



Workshop on experimental and theoretical problematic around actinides for future reactors.

17 ~ 19 March 2014

Maëlle Kerveno (IPHC/CNRS), Marc Dupuis (CEA/DAM)



Presentations

If you agree, the presentations will be put on the web after the workshop.

Wifi

Access codes:

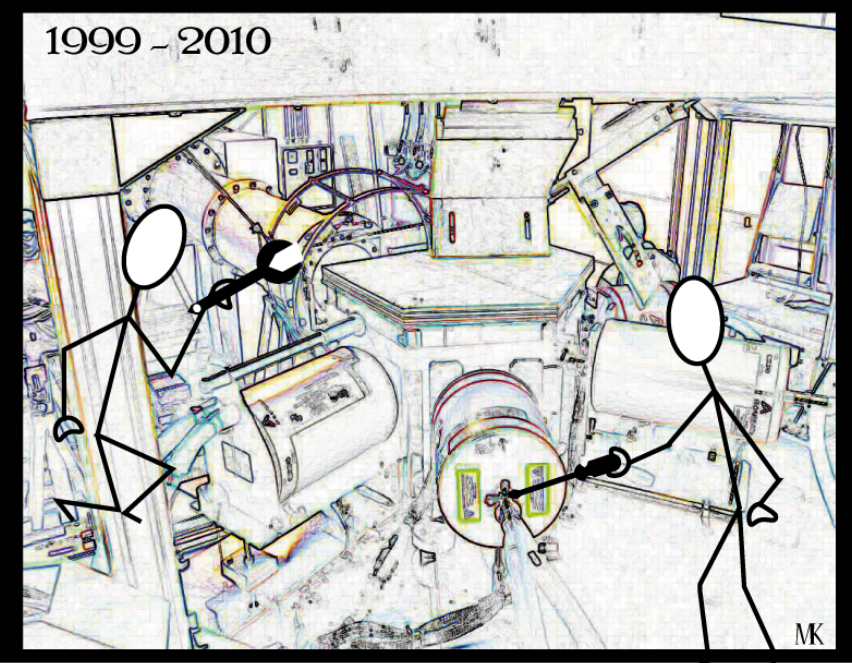
Reimbursement

- Join bank account details (RIB, IBAN)
- Keep Hotel and restaurants bills.

Lunches

- We leave the SPhN site by car for the CEA Saclay center cafeteria which is two kilometers away.
- Payment: one of the organizers of the workshop will have the ESNT restaurant card and pay for the workshop participants.
- Please, wait for Maëlle or Marc at check-out !

1999 - 2010



Experimentalist's point of view

 This block contains several elements:

- Neutron Cross-section Plots:** Four plots showing the neutron cross-section σ (mb) versus Neutron Energy (MeV). The plots are labeled with specific energy values: 45 keV, 103 keV, 159 keV, 211 keV, 584 keV, and 1015 keV. Each plot shows experimental data points (colored dots) and theoretical curves (black lines).
- Text in a speech bubble:** "model dependent blabla blabla method blablablabla...bla discrepancies blabla bla theoretical bla predictions blabla blabla bla effect in reactor core bla bla which other measurements? blablabla improvements!!!!!!"
- Reactor Core Diagram:** A detailed cutaway diagram of a reactor core with various components labeled in French: "Couvercle", "Colonne d'entretien", "Sortie d'eau du circuit primaire", "Commande de barre de contrôle", "Assemblage combustible", "Instrumentation interne", "Entrée d'eau du circuit primaire", and "TUBE guide du circuit primaire".
- Stick Figure:** A stick figure on the left holding a wrench, and another stick figure on the right pointing towards the reactor core diagram.

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111101010010101101
010101000011110010
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010010111010101010
010101000010100101
010100100010010101
01111111111110101
111000100101000001
110001000101010100
101001010101101010
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% % % % %



we need help... 😊

2011 - ... THEORETICIANS

TOC - TOC - TOC

Cross Sections (barns)

Modèle optique

$$(\nabla^2 + k^2)\psi = \frac{2\mu}{\hbar^2} U \psi$$

$$EBS : (\nabla^2 + k^2)\psi = \frac{2\mu}{\hbar^2} U^* \psi$$

Neutron Energy →

Vector densité d'élément de probabilité

$$\frac{\hbar}{2i\mu} (\Psi^* \nabla^2 \Psi - \Psi \nabla^2 \Psi^*) = \frac{2\mu}{\hbar^2} (U^* \Psi - U \Psi^*) \Psi^*$$

SPRT

235Nb

Modèle optique

EBS :

EBS cc :

Vector densité d'élément de probabilité

MK

2013

Measurement of ²³⁵U(n, n'_g)p and ²³⁵U(n, n'_g)p reaction cross sections

M. Kerveno,¹ C. Tilly,¹ A. Bagnall,¹ C. Bussard,¹ P. Desgeorges,¹ C. Drouot,¹ S. Godey,¹ S. Hilaire,¹ B. Serfaty,¹ E. Serron,¹ A. Siffert,¹ A. Tardieu,¹ A. L. Tardieu,¹ M. Pignatelli,¹ P. Bouchon,² C. Baudin,² C. Hillaire,² M. Sarrailh,² ¹IPHC, Université de Strasbourg, 67037 STRASBOURG, FRANCE; ²IRSN, Université de Strasbourg, 67083 STRASBOURG, FRANCE

The design of generation IV nuclear reactors and the studies of new fuel cycles require knowledge of the cross sections of various nuclear reactions. One example is given in this paper, concerning the ²³⁵U(n, n'_g)p and ²³⁵U(n, n'_g)p reactions for the 235U isotopes. The present study uses the ¹⁶O(n, n'_g)p and ¹⁶O(n, n'_g)p reactions for the 235U isotopes. The experimental setup and the data analysis are presented. The results are compared with the data from the literature and the uncertainty is estimated. The experimental setup and the data analysis are presented. The results are compared with the data from the literature and the uncertainty is estimated.

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2012 - ... EVALUATORS

TOC - TOC - TOC

CONVERSION MATRI

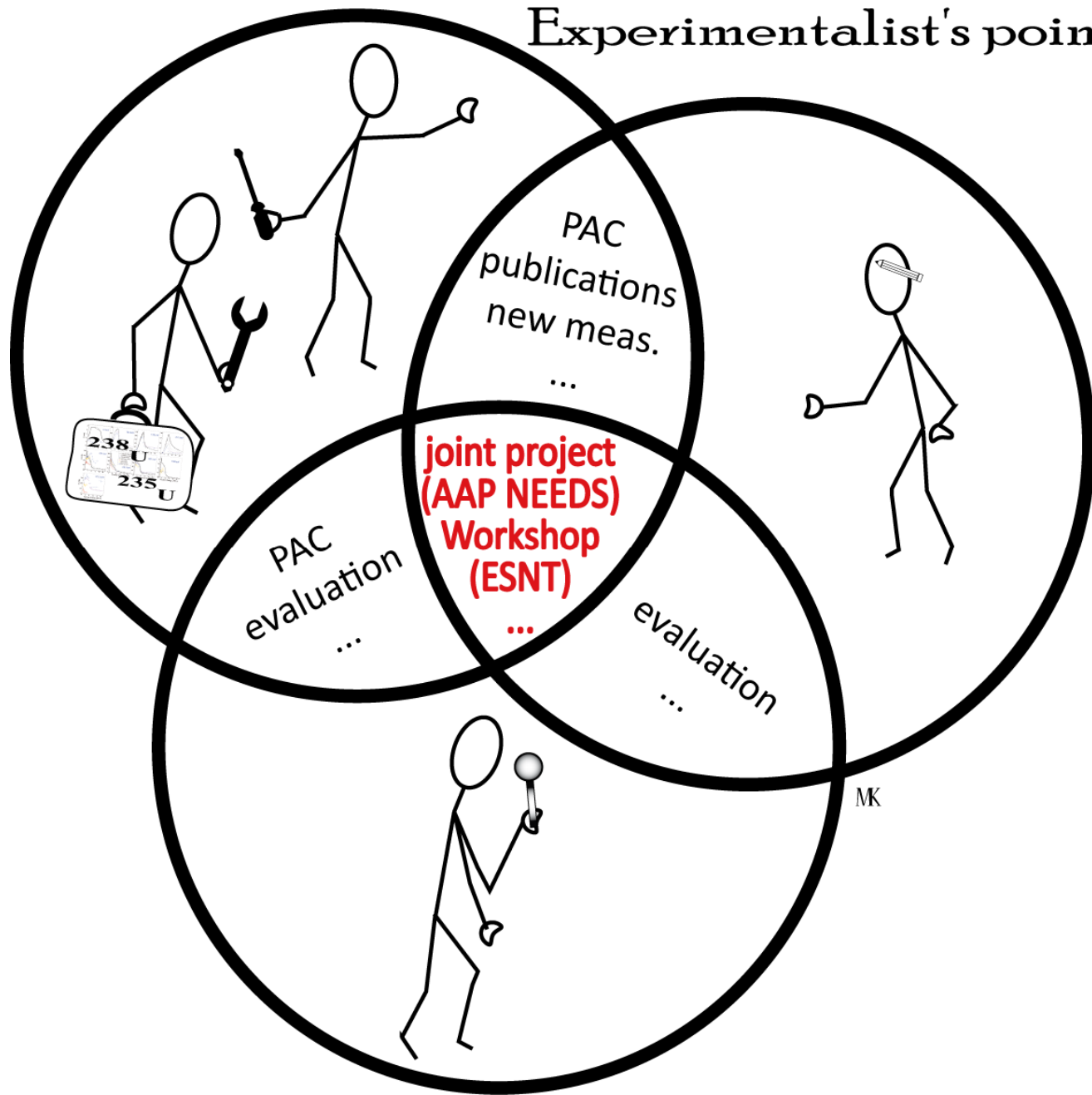
CONVERSION MATRI

PROCESSEMENT

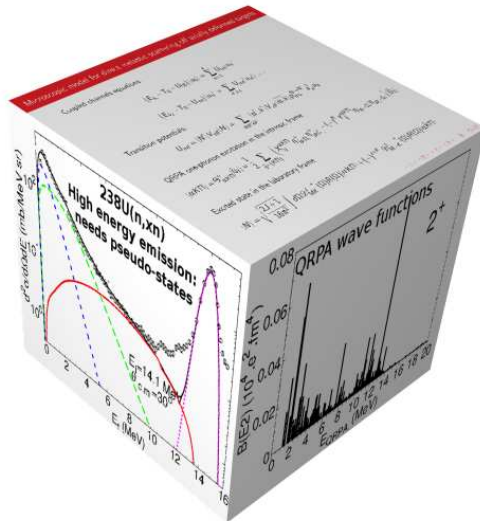
Diagramme de la pile

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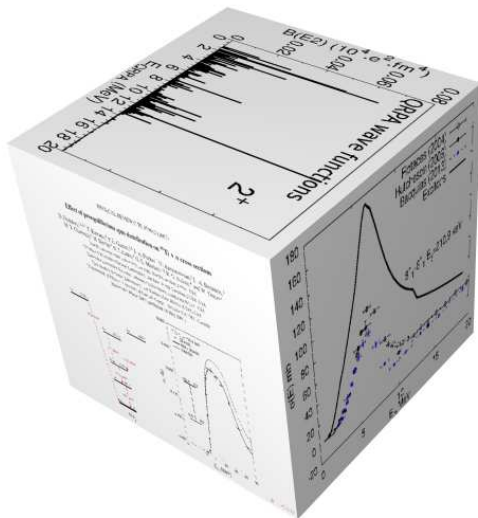
Experimentalist's point of view



... working on microscopic inelastic scattering models
to explain $^{238}\text{U}(n,xn)$ measured cross sections ...

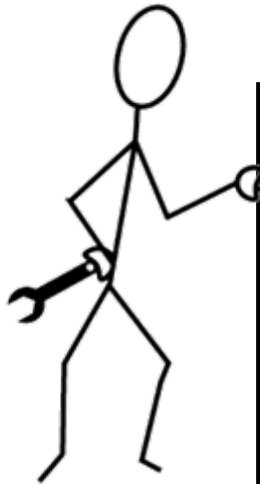


2013 other observables of interest ...
 deeper testing of nuclear reaction modeling ...

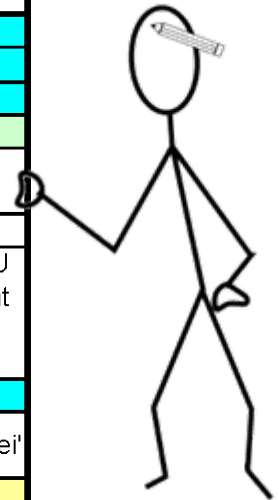


PROGRAM

Workshop Experimental and theoretical problematic around actinides for future reactors.



17th March, Monday		
11:30 - 12:15	Registration	
12:30 - 13:45	lunch	
13:45 - 14:00	Registration	
	General talks	
14:00 - 14:15	Maëlle Kerveno (CNRS) Marc Dupuis (CEA/DAM)	Introduction
14:15 - 15:00	E. Bauge (CEA/DAM)	"lecture on inelastic model"
15:00 - 15:45	D. Bernard (CEA/DEN)	"Importance of the neutron slowing down through ^{238}U inelastic scattering for reactor applications and inherent nuclear structure uncertainties for the evaluation of its discrete levels"
15:45 - 16:00	break	
16:00 - 16:45	R. Capote (IAEA)	"Challenges in nuclear data evaluation of actinide nuclei"
16:45 - 17:15	Discussion	



18th March, Tuesday		
theoretical (n,xn) and (n,xn γ)		
9:00 - 9:45	S. Hilaire (CEA/DAM)	"TALYS code"
9:45 - 10:30	P. Romain (CEA/DAM)	"What bothers me about inelastic models"
10:30 - 11:00	break	
11:00 - 11:45	T. Kawano (LANL)	"Theoretical issues on nuclear reactions modeling."
11:45 - 12:30	M. Dupuis (CEA/DAM)	"last development on direct nucleoninelastic scattering modeling and spin distributions."
12:30 - 14:00	lunch	
experimental (n,xn) and (n,xn γ)		
14:00 - 14:45	A. Plompen (JRC/IRMM)	"Actinide on the High Priority Request List." "Experiences with modelling (n,n' γ) data using TALYS"
14:45 - 15:30	A. Bacquias/M. kerveno (CNRS/IPHC)	"latest results on (n,xn γ) on ^{235}U , ^{238}U , $^{232}\text{Th}(\text{?})$ "
15:30 - 15:45	break	
15:45 - 16:30	C. Borcea (IFIN)	"surrogate reaction for inelastic reaction investigation."
16:30 - 17:15	Discussion	

19th March, Wednesday		
experimental (n,xn) and (n,xn γ)		
9:00 - 9:45	X. Ledoux (GANIL)	"measurements at NFS"
9:45 - 10:30	G. Belier (CEA/DAM)	"Integral measurement of ^{235}U isomeric excitation by neutron inelastic scattering - (n,xn) reaction cross section measurement on actinides with Carmen @ NFS"
10:30 - 11:00	break	
11:00 - 11:45	F. Gunsing (CEA/Ifu)	"Minor actinide reaction cross sections at n_TOF at CERN"
11:45 - 12:30		
12:30 - 14:00	lunch	
14:00 - 14:45	S. Hilaire (CEA/DAM)	"Things we have (maybe) not talked about !"
14:45 - 15:30	Discussion	
15:30 - 16:15		
16:15 - 17:00		