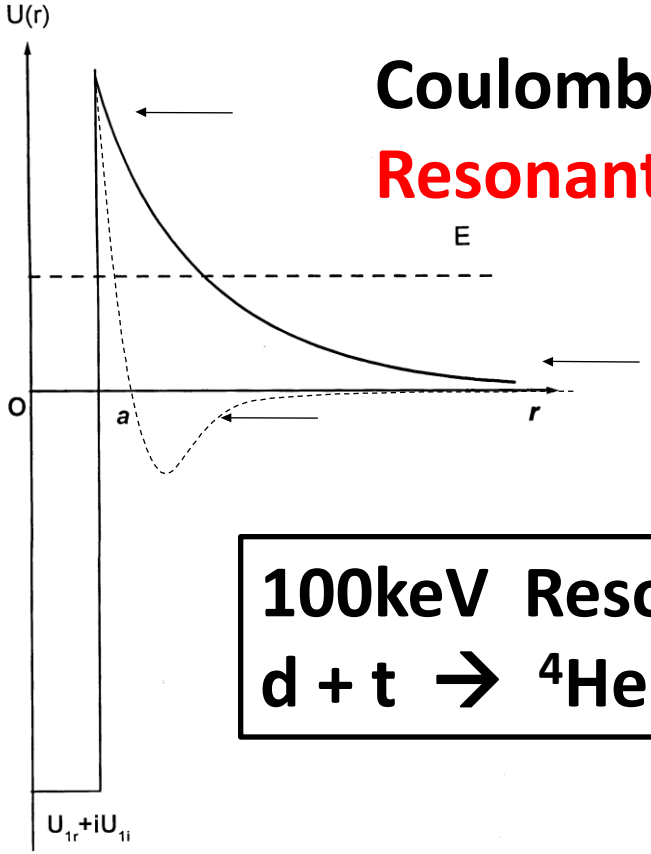
COLD FUSION ENERGY Inc.

Green Nuclear Energy and Nuclear Physics



Coulomb Barrier—
Resonant Tunneling

Plasma
Metal Hydride

100keV Resonance
d + t → ^{4}He + n

Xing Z. Li

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Tsinghua University,
Beijing, CHINA

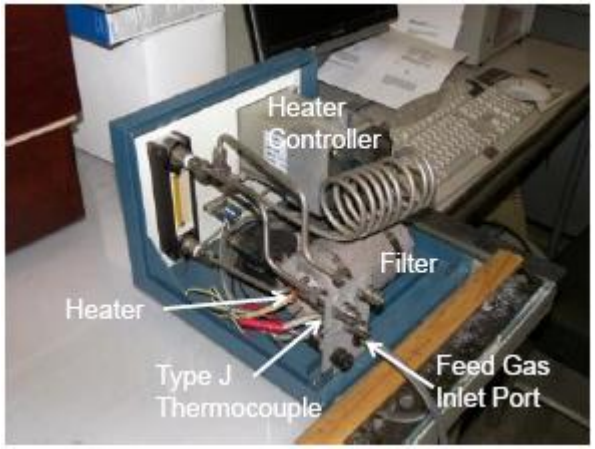
World Green Energy Symposium ,Oct. 19-21, 2011. Philadelphia, USA

Investigation of Anomalous Heat Observed in Bulk Palladium

Gustave C. Fralick (Project Lead),
John D. Wrbanek, Susan Y. Wrbanek,
Janis M. Niedra (ASRC) and Marc G. Millis
with
David J. Spry, Roger Meredith
and Jim Mazor (TFOME/Sierra Lobo)

NASA Glenn Research Center
Cleveland, Ohio

LENR @GRC

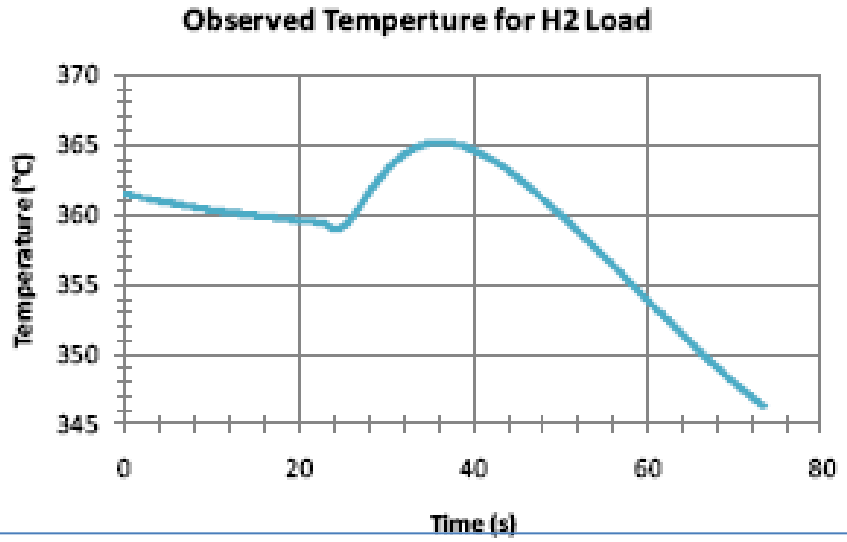


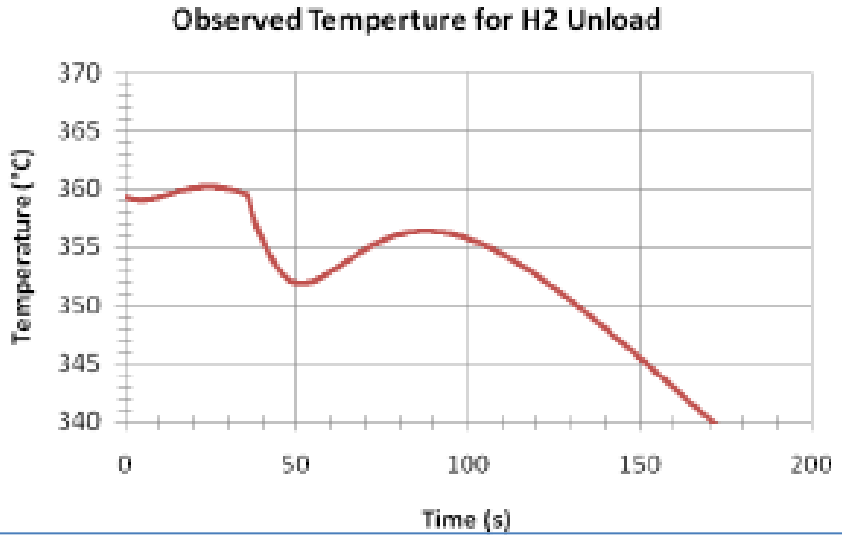
RESULTS (Preliminary): Temperatures vs. Time

Loading

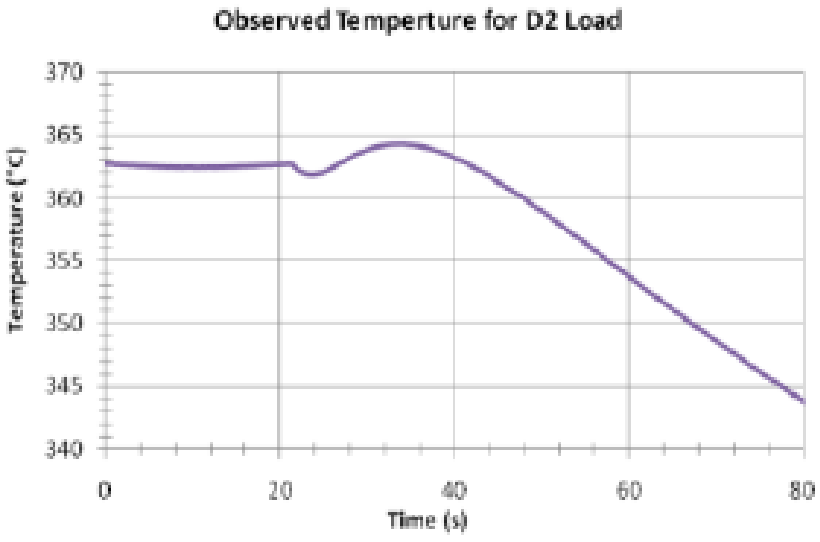
Unloading

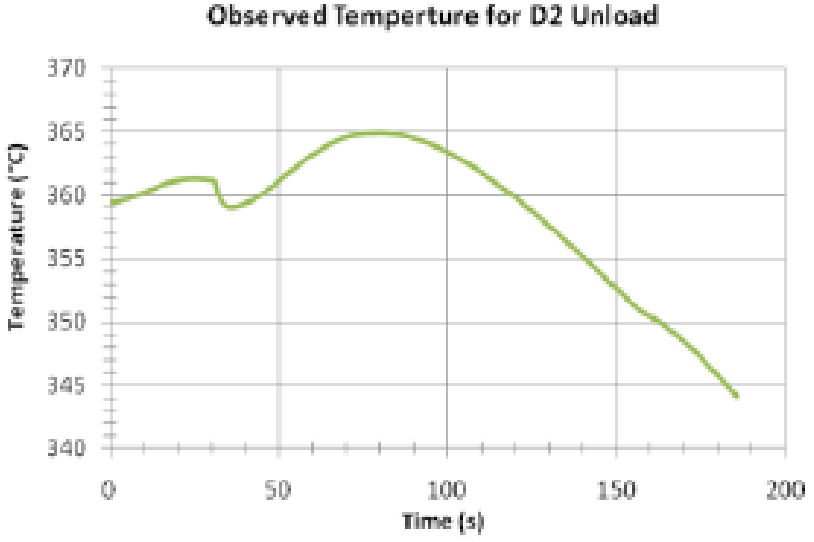
Hydrogen





Deuterium





References

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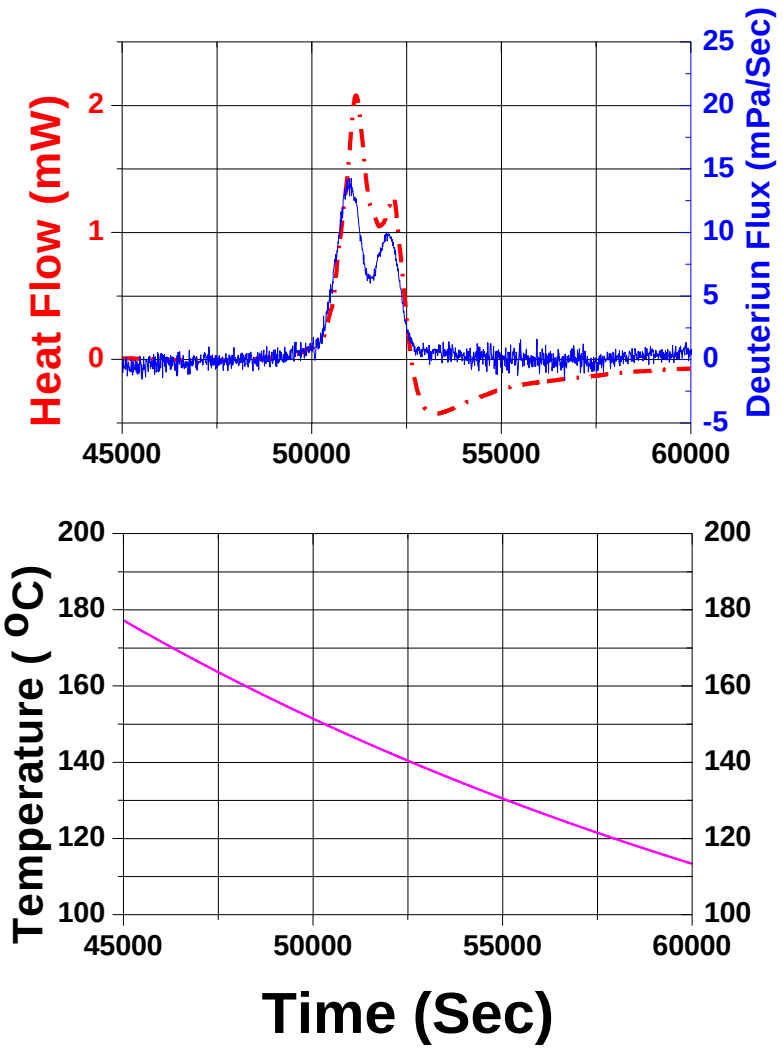
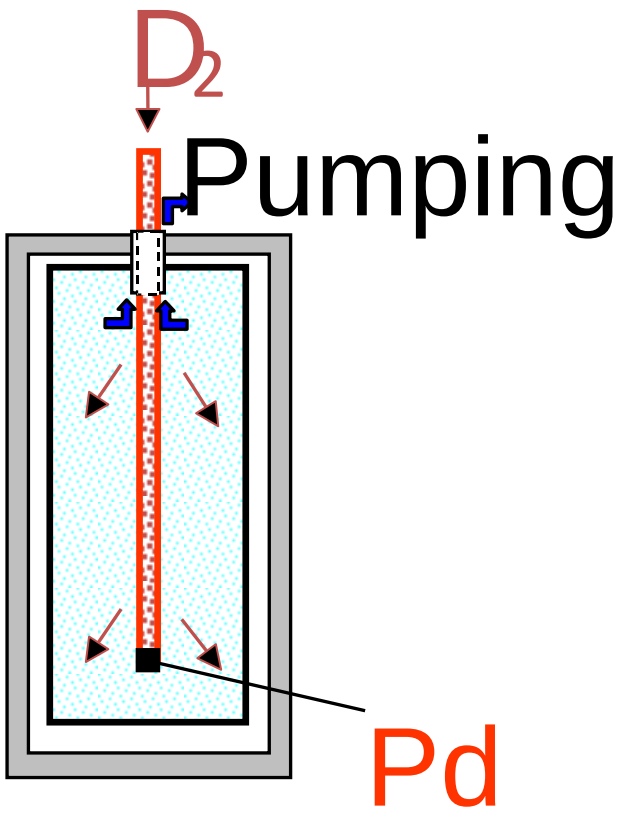
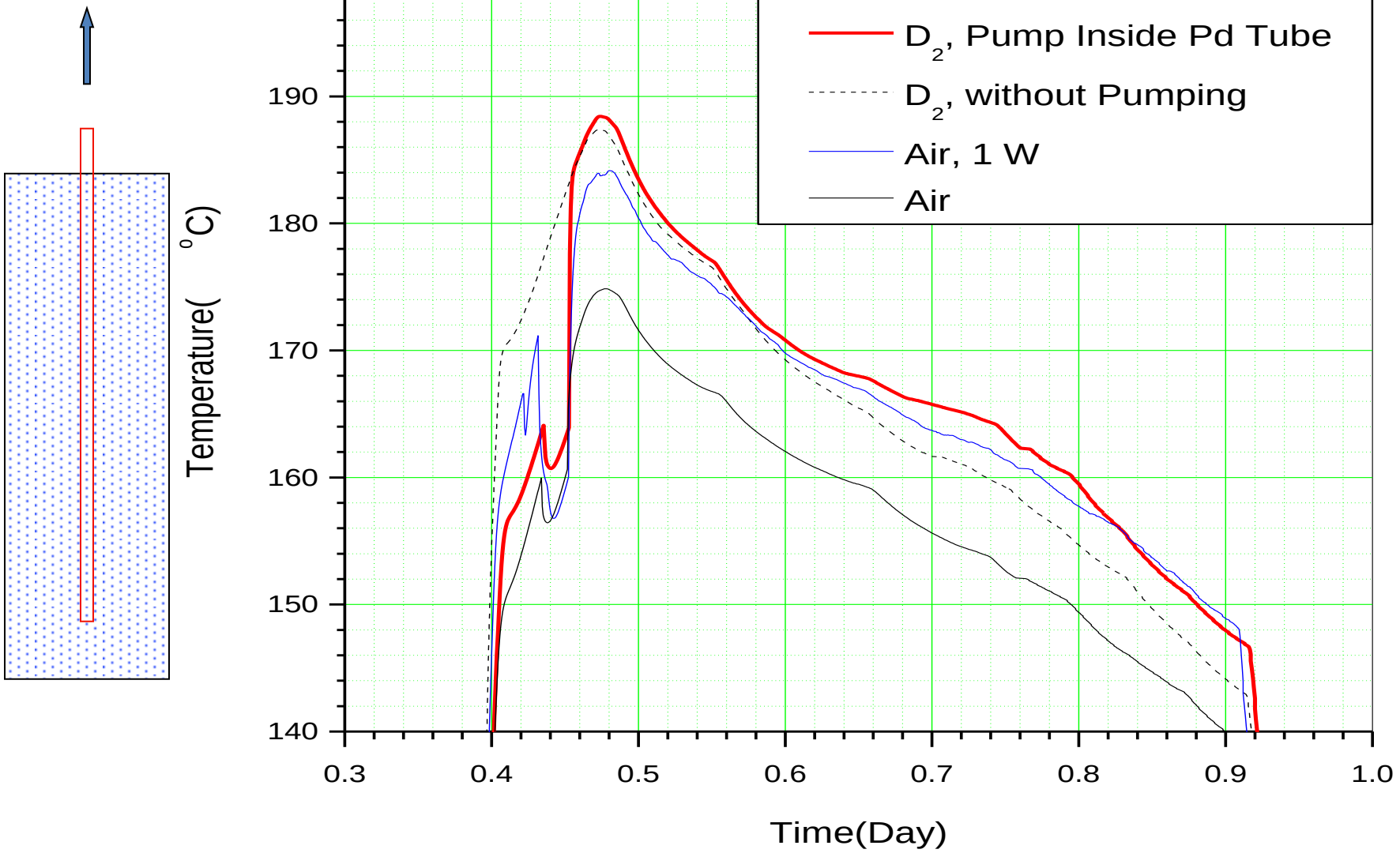
Deuterium Flux & Anomalous Heat Flow

X.Z.Li, et al., J. of Physics D: Applied Physics 36 (2003) 3095





5 Pd Tube, 1 W "Excess Heat" by D_2 Flux

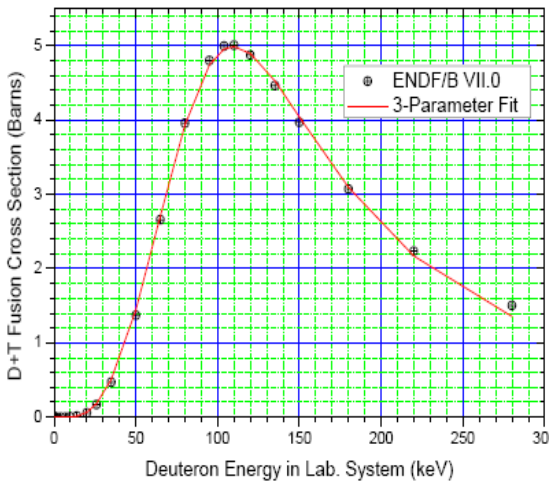


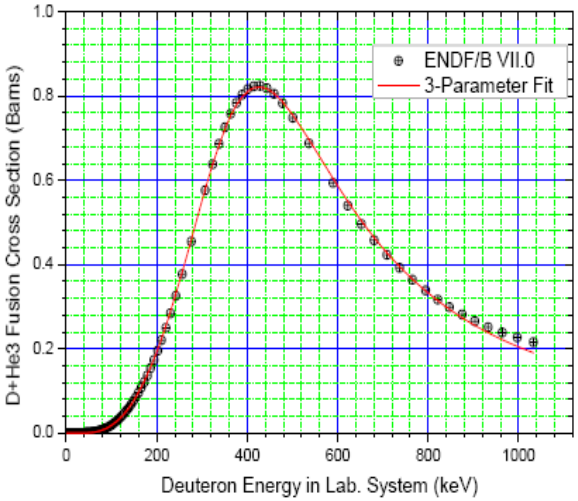
Ph. D. Thesis, 2008

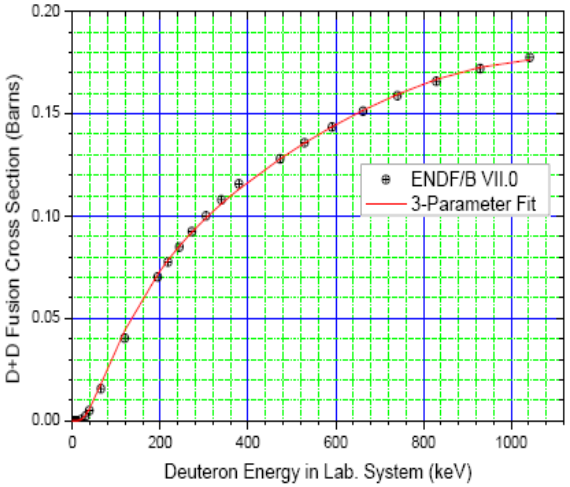
Green Nuclear Energy is Feasible !

- Nuclear : Energy, eV------ MeV
- Green: Selectivity,
~~Neutron, Gamma,~~ X, Charged Particles, Neutrino
- Selectivity: Resonant Tunneling
- Resonant Tunneling: Hot Fusion Data

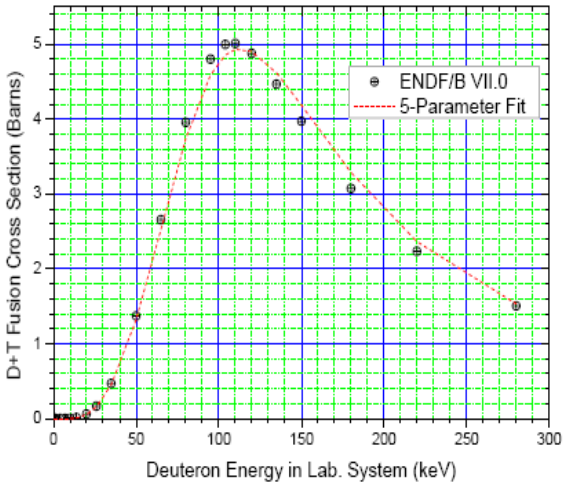
3-Parameter Selective Resonant Tunneling Formula

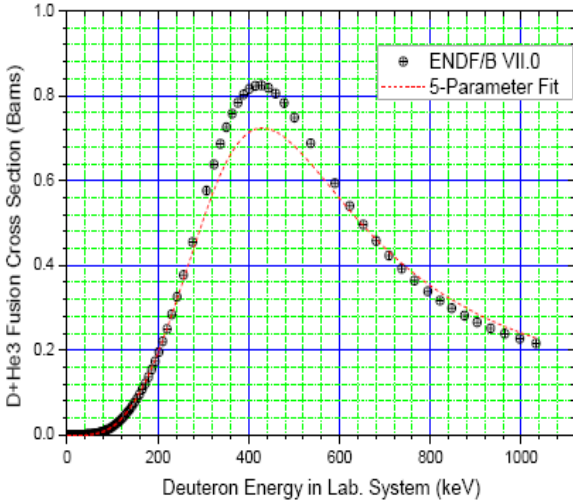


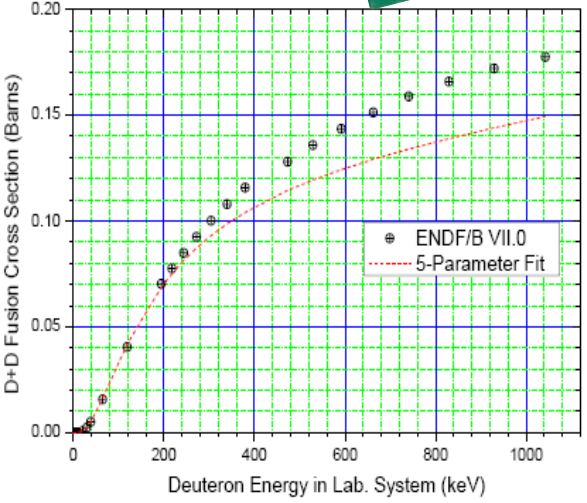




5-Parameter NRL Formula

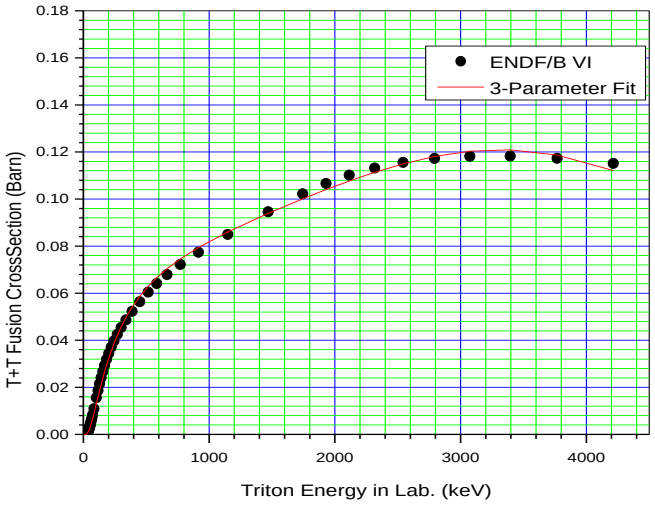


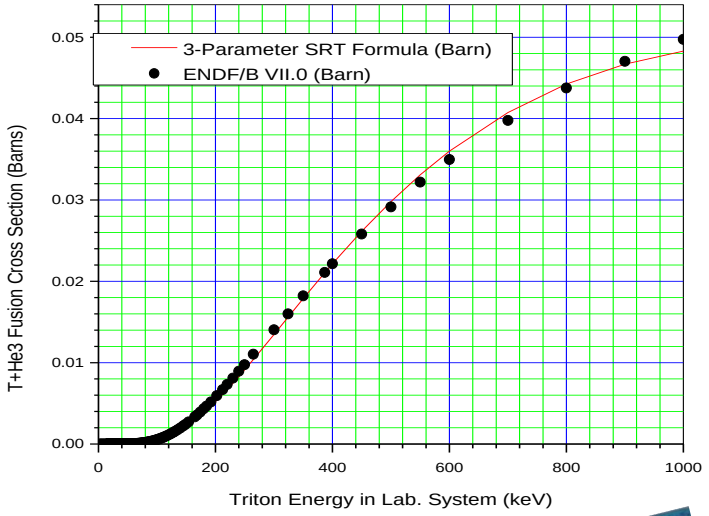




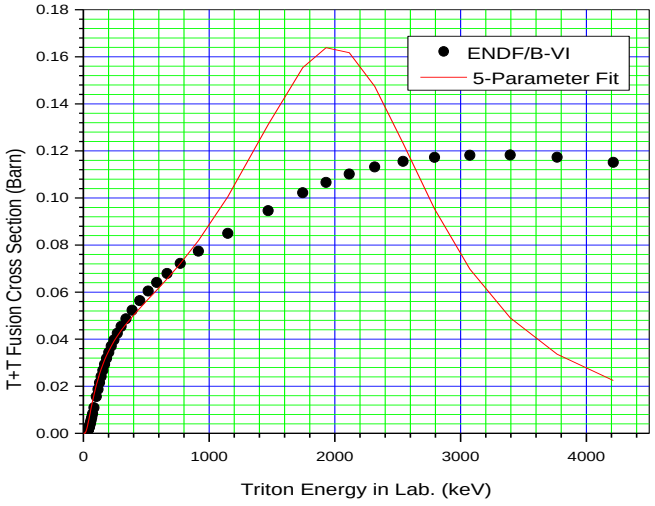
D+T **D+He3** **D+D**

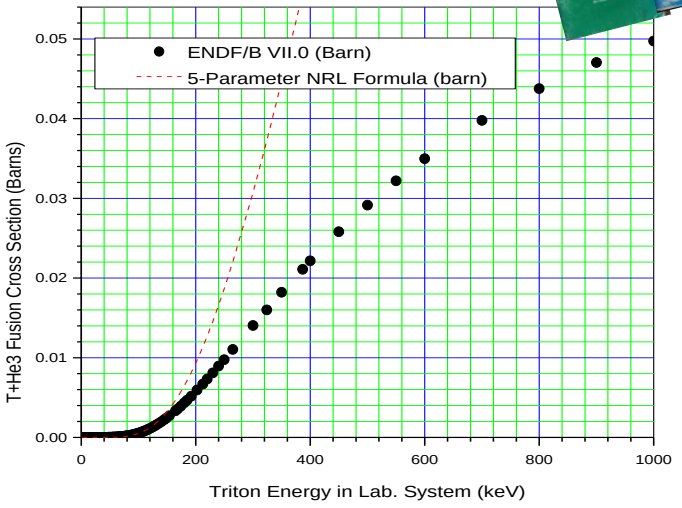
3-Parameter Selective Resonant Tunneling Formula





5-Parameter NRL Formula





T+T

T+He3

5-Parameter Formula

Naval Research Lab. Plasma Formulary

$A_1 = 45.95$

$A_2 = 50200$

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

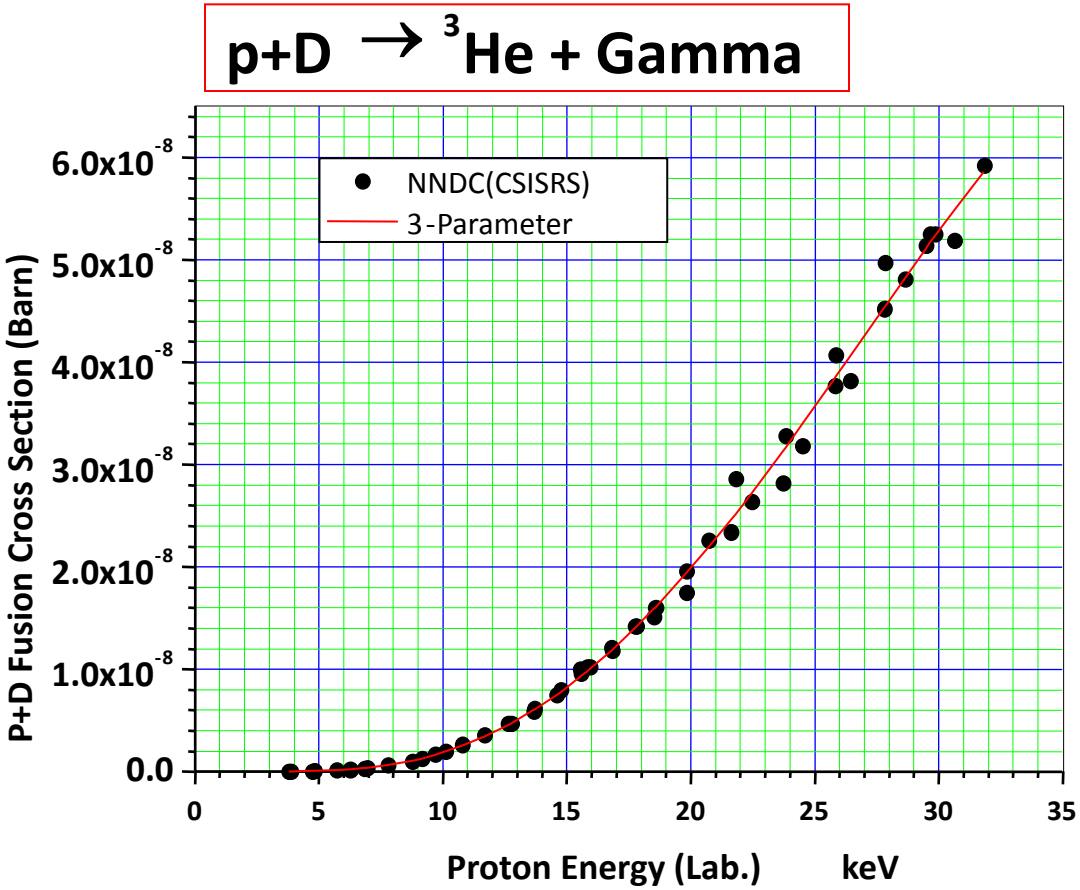
$A_4 = 1.076$

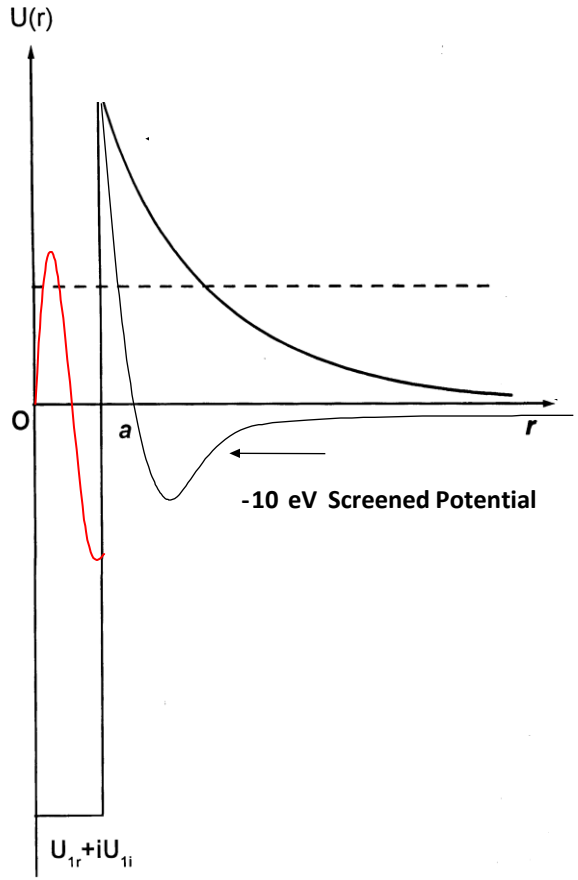
$A_5 = 409$

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

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

3-Parameter New Formula(Selective Resonant Tunneling)





$$p + d \rightarrow {}^{3}He + \nu + \tilde{\nu}$$

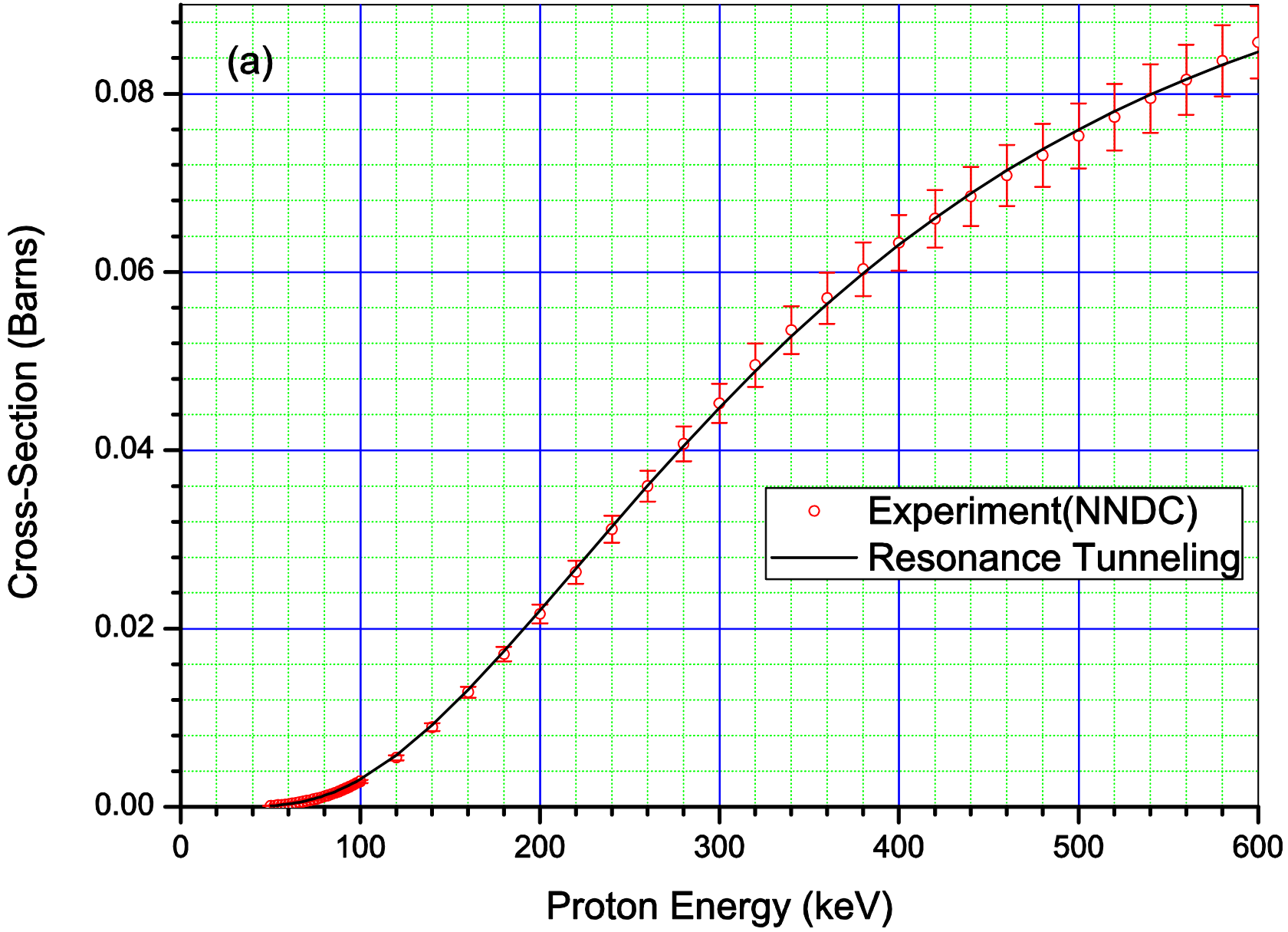
$$p + d + e^{-} \rightarrow T + \nu + \tilde{\nu}$$

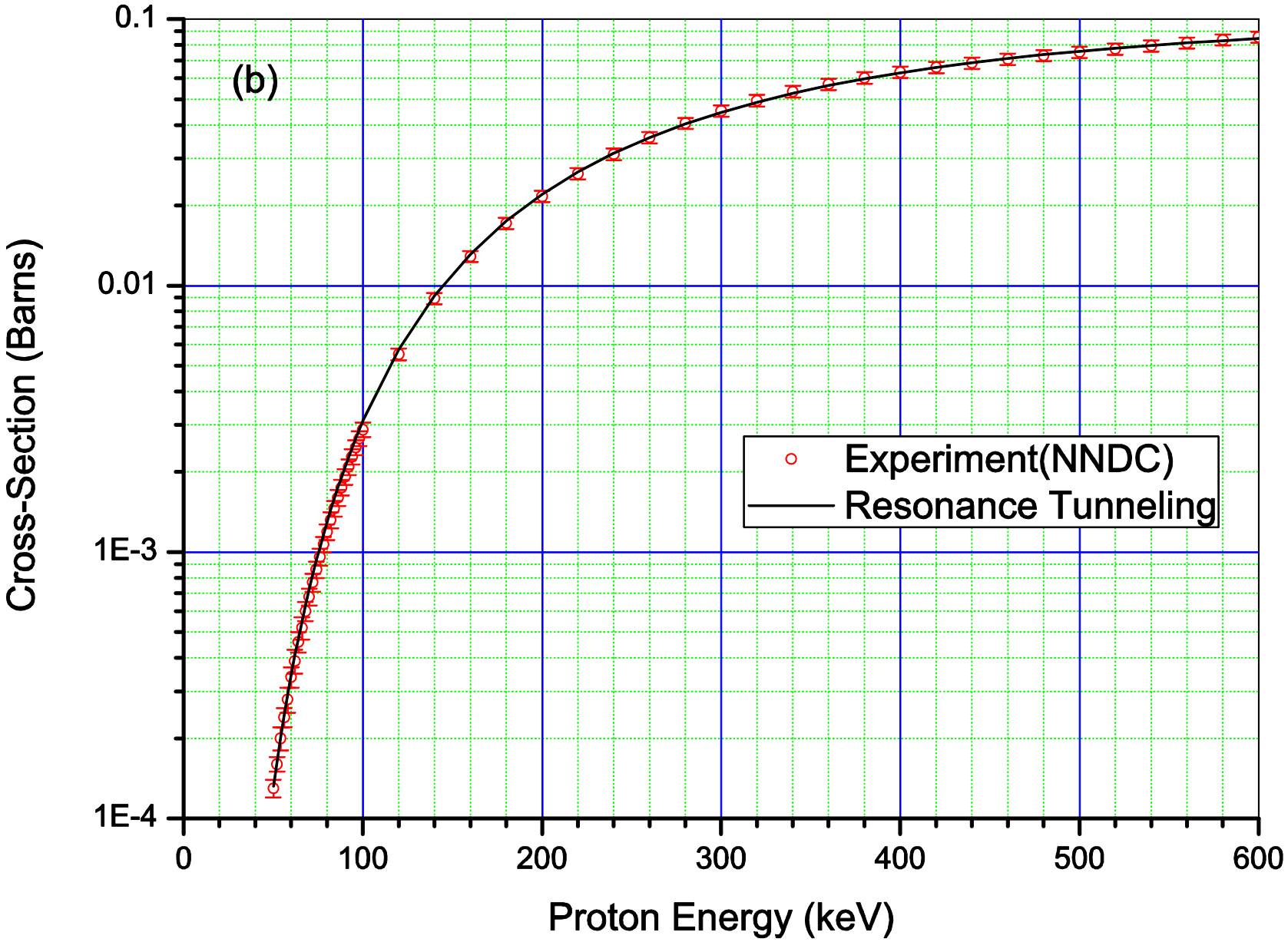
U_r = - 43.905MeV

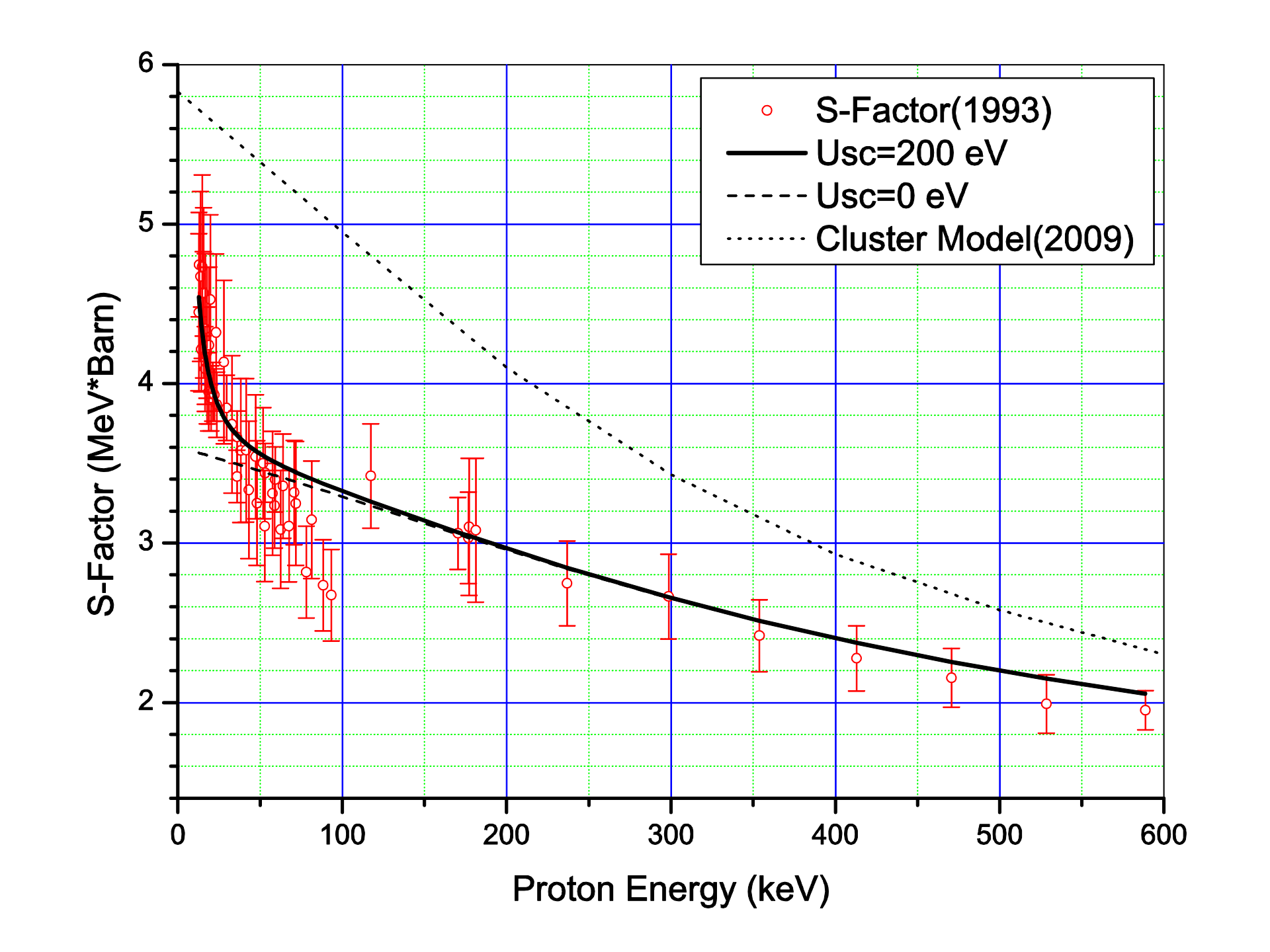
$(k_1 a_0) \sim (3\pi/2)$

Hot Fusion Data justified Cold Fusion

$$p + {}^{6}Li \rightarrow {}^{4}He + {}^{3}He + 4.02MeV$$




(b)
Cross-Section (Barns)
0.1
0.01
1E-3
1E-4
0
100
200
300
400
500
600
Proton Energy (keV)
Experiment(NNDC)
Resonance Tunneling


S-Factor(1993)
Usc=200 eV
Usc=0 eV
Cluster Model(2009)
S-Factor (MeV*Barn)
Proton Energy (keV)
6
5
4
3
2
0
100
200
300
400
500
600

IOP Publishing and International Atomic Energy Agency — Nuclear Fusion

Nucl. Fusion 48 (2008) 125003 (5pp) — doi:10.1088/0029-5515/48/12/125003

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

菊池满

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Received 29 April 2008, accepte
Published 3 November 2008
Online at stacks.iop.org/NF/48/1

Abstract

The recent ENDF/B VII.0 data a
differences between experimenta
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.-

Dr. M. Kikuchi,
Supreme Researcher
Fusion research and development directorate
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

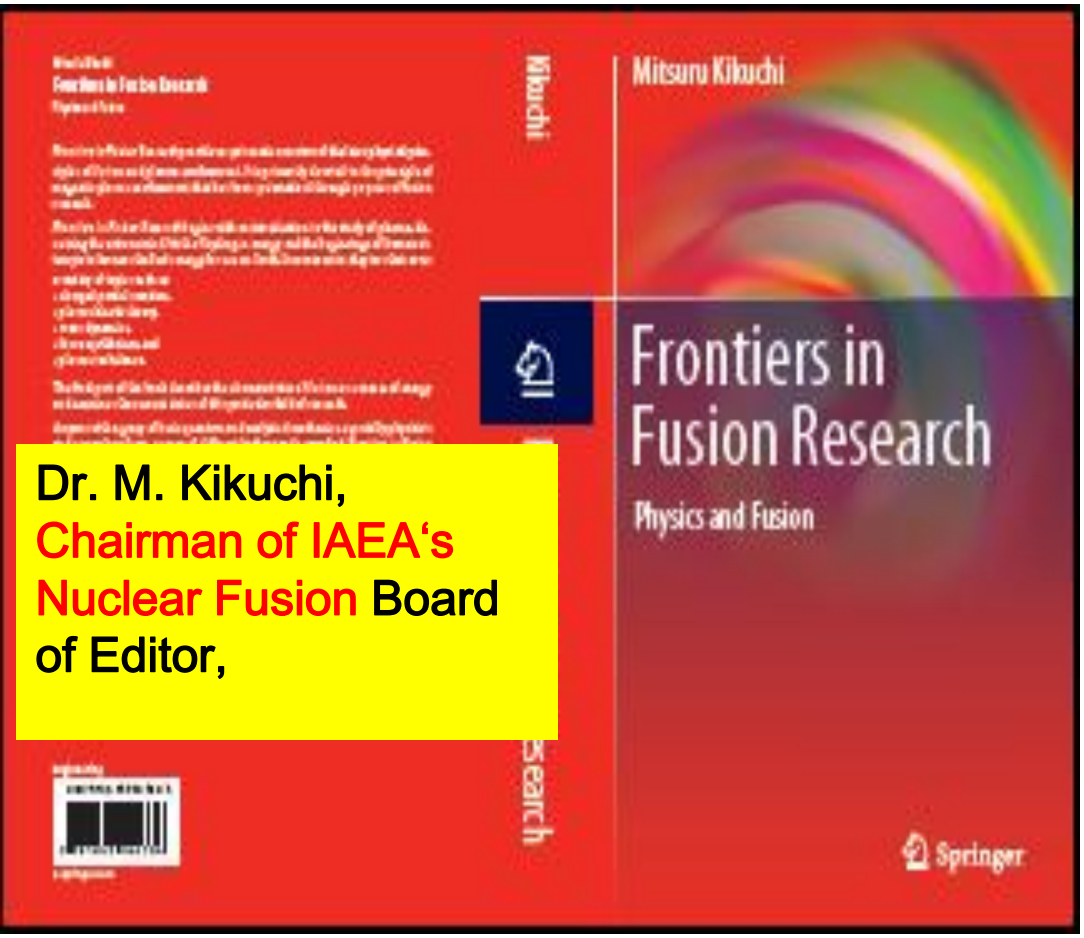
（Charles Evans Associates , Sunnyvale, CA） （*Terrestrial Lithium (Handbook)* ***12.48***） **T.Passell**

Sample Designation	Li-7/Li-6 Ratio	Uncertainty	One Sigma Range
Pd-D from Arata (Virgin)	**13.6**	1.0	12.6 to 13.6
Pd-A from Arata (Active)	14.5	0.3	14.2 to 14.8
Pd-B from Arata (Active)	**22.0**	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
Arata S-8 Powder	**14.6**	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
Li Tsinghua Sample E	**23.3**	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)	**12.9**	0.8	12.1 to 13.7

CIAE, TOF-SIMS, Surface Depth

Anomalous Heat from Metal Hydrides

Resonant Fusion

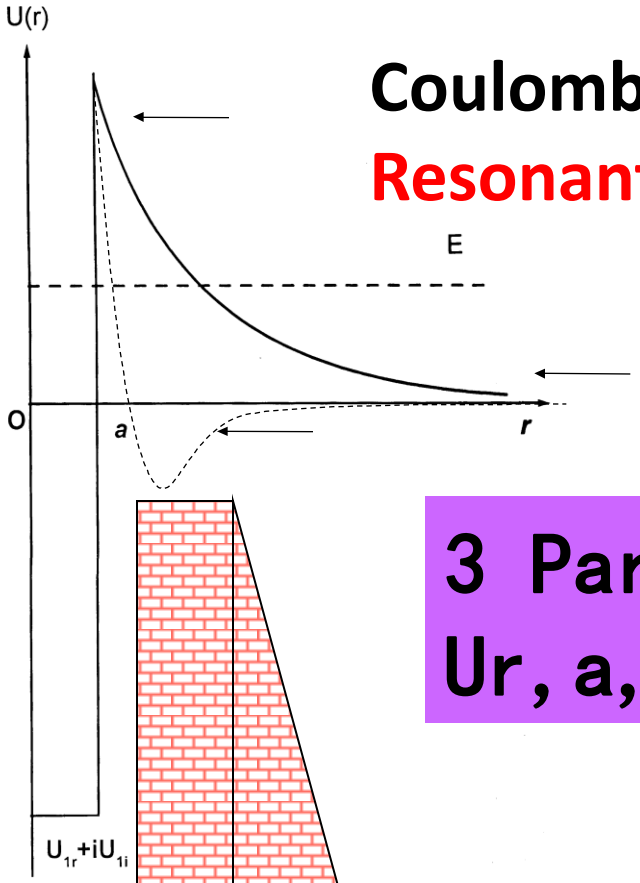


Dr. M. Kikuchi,
Chairman of IAEA's Nuclear Fusion Board of Editor,

Strong —Neutron

E.M. -- Gamma

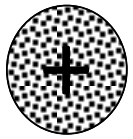
Weak —Neutrino



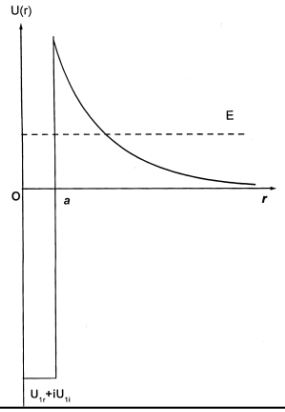
Coulomb Barrier—

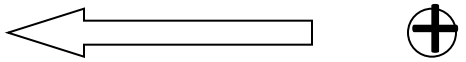
Resonant Tunneling

3 Parameter:
Ur, a, Ui

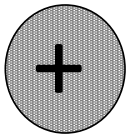


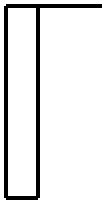
Target

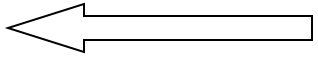




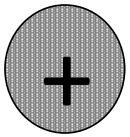
Accelerator



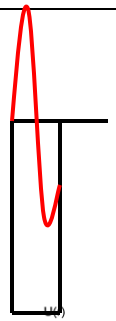


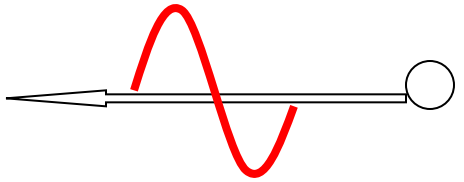


Neutron

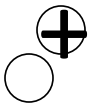


B,Cd,Sm,Gd

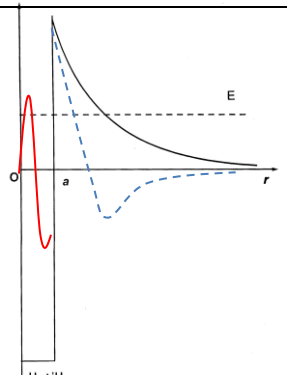


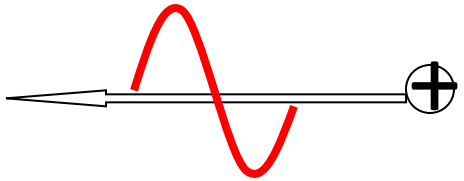


Neutron Resonant Absorption



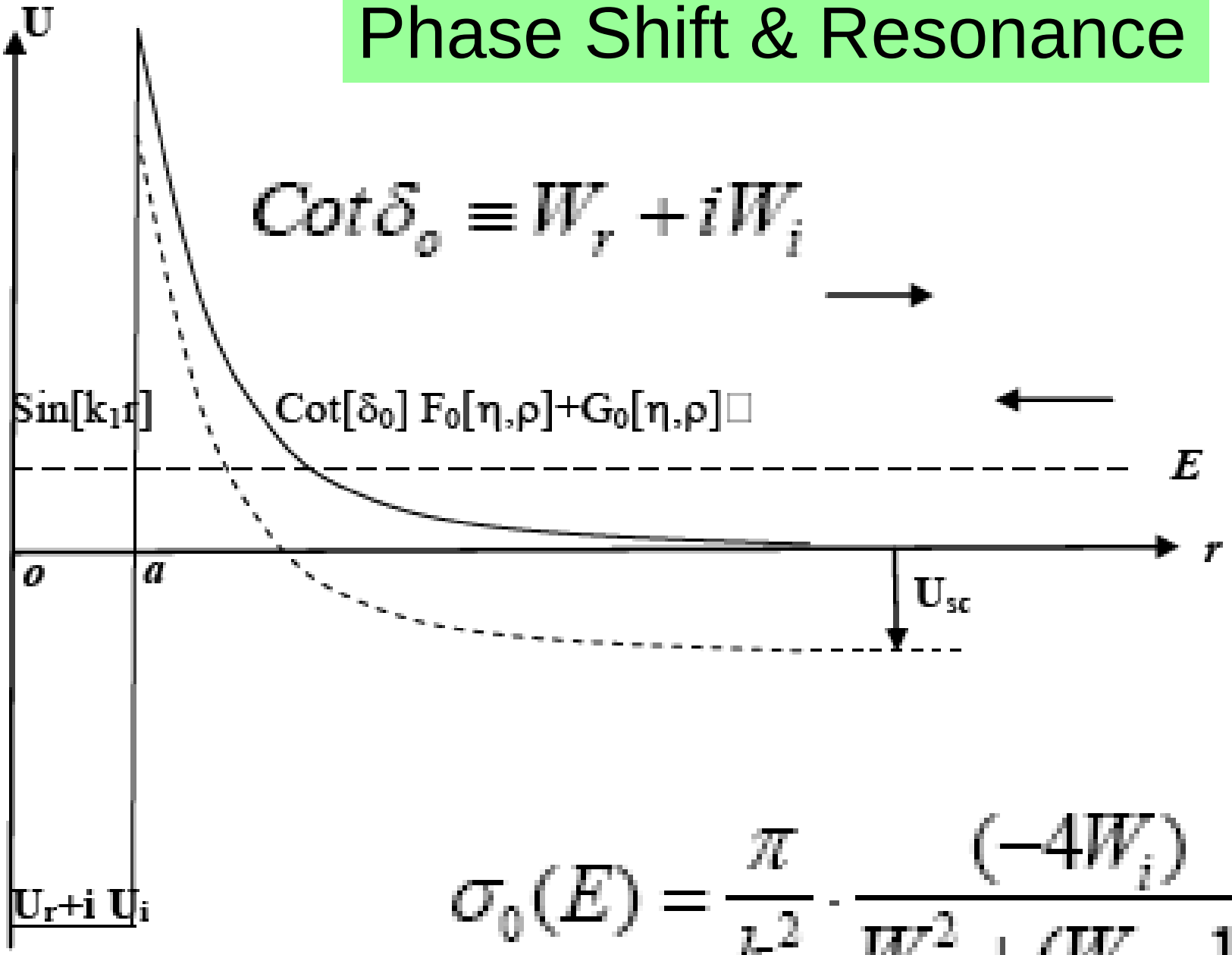
NiH? p+d? p + ^{6}Li?





p+ ^{6}Li Resonant Absorption in metal hydrides

Phase Shift & Resonance



$$\sigma_0(E) = \frac{\pi}{k^2} \cdot \frac{(-4W_i)}{W_r^2 + (W_i - 1)^2}$$

Criterion for Low Lying Resonance Energy Level

$$\sigma_0(E) = \frac{\pi}{k^2} \cdot \frac{(-4W_i)}{W_r^2 + (W_i - 1)^2}$$

$$W_r \propto \left[\frac{Z \cdot CotZ \cdot -\rho \cdot G_0'[\eta, \rho] / G_0[\eta, \rho]}{Z \cdot CotZ \cdot -\rho \cdot F_0'[\eta, \rho] / F_0[\eta, \rho]} \right]_{r=a}$$

$$Z = k_1 a \equiv \sqrt{\frac{2\mu}{\hbar^2}(E - U_r - iU_i)} \cdot a$$

$$\sqrt{\frac{2\mu}{\hbar^2}(-U_r a^2)} \cdot Cot[\sqrt{\frac{2\mu}{\hbar^2}(-U_r a^2)}] - \left[\frac{\rho}{G_0[\eta, \rho]} \frac{\partial G_0[\eta, \rho]}{\partial \rho} \right]_{r=a, k \to 0} = 0$$