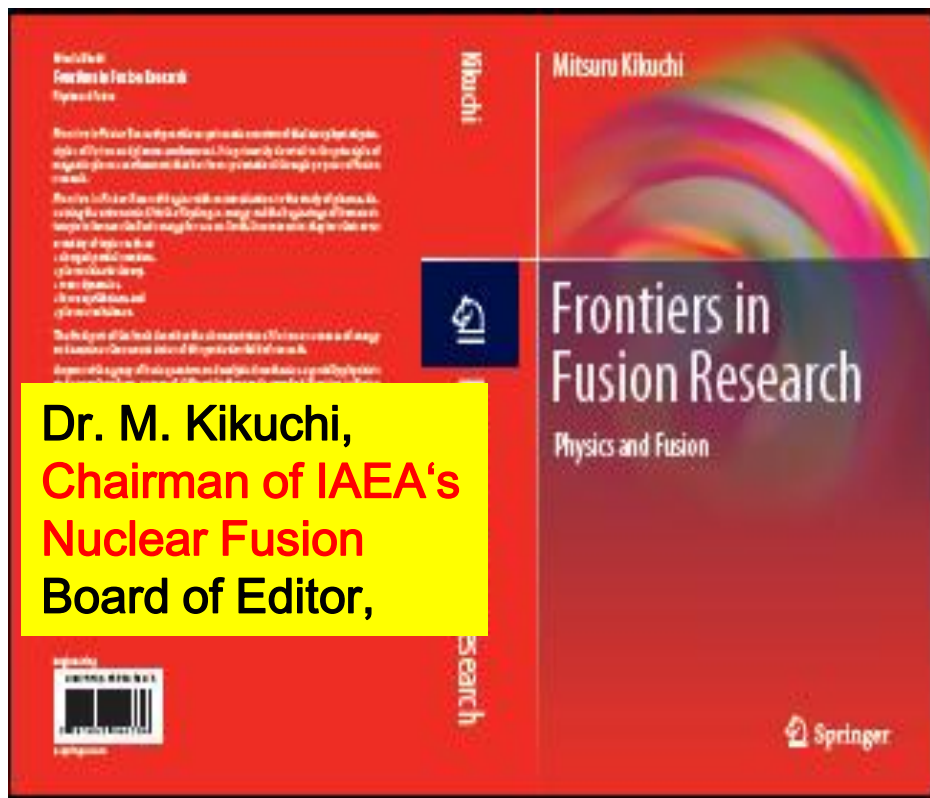


# A Clean Nuclear Energy Using Hydrogen and Condensed Matter Nuclear Science ---Anomalous Heat from Metal Hydrides---

## Resonant Fusion

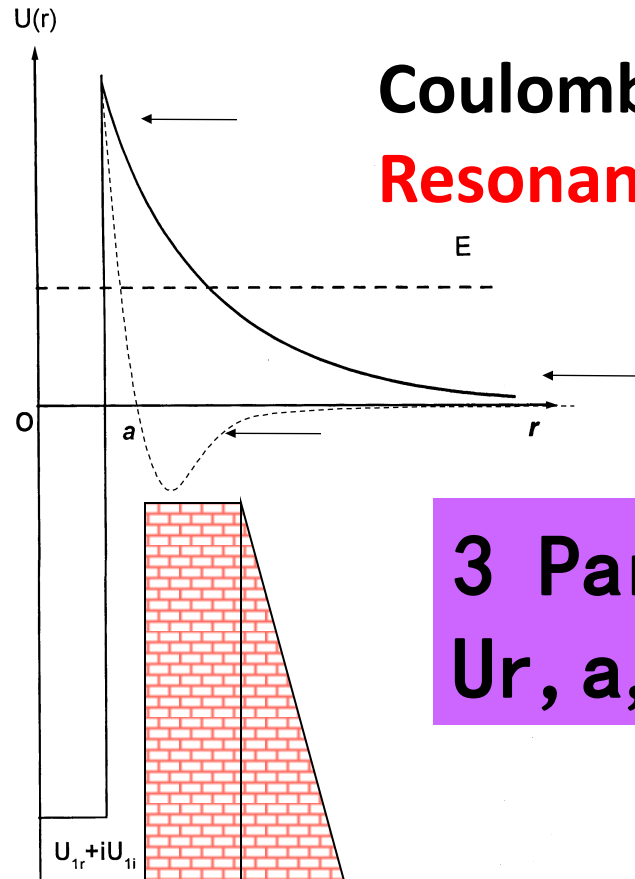


Xing Z. Li, Zhan M. Dong, Chang L. Liang, Han Yi, Yun P. Fu  
Department of Physics, Tsinghua University, Beijing, 100084, CHINA  
2011, May 18, 15<sup>th</sup> ICENES, San Francisco

Strong — Neutron

E.M. -- Gamma

Weak — Neutrino

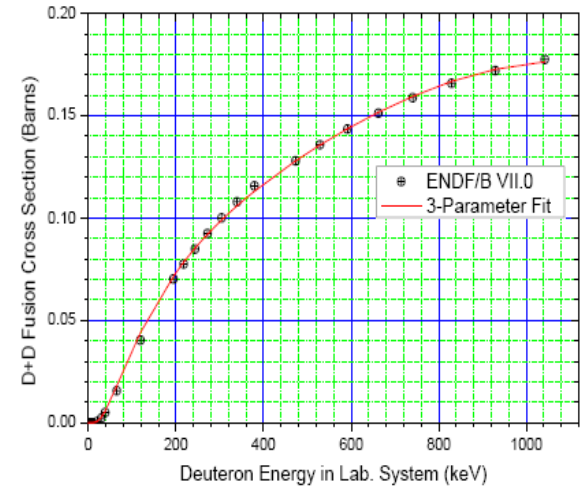
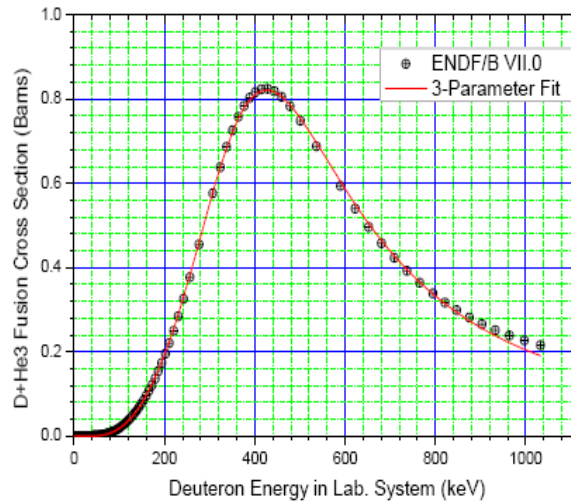
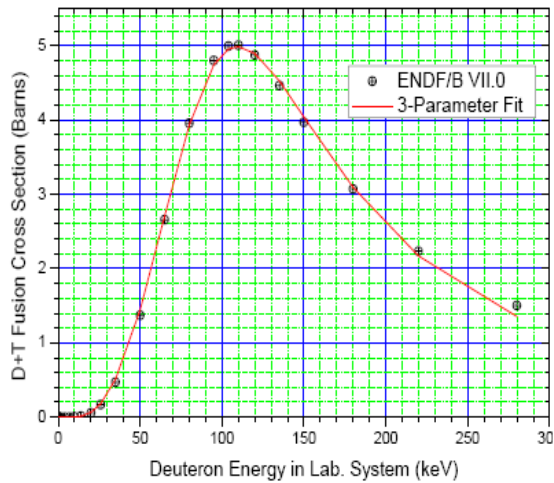


Coulomb Barrier—  
**Resonant** Tunneling

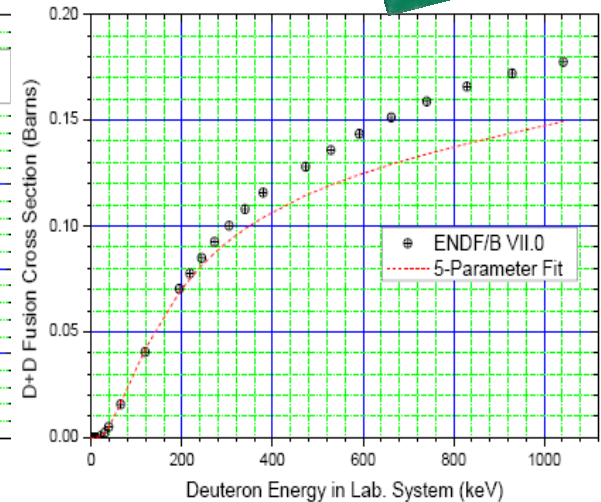
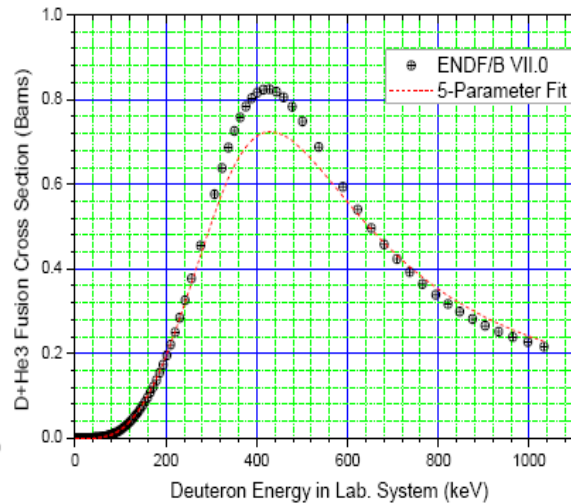
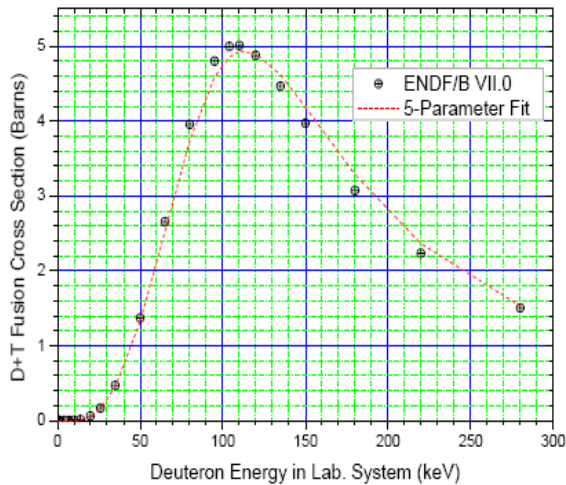
3 Parameter:  
 $U_r, a, U_i$



# 3-Parameter Selective Resonant Tunneling Formula



# 5-Parameter NRL Formula

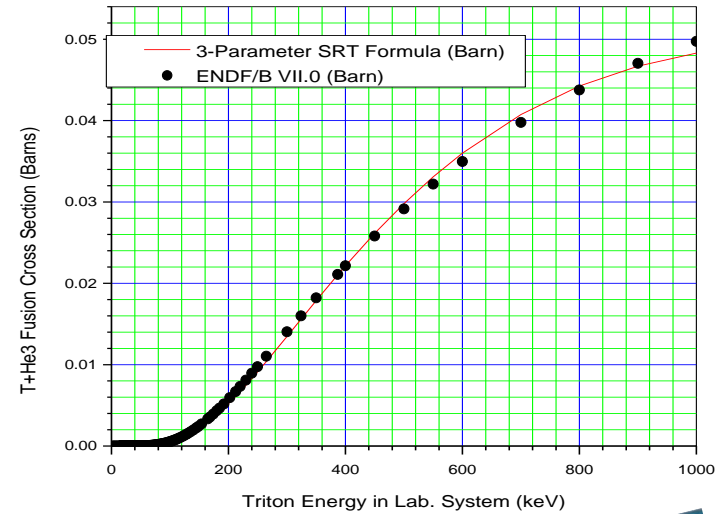
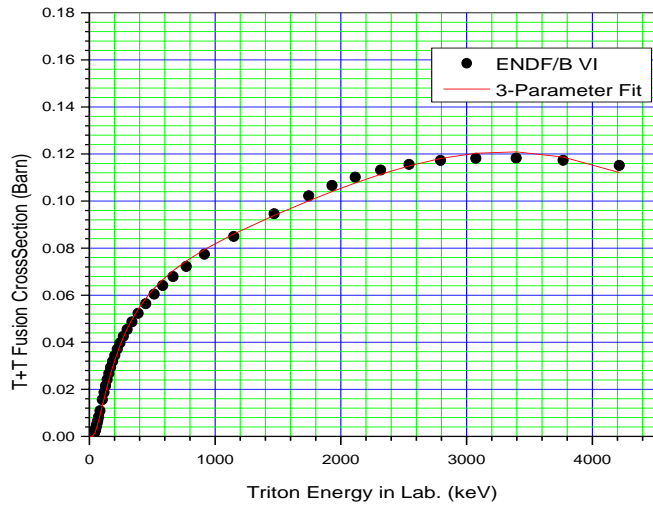


**D+T**

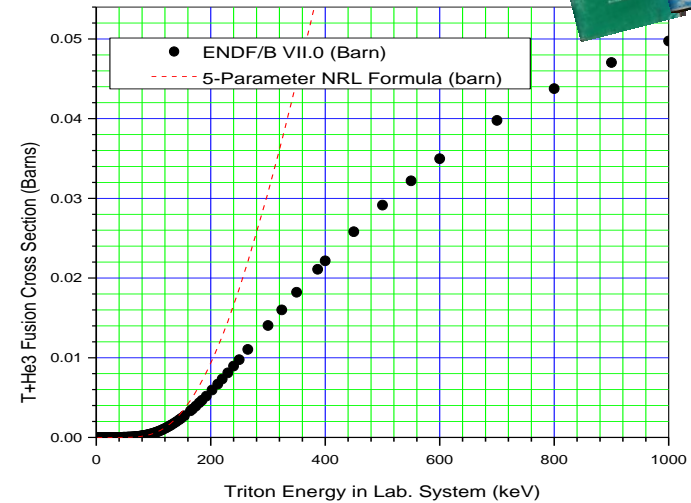
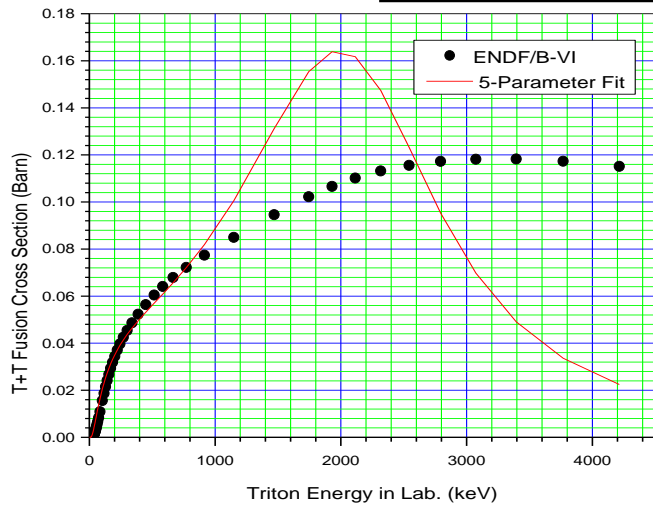
**D+He3**

**D+D**

# 3-Parameter Selective Resonant Tunneling Formula



## 5-Parameter NRL Formula



T+T

T+He3



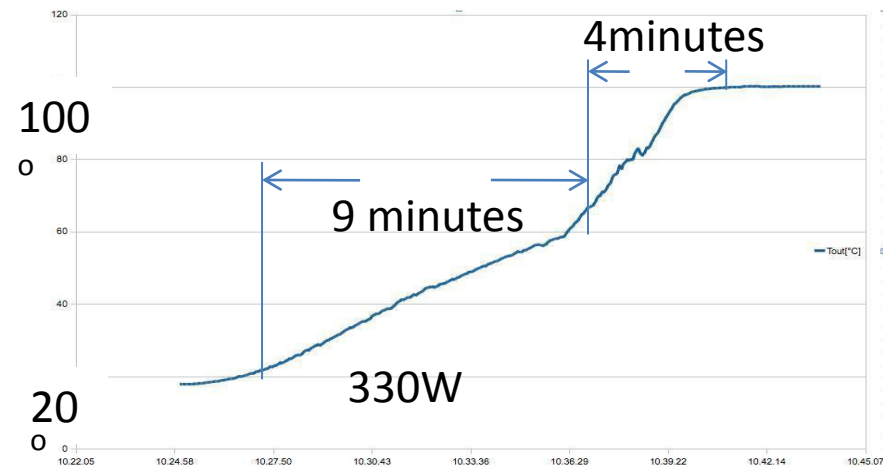
# Ni+H Reactor (Rossi Reactor, E-Cat)

Chairman of the Royal Swedish Academy of Sciences' Energy Committee

Chairman of the [Swedish Skeptics Society](#)



**No Radiation Detected**



**50 c.c. Ni Powder +0.11 g. Hydrogen, 0.15 kWh;  
6.5kg/hour Water (18 C), 330W electrical heating power in;  
Steam out (100.1 C, 1.3% water), → 4.6 kW, 6 hours, 25 kWh.**

**Oct. 2011, 1MW Demonstration, \$ 0.01/kWh, \$2000/kW.**

**97 Reactors running in 4 countries**

# **Nuclear Energy**

**without Nuclear Contamination is Emerging !!!**

**Cambridge University, Cavendish Laboratory  
Nobel Prize Winner , Prof. B. Josephson**

**<http://www.tcm.phy.cam.ac.uk/~bdj10/>**

# 5-Parameter Formula

## Naval Research Lab. Plasma Formulary

$$A_1 = 45.95$$

$$A_2 = 50200$$

$$A_3 = 1.368 \cdot 10^{-2}$$

$$A_4 = 1.076$$

$$A_5 = 409$$



$$\sigma = \frac{A_5 + \frac{A_2}{(A_4 - A_3 E)^2 + 1}}{E[\exp(\frac{A_1}{\sqrt{E}}) - 1]}$$

$$\sigma = \frac{\pi}{k^2} \frac{-4W_i}{W_r^2 + (W_i - 1)^2}$$

# A new simple formula for fusion cross-sections of light nuclei

Xing Z. Li, Qing M. Wei and

Department of Physics, Tsinghua Univer

E-mail: [lxz-dmp@tsinghua.edu.cn](mailto:lxz-dmp@tsinghua.edu.cn)

Received 29 April 2008, accepted

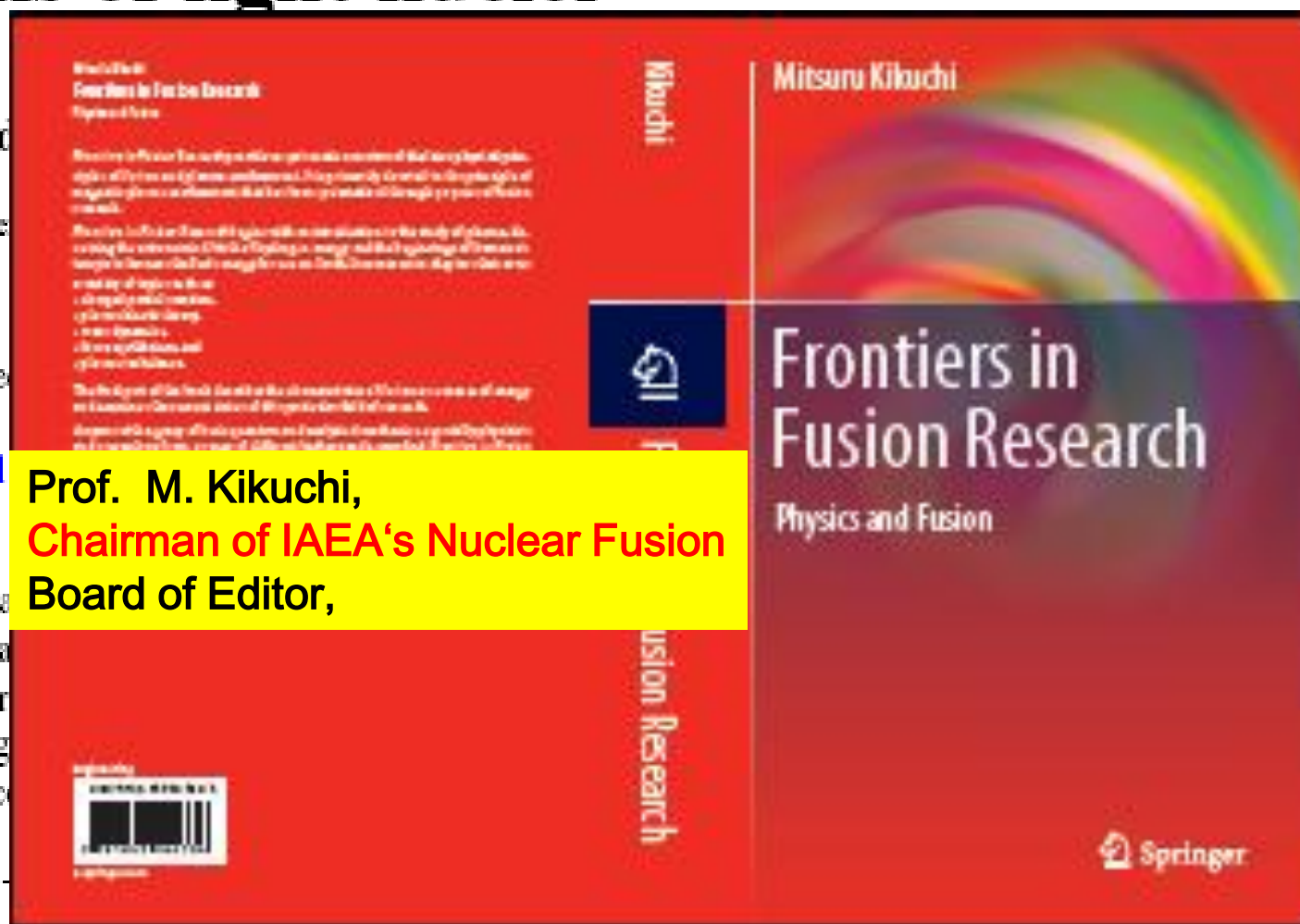
Published 3 November 2008

Online at [stacks.iop.org/NF/48/1](http://stacks.iop.org/NF/48/1)

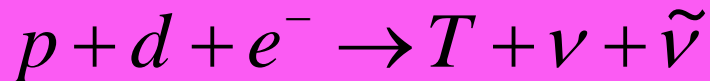
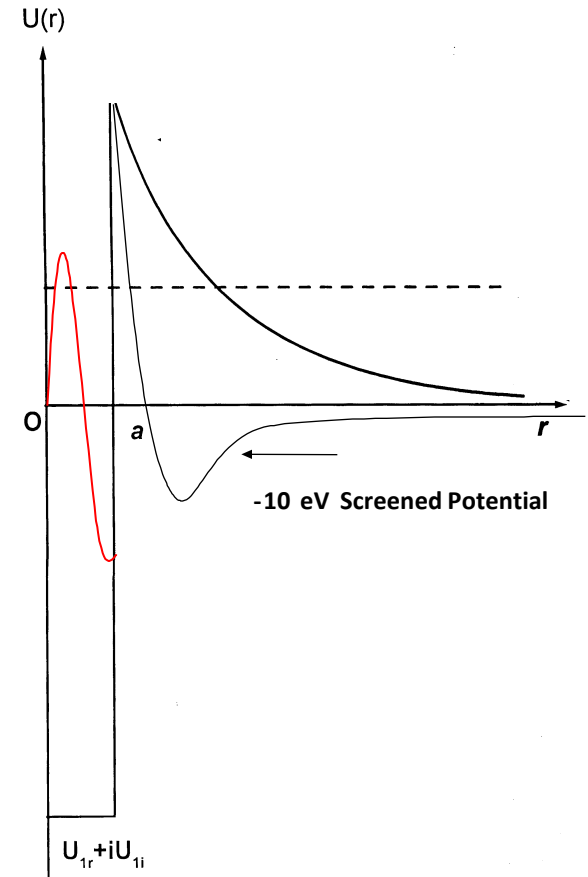
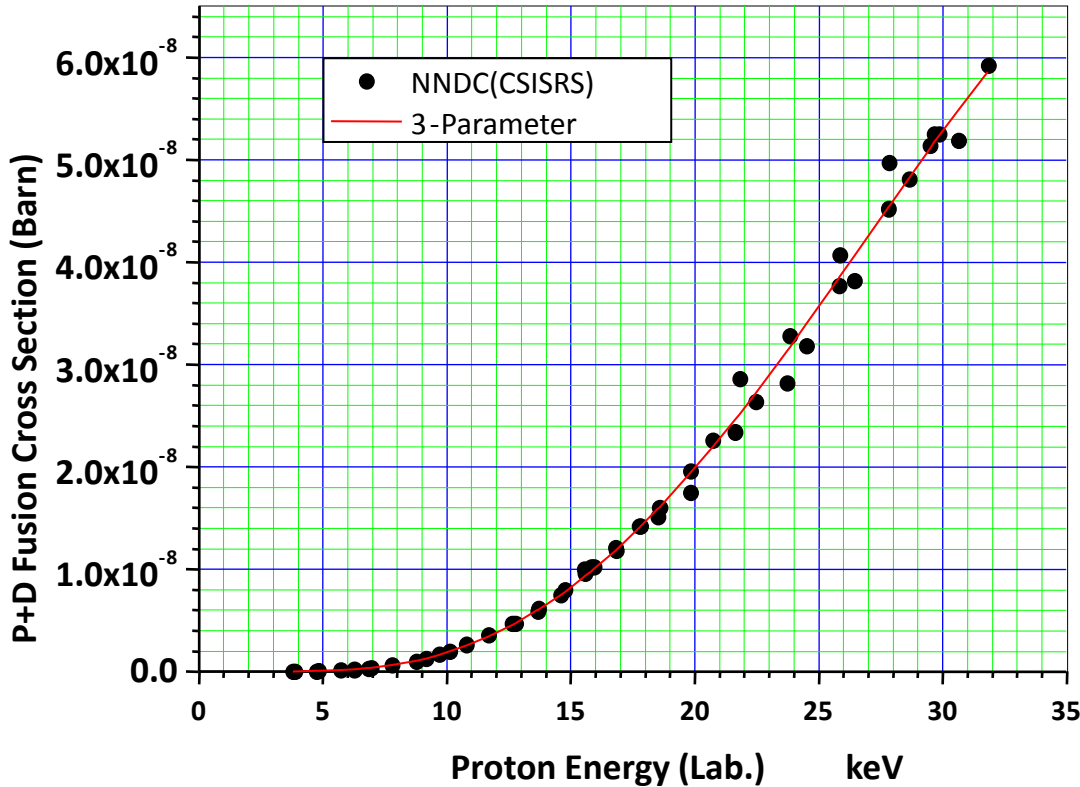
## Abstract

The recent ENDF/B VII.0 data a differences between experimental for a replacement to the old 5-par fit with the experimental data is g width is taken explicitly into acc

PACS numbers: 24.10.-i, 24.30.-



# 3-Parameter New Formula(Selective Resonant Tunneling )

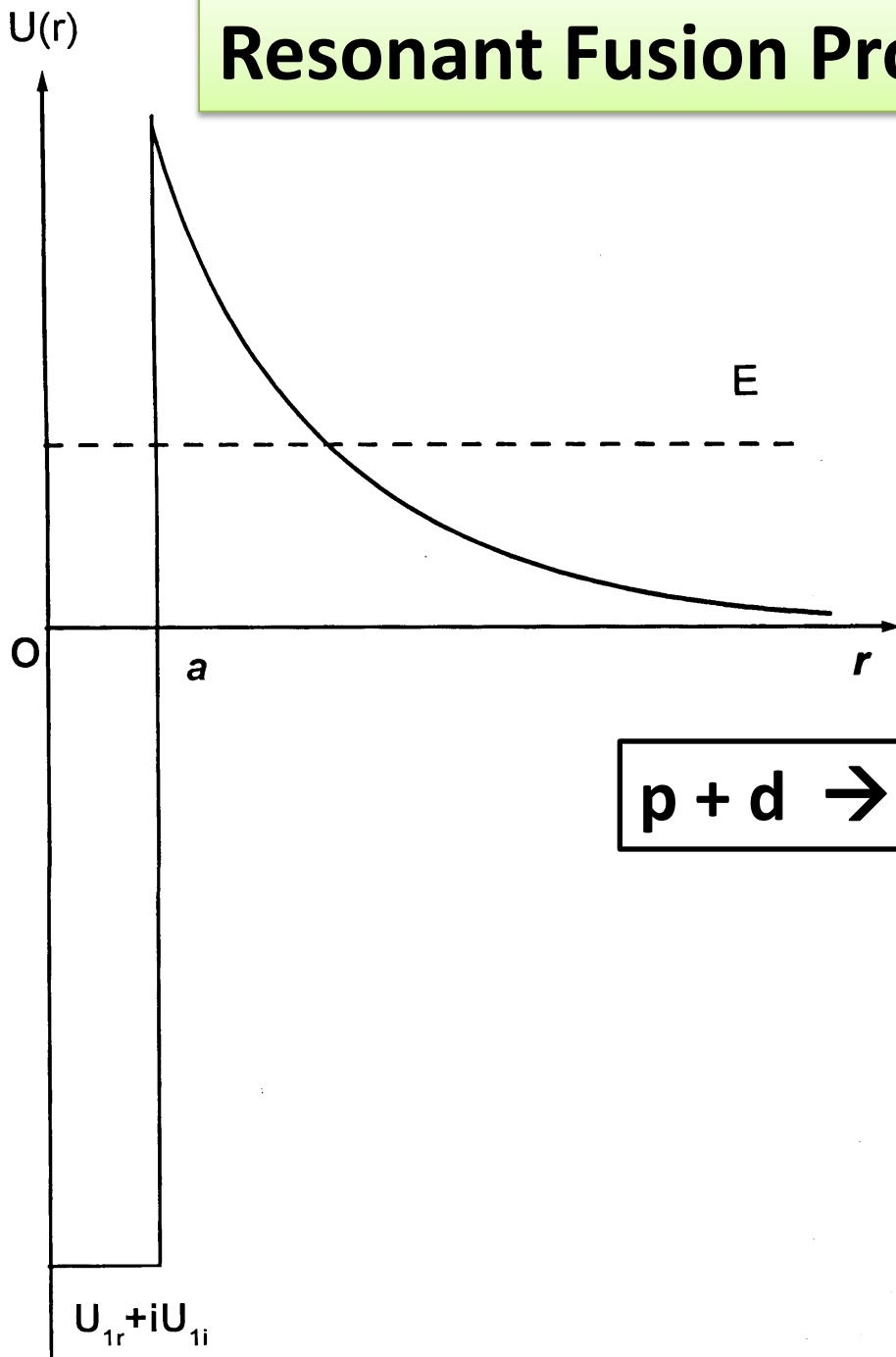


$$U_r = -43.905 \text{ MeV}$$

$$(k_1 a_0) \sim (3\pi/2)$$

Hot Fusion Data justified Cold Fusion

# Resonant Fusion Products Change with Energy



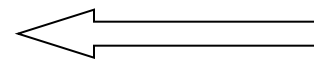
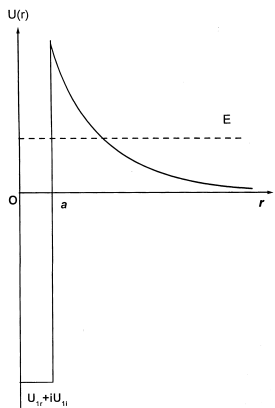
100keV Resonance  
 $d + t \rightarrow {}^4\text{He} + n$

$p + d \rightarrow {}^3\text{He} + \text{gamma}$

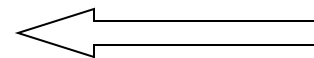
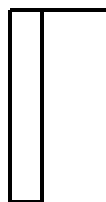
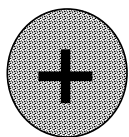
$p + d \rightarrow {}^3\text{He} + \text{Neutrino} + \text{Anti-Neutrino}$



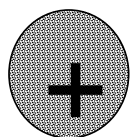
Target



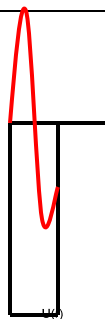
Accelerator



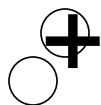
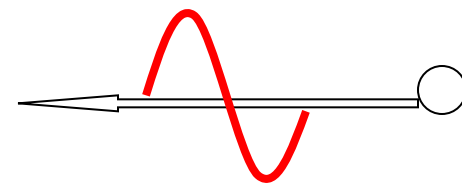
Neutron



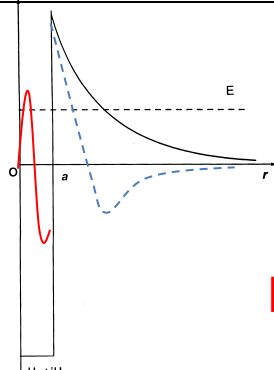
B, Cd, Sm, Gd



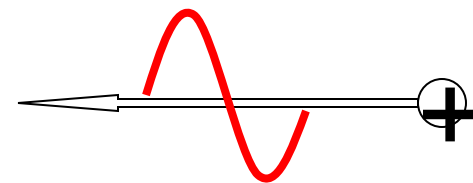
Neutron Resonant Absorption



NiH, p+d



p+d Resonant Absorption in metal hydrides



# A new simple formula for fusion cross-sections of light nuclei

菊池满

Xing Z. Li, Qing M. Wei and

Department of Physics, Tsinghua Univer

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Received 29 April 2008, accepte

Published 3 November 2008

Online at [stacks.iop.org/NF/48/1](http://stacks.iop.org/NF/48/1)

## Abstract

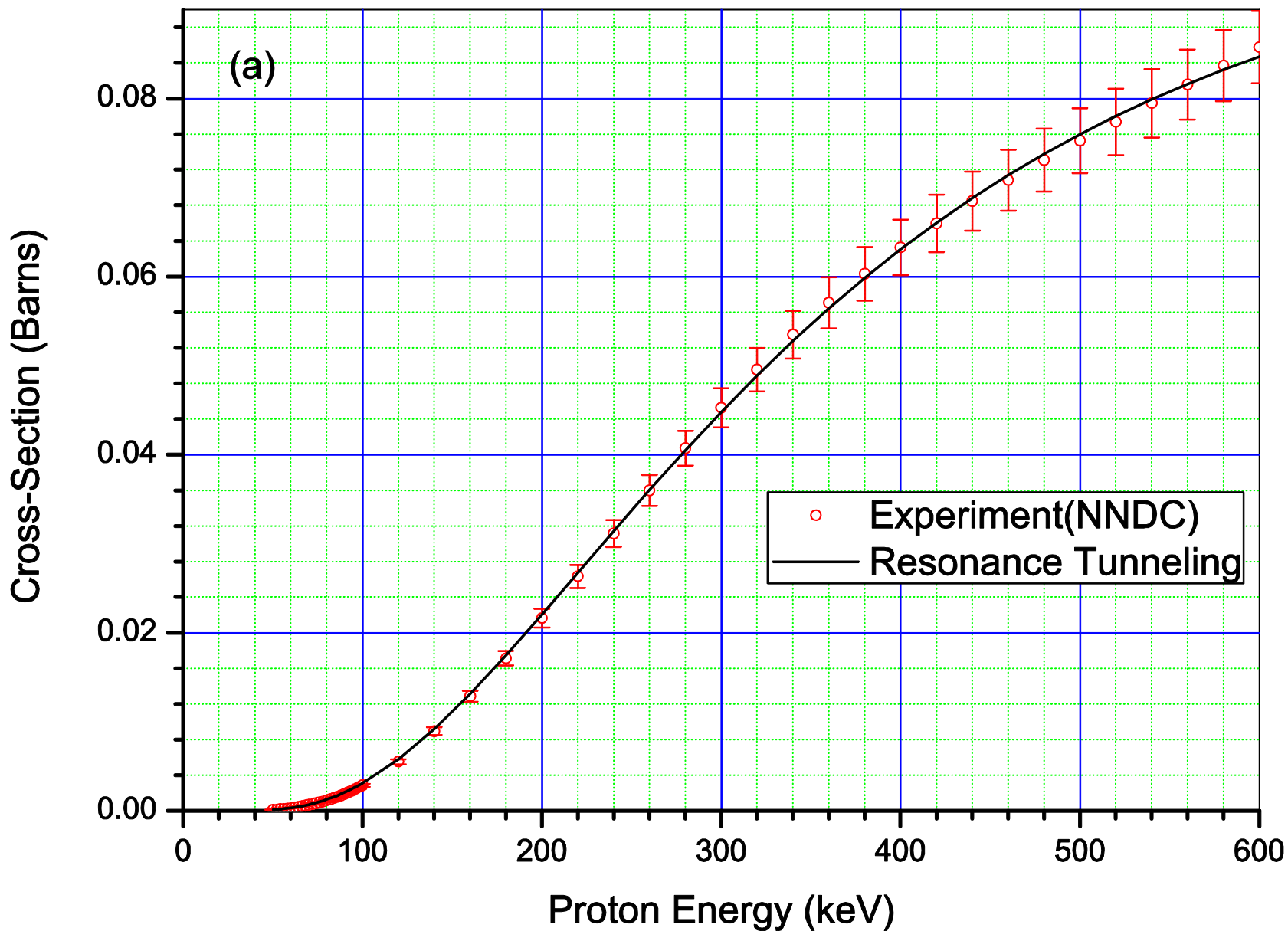
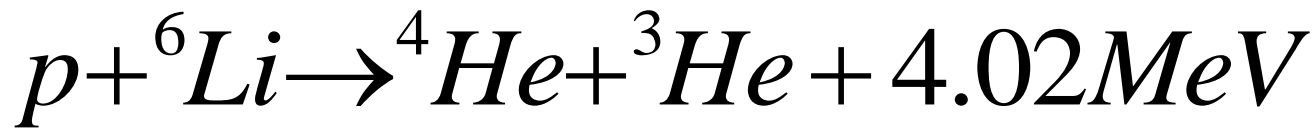
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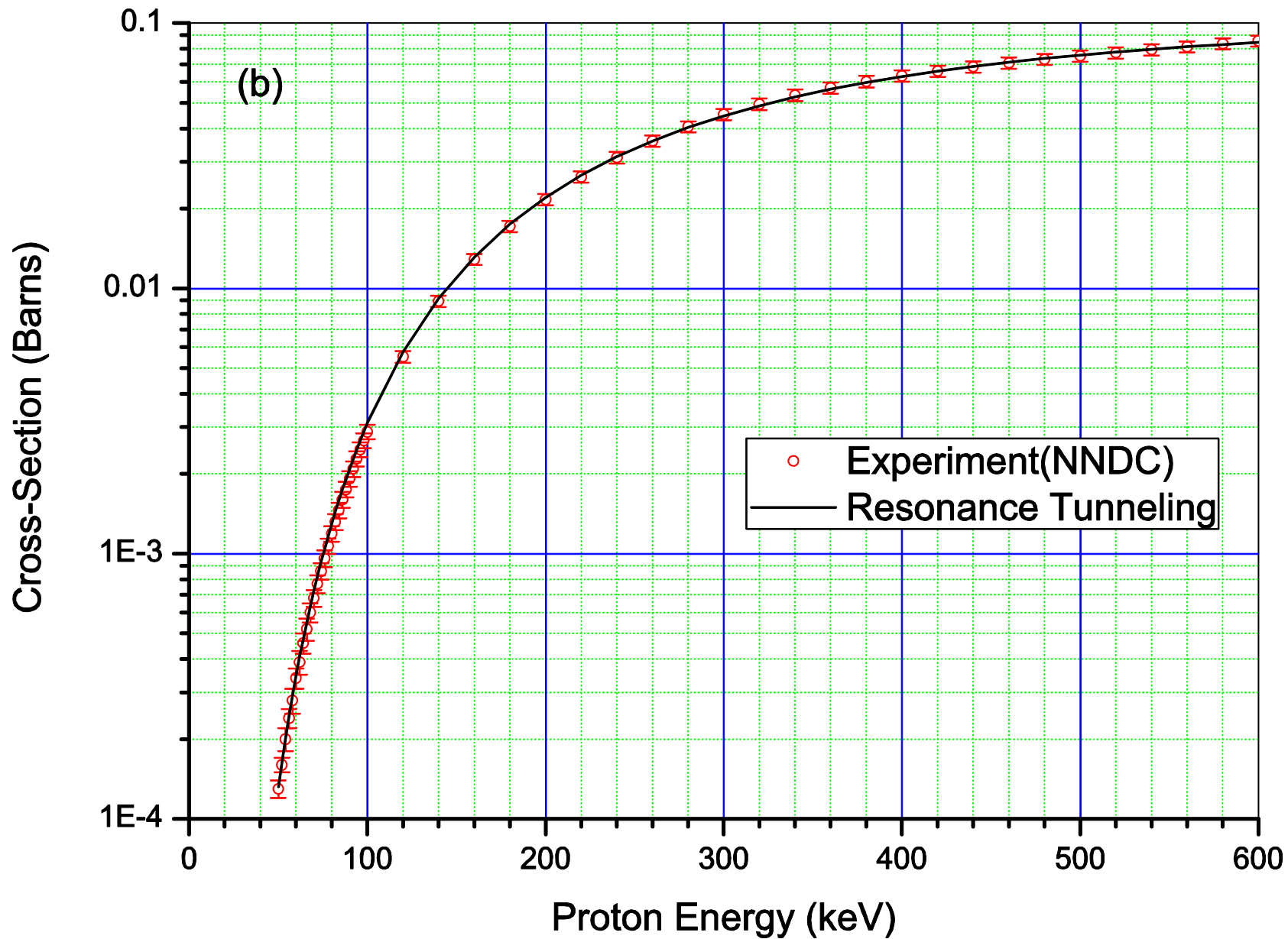
PACS numbers: 24.10.-i, 24.30.-



**Dr. M. Kikuchi,**  
**Supreme Researcher**  
**Fusion research and development**  
**director**  
**Japan Atomic Energy Agency**

**Chairman of IAEA's Nuclear Fusion**  
**Board of Editor, Fellow, Institute of**  
**Physics**





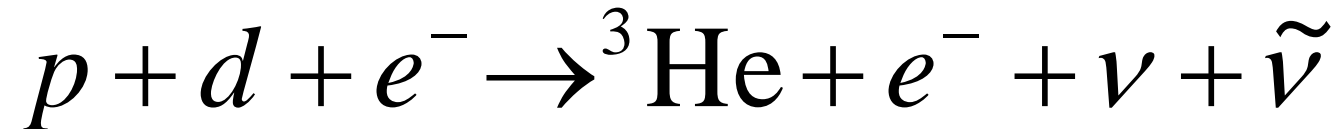
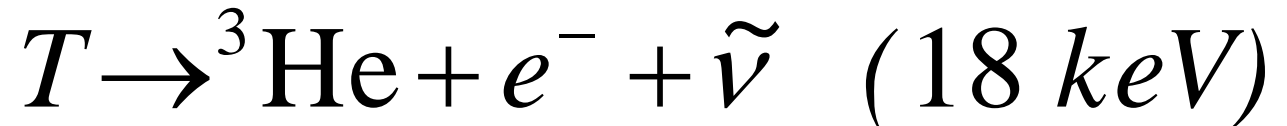
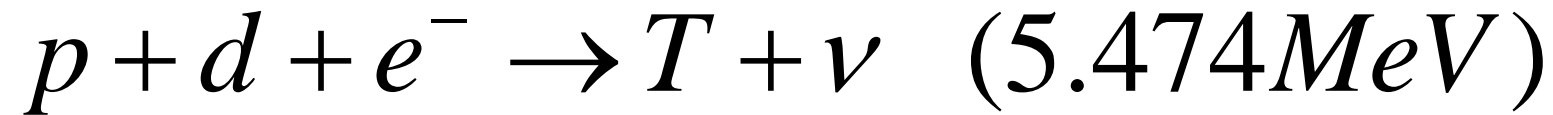
## Li-7/Li-6 Ratios in Powdered Palladium Exposed to Gaseous Hydrogen and Deuterium from TOF SIMS Analyses

(Charles Evans Associates, Sunnyvale, CA) (Terrestrial Lithium (Handbook) **12.48**) **T.Passell**

Sample Designation	Li-7/Li-6 Ratio	Uncertainty	One Sigma Range
Pd-D from Arata (Virgin)	<b>13.6</b>	1.0	12.6 to 13.6
Pd-A from Arata (Active)	14.5	0.3	14.2 to 14.8
<b>Pd-B from Arata (Active)</b>	<b>22.0</b>	1.4	20.6 to 23.4
Pd-C from Arata (Active)	16.2	0.1	16.1 to 16.3
SRI-H2O (Arata Exper.)	14.5	1.7	12.8 to 16.2
SRI-D2O (Arata Exper.)	13.8	0.1	13.7 to 13.9
<b>Arata S-8 Powder</b>	<b>14.6</b>	3.4	11.2 to 18.0
Arata S-5 Powder	13.5	1.8	11.7 to 15.3
Arata S-2 Powder	12.3	0.8	11.5 to 13.1
Arata S-1 Powder	13.1	0.5	12.6 to 13.6
<b>Li Tsinghua Sample E</b>	<b>23.3</b>	1.8	21.5 to 25.1
Li Tsinghua Sample D	13.1	1.1	12.0 to 14.2
Li Tsinghua Sample B (Virgin)	<b>12.9</b>	0.8	12.1 to 13.7

401, TOF-SIMS, Surface Depth

{ (HD molecule - like) + ( ${}^3\text{He}^*$ ) }



‘Investigations designed to check the reported observations of excess tritium in electrolytic cells are desirable.’

----DOE, ERAB report 1989

