

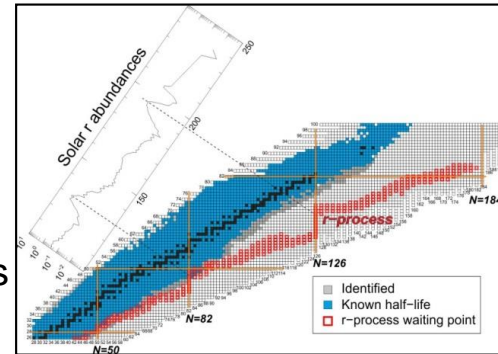
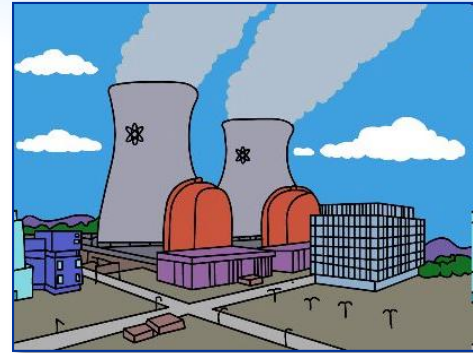
# New CRP on Updating Fission Yield Data for Applications

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**Nuclear Data Section, IAEA**

# Importance of Fission Yields

- **Reactor applications:**
  - Fuel inventory (PIE)
  - Burn-up calculations (based on burn-up indicators)
  - Decay heat & Dose calculations with uncertainties
  - Fuel storage and transport (Criticality-safety)
  - Dose calculations with uncertainties
  - Full core analysis with uncertainties
- **Safeguards:**
  - Non-invasive reactor monitoring: knowledge and quantification of the antineutrino spectra
- **Nuclear Astrophysics:**
  - Synthesis of heavy elements in the universe through r process – re-cycling of low A elements



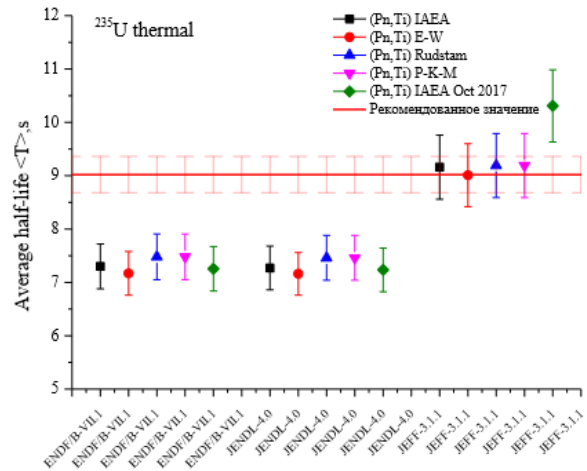
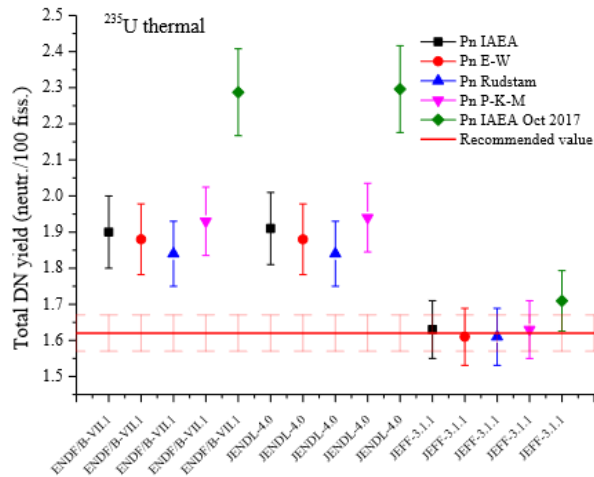
# CRP on beta-delayed neutrons (2013-2018)



- Compilation and evaluation of all available  $T_{1/2}$  and  $P_n$
- Over 600 entries
- All data available online
- Benchmark against integral data:  $\bar{\nu}$ ,  $\langle T \rangle$ , group constants

# Benchmark

## U-235 (thermal neutron induced fission)

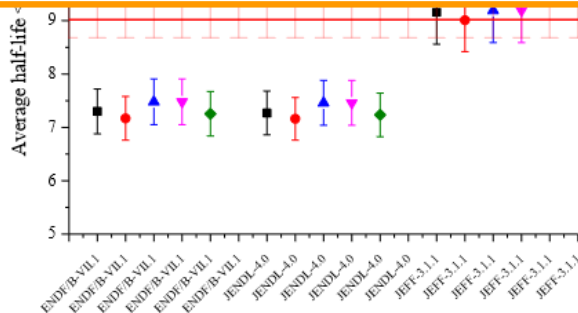
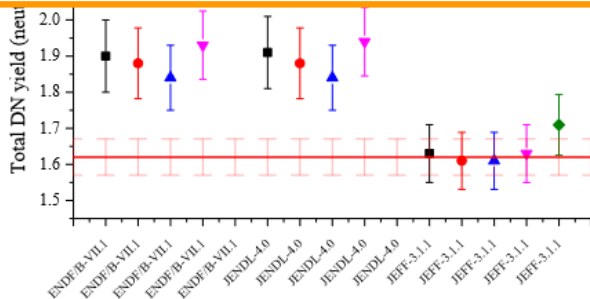


# Benchmark

## U-235 (thermal neutron induced fission)



All benchmarks sensitive to FY data



# Review of current status



## ↑ Participants

Franz-Josef Hamsch

Olivier Serot

Julien Taieb

Karl-Heinz Schmidt

Satoshi Chiba

Vladimir Piksaikin

Stephan Pomp

Mattias Lantz

Ali Al-Adili

Andrea Mattera

Dimitri Rochman

Michael Fleming

Filip Kondev

Alejandro Sonzogni

Werner Tornow

Frederik Tovesson

Marco Pigni

Chen Yongjing

Liu Shilong

Nengchuan Shu

## Technical Meeting on Fission Yields: current status and perspectives in measurements, theory and evaluations

23-26 May 2016, IAEA Headquarters, Vienna, Austria

### Purpose

Discuss recent progress in experimental techniques and achievements in terms of resolution and accuracy of Fission Yield data. Address developments in theoretical approaches and enhancement of predictive power of empirical models. Assess the status of evaluated Fission Yield data in existing libraries, and discuss developments in evaluation methods including covariances.

The goal is to review the current status of Fission Yield Data, in view of existing and emerging data needs for energy and non-energy applications, and propose ways of addressing these needs.

### Preliminary Agenda

The preliminary Agenda is available [here](#).

### Meeting participants

[Photo](#)

Summary Report INDC(NDS)-0713

# Review of current status



## ↑ Participants

Franz-Josef Hamsch  
Olivier Serot  
Julien Taieb  
Kar  
Sat  
Vlad  
Step  
Mat  
Ali A  
And  
Dim  
Michael Fleming  
Filip Kondev  
Alejandro Sonzogni  
Werner Tornow  
Frederik Tovesson  
Marco Pigni  
Chen Yongjing  
Liu Shilong  
Nengchuan Shu

## Technical Meeting on Fission Yields: current status and perspectives in measurements, theory and evaluations

23-26 May 2016, IAEA Headquarters, Vienna, Austria

Recommended a new  
CRP on FY data

Meeting participants  
Photo

Summary Report INDC(NDS)-0713

# Proposal presented to International Nuclear Data Committee, 2016



- Objective: improve existing evaluated Fission Product Yields (FPY) for U-235,238; Pu-239,241; Cf-252
- Scope:
  - Compilation of all new FFY and FPY experimental data
  - Improve systematics and models
  - Incorporate new knowledge in FPY evaluations: correct errors and inconsistencies, update evaluations, provide reliable estimate of uncertainties
  - Agree on treatment of covariances, provide FPY covariance data for inclusion in ENDF database
  - Validation of new evaluations
  - Dissemination



# Proposal presented to INDC-2016

endorsed

- Objective: improve the accuracy of neutron fission Product Yields (FPY)
- Scope:

As a follow-up to NEA WPEC SG 37 on FY evaluation methodologies, the Working Group recognizes the need of further activities on this subject and endorses the proposed CRP. The CRP will include compilation of experimental FY data (including new experiments) and the improvement of systematics and models aimed at updating evaluations, including reliable estimates of uncertainties for thermal, fast and 14 MeV incident neutron energies.

The Working Group recommends validation of evaluated FY using benchmark data on beta-delayed neutron emission, antineutrino spectra, and decay heat. Activities toward compilation of relevant benchmark data are strongly encouraged.

# Proposal presented to INDC-2016

- Objective: improve **endorsed** fission Product Yields (FPY)
- Scope:

As a follow-up to NEA WPEC SG 37 on FY evaluation methodologies, the Working Group recognizes the need of further

**Confirmed by INDC - 2018**

activities. CRP new models estimate neutron energies.

The Working Group recommends validation of evaluated FY using benchmark data on beta-delayed neutron emission, antineutrino spectra, and decay heat. Activities toward compilation of relevant benchmark data are strongly encouraged.

# CRP on Updating Fission Yield Data for Applications



- Objective: provide updated fission yield data with associated uncertainties for applications for  $^{235,238}\text{U}$ ;  $^{239,241}\text{Pu}$ ;  $^{252}\text{Cf}$
- Duration 4-5 years: 2019-2023/24
- Output: new data files, online database, technical report (+publications, conference presentations etc.)

# Timeframe

- Preparation of CRP proposal/approval Dec. 2018
- Agreements/contracts signed with participants 1Q-3Q/2019
- 1<sup>st</sup> Research Coordination Meeting (RCM) by end of 2019
- 2 more RCMs during course
- Smaller Consultant Meetings if needed



# CRP work program



- According to scope proposed in IAEA TM 2016 and INDC 2016
- Based on agreement with participating institutes (individual programs)
- Adjusted by discussions at RCM (group or individual assignments)

# CRP work program

- According to scope proposed in IAEA TM 2016
- Based on particular program  
**Goal is timely achievement of CRP dual objective**
- Adjusted by discussions at RCM (group or individual assignments)

# Participation



- No of participants: 10-15
- Countries : Belgium, China, Finland, France, Germany, India, Japan, Russia, Sweden, UK, USA
- Research/Contract agreements signed with participating institutes
- Additionally: advisors to CRP

# Participation funding



- Participation in 3 Research Coordination Meetings + CMs (costs covered)
- Research Contracts (12-16K Euros) to countries eligible for Technical Cooperation: central/East Europe, China, Russia, S. America, Asia
- Research (NO FUNDING) Agreements with countries non-eligible for Technical Cooperation: North America, North/Western Europe, Japan, Australia



# Info on IAEA CRPs



https://www.iaea.org/services/coordinated-research-activities



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## Coordinated Research Activities

### Coordinated Research Activities

- › How CRPs work
- › How to participate
- › Explore the CRPs
- › News

The IAEA encourages and assists research on and development and practical use of atomic energy and its applications for peaceful purposes throughout the world. It brings together research institutions from its developing and developed Member States to collaborate on research projects of common interest, so-called Coordinated Research Projects (CRPs).

Explore the  
**CRPs**

### Related resources

- 📄 Factsheet: IAEA Coordinated Research Activities



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*Thank you!*

