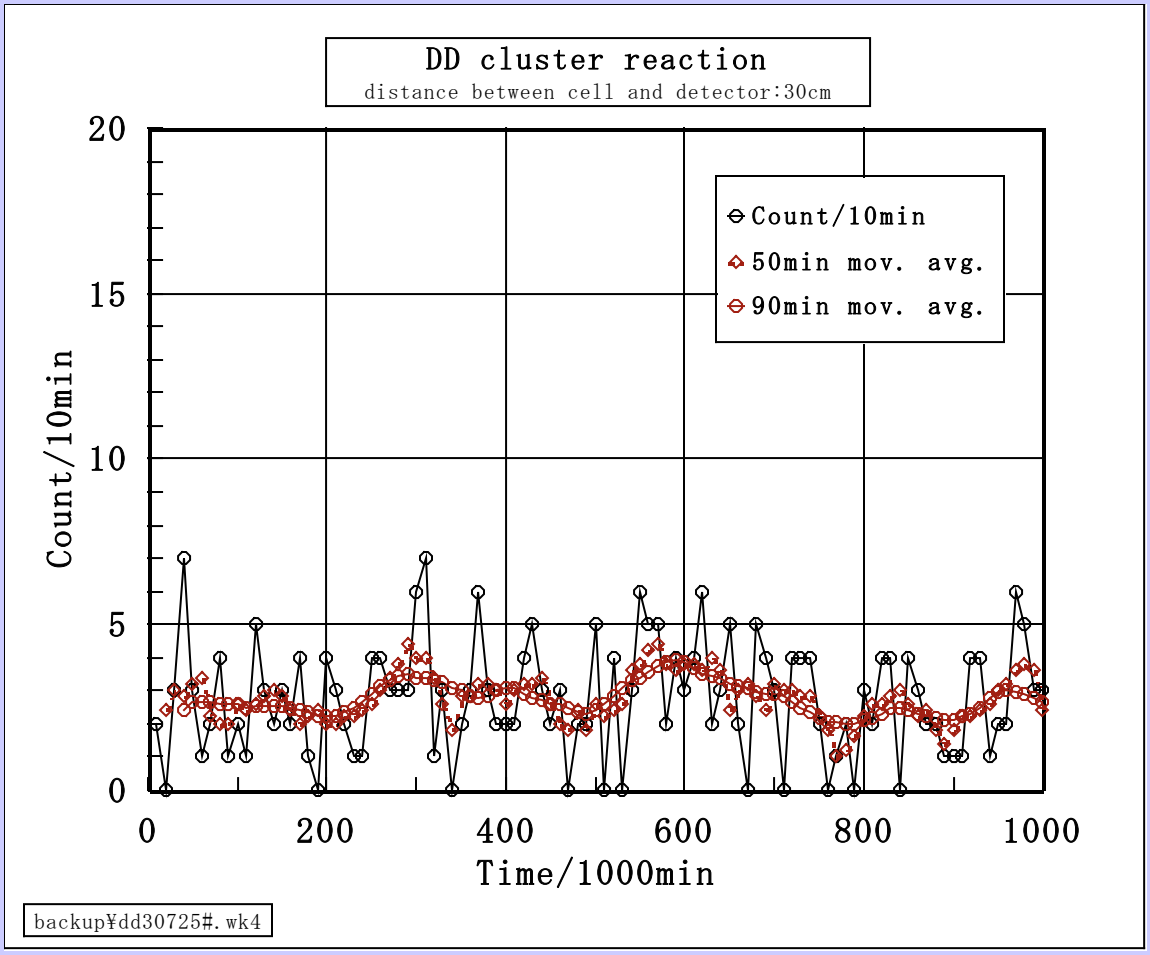
Neutron emission real time



3atm. H2 gas
8kG、-196 ℃



3atm D2 gas、8kG、20 ℃



Rate of neutron emission at various condition

Gas	Mag. field	Temperature	Neutron count
Air	8kG	20℃	0.60c/min
Air	8kG	-196℃	0.58c/min
Vac.	5kG	20℃	0.59c/min
Vac.	8kG	-196℃	0.54c/min
H_2	8kG	20℃	0.52c/min
H_2	8kG	-196℃	0.82c/min
D_2	8kG	-196℃	5c/s

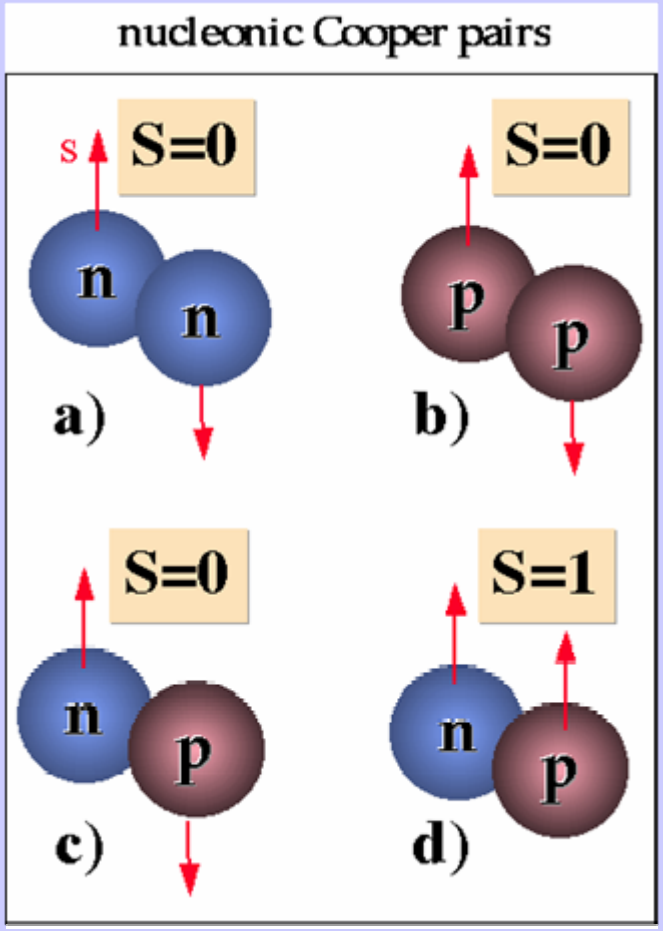
Results obtained by the third method

- Neutron can be generated without some medium.
- Neutron generated at the condition of D_2 gas,low temperature and magnetic field.
- Neutron generated as burst and sporadic.
- $\sigma = 10^{-16}$/d-d·s

Proton--Neutron Superconductivity in N~Z Nuclei

Witold Nazarewicz,
University of Tennessee-Knoxville and Oak Ridge National Laboratory
Stuart Pittel
Bartol Research Institute, University of Delaware

Lay Language Description of Session E8 Saturday, April 19, 1997, 8 AM
Joint APS/AAPT Meeting, Washington, DC



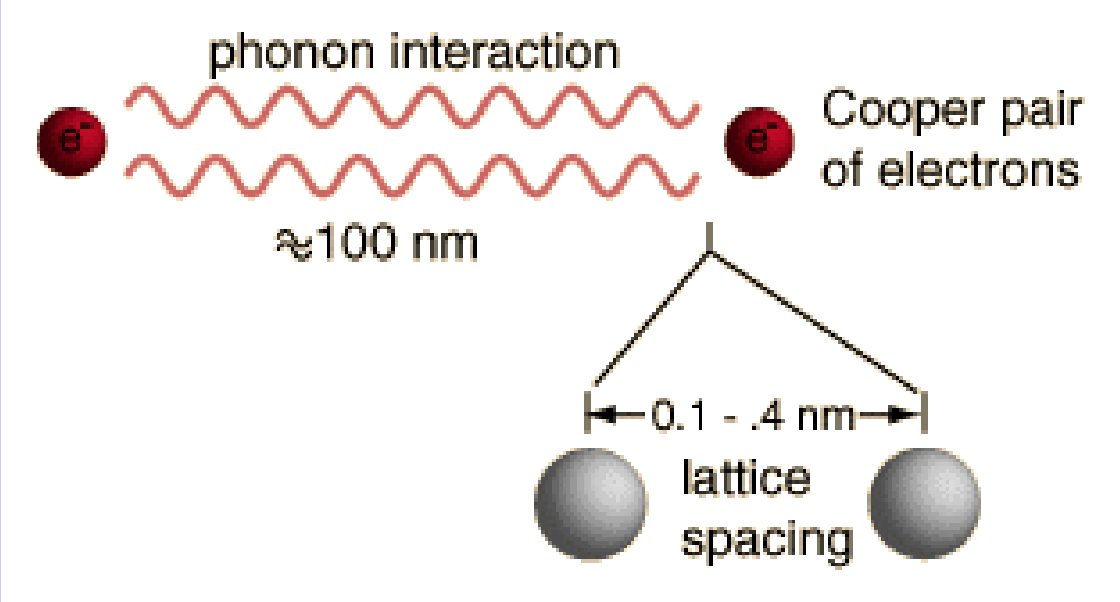
Cluster Fusion

EVIDENCE FOR CLUSTER IMPACT FUSION swings back and forth.

This phenomenon, in which the rate for d-d fusion would be enhanced by many orders of magnitude if a beam of clusters of D_2O molecules (rather than free deuterons) were collided with a deuterated target, was first reported by a Brookhaven team in 1989.

A new experiment carried out at the University of Washington in Seattle finds no evidence for cluster impact fusion, at least not for small water clusters such as OD^-, $O_2D_3^-$, and $O_3D_5^-$. (R. Vandenbosch et al., Physical Review Letters, 16 December 1991.)

Superconductive model



Deuterium and electron motion