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# Uncertainty propagations in the nuclear fuel cycle

Uppsala University  
in collaboration with Vattenfall

April 24-25, 2013

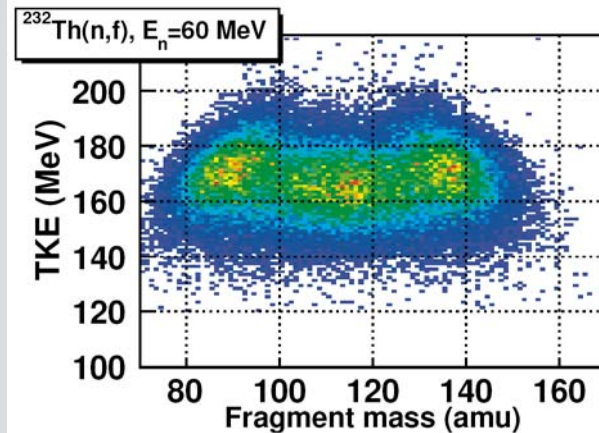


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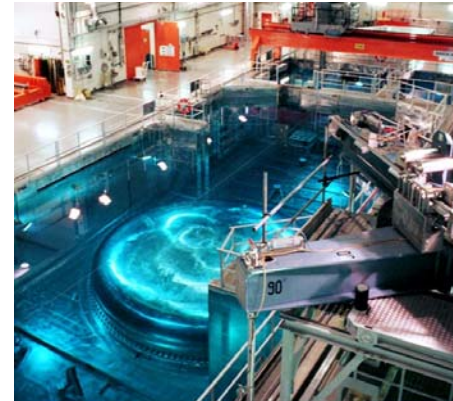
# Nuclear Reactions Research Group

ANP: ca 50 people, Group: 16 full time, 2 adj. prof., 5 "other"

"Mission statement":



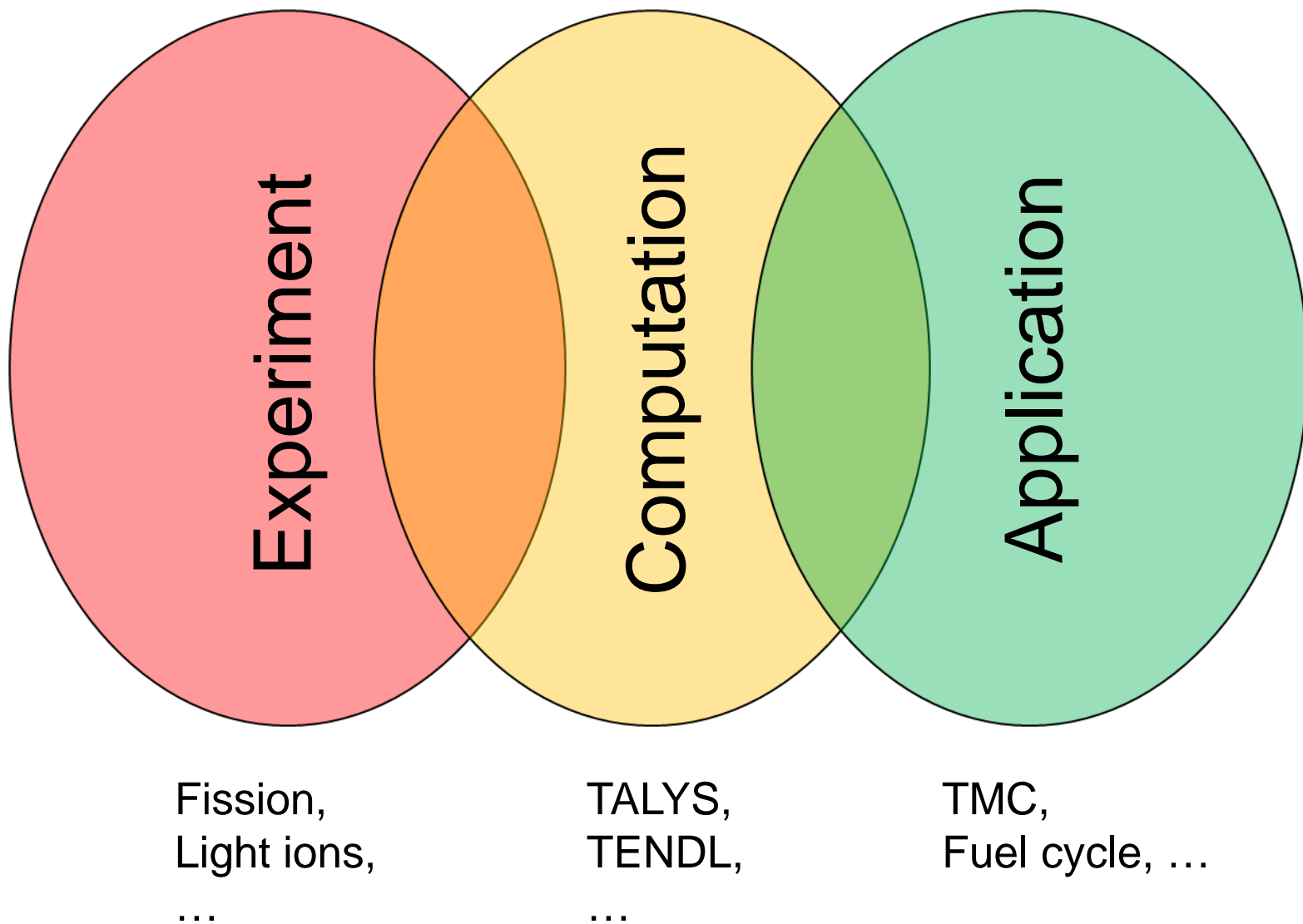
- Model codes  
**TALYS,**  
**EMPIRE,**  
...
- Evaluations  
**TENDL,**  
**ENDF-B/VII,**  
**JENDL,**  
...
- Simulations  
Serpent,  
MCNP,  
PHITS,  
...





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# Nuclear Reactions Research Group





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# Nuclear Reactions Research Group

Facility/Topic

UU People

## Experiments

## Computations

**NFS**

GANIL,  
France

Cross sections  
(fission, lcp)

Cecilia,  
Stephan,  
Diego,  
Kaj

**IGISOL**

Jyväskylä,  
Finland

Fission yields  
(LWR and FR)

Mattias,  
Andreas,  
Andrea,  
Bill

**”other”**

TSL, Sweden  
and  
LLN and JRC,  
Belgium

fission, lcp,  
(n,xn)

Stephan,  
Cecilia,  
Vasily,  
Ali

**TENDL,  
TMC**

buffy, Sweden  
and  
NRG,  
The Netherlands

Uncertainties and  
“Quality assurance”

Henrik,  
Arjan, ☺  
Klaes-Håkan,  
Michael,  
Junfeng,  
Erwin,  
Louise,  
Petter



# Objectives

## Purpose of the meeting:

- Identify how uncertainty propagations in the nuclear fuel cycle and reactor safety calculations are done today. **How could it be improved?**
- Discuss if the **requirements** for uncertainty propagations are to be changed the future? What are the potential **benefits**?
- Find out how the Total Monte Carlo methodology can be **tested and possibly be implemented** within existing commercial code packages.
- Establish new **relations** between the nuclear engineering industry and academia within this field.
- Explore how new methodologies can help to **improve quality assurance** issues.



# Agenda - Wednesday

13:15 **Stephan Pomp**: Welcome. Presentation of participants.

14:00 **Arjan Koning**: "Nuclear data uncertainty propagation using a Total Monte Carlo approach"

14:45 **Ewa Kurcyusz-Ohlofsson**: "Vattenfall's perspective on uncertainty analysis"

15:15 Coffee

15:45 **Jean-Christophe Sublet**: "Reaction rate uncertainty quantifications and propagations"

16:15 **Oliver Bus**: "NUDUNA, Nuclear Data Uncertainty Analysis"

16:45 **Dimitri Rochman**: "Perturbation vs. Total Monte Carlo"

17:15 Discussion

17:45 **Henrik Sjöstrand**: Closing remarks

**19:30 Dinner at Villa Romana**



# Agenda - Thursday

09:00 **Henrik Sjöstrand**: " Uncertainty propagation work at Uppsala university"

09:30 **Discussion**: how to **integrate TMC** or other uncertainty methodologies **into existing codes**. Starts with a presentation from VTT.

10:30 Coffee

11:00 **Axel Hoefler**: "Application of the MOCADATA Monte Carlo package to Uncertainty Analysis for Criticality Safety Assessment"

11:30 Discussions

13:00 Closing remarks



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# Participants ...

Vattenfall nuclear fuel

Areva

Studsvik Scandpower

SSM

SKB

VTT

Forsmark

SP

CCFE

NRG

Uppsala University



