

# IAEA Photonuclear Data Library 2019

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# Overview

## • Isotopes and reactions to update

- 219 materials,  $^2\text{H}$  to  $^{241}\text{Pu}$ , for photo-induced reaction
- 20 evaluations from IAEA1999, all others new
- Energies up to 200 MeV (some of them are still 140 MeV)
- Report published in **Nuclear Data Sheets 163, 109 (2020)**

## • Motivation

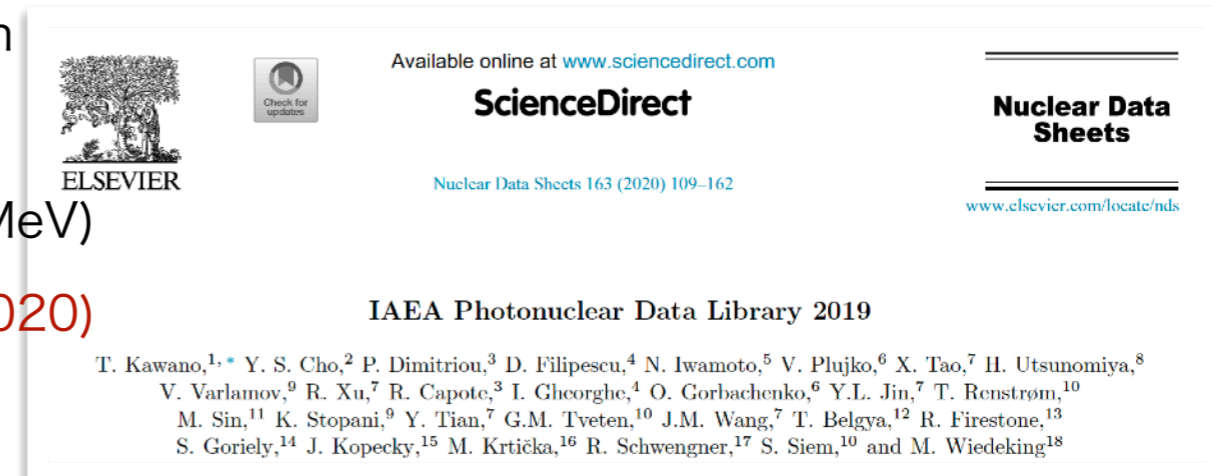
- Previous IAEA Photonuclear Data Library evaluated more than 20 years ago
- New data and evaluation technique available nowadays

## • New Data / Theory

- Modern statistical codes, TALYS, CCONE, EMPIRE, CoH3, capable of producing the evaluated photo-induced reaction data
- **NewSUBARU** facility provided new photo-induced reaction data
- Photon-strength function database produced, in parallel to IAEA Photonuclear 2019

## • Validation

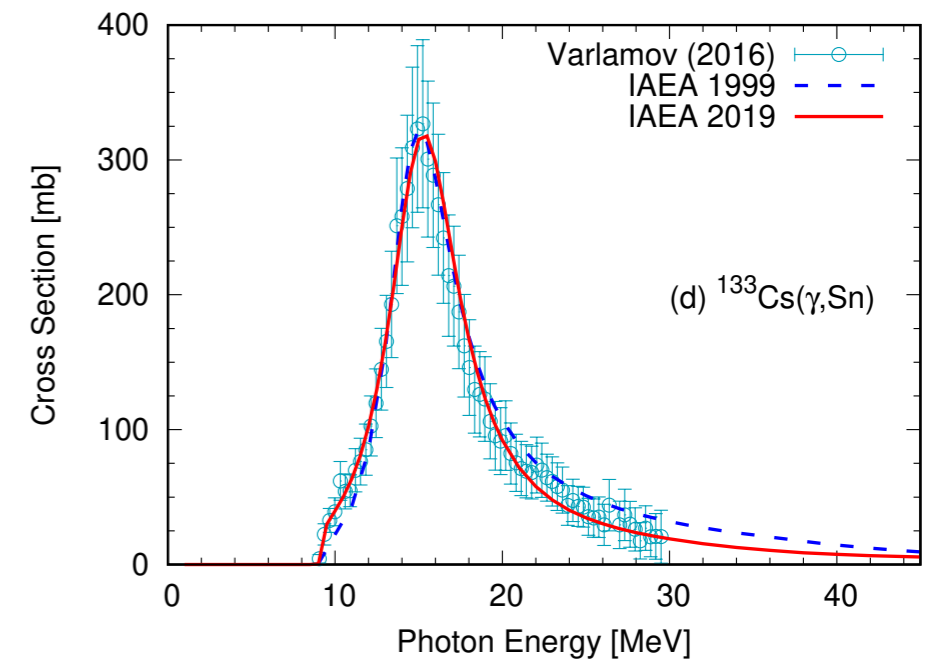
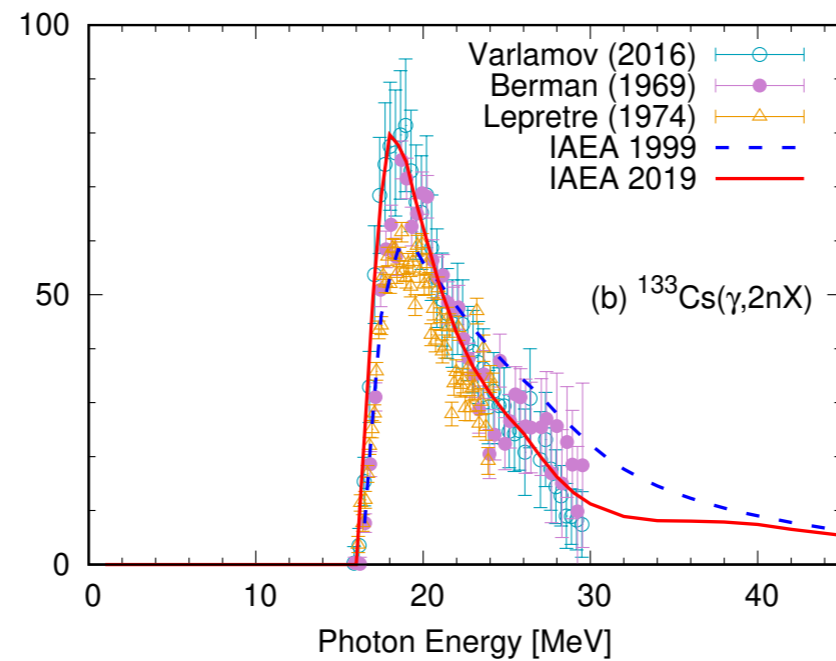
- Data format check, processing issues reported by IAEA, **H. Kawada, IAEA-NDS-0232**



# Evaluations by KAERI and CIAE/CNDC

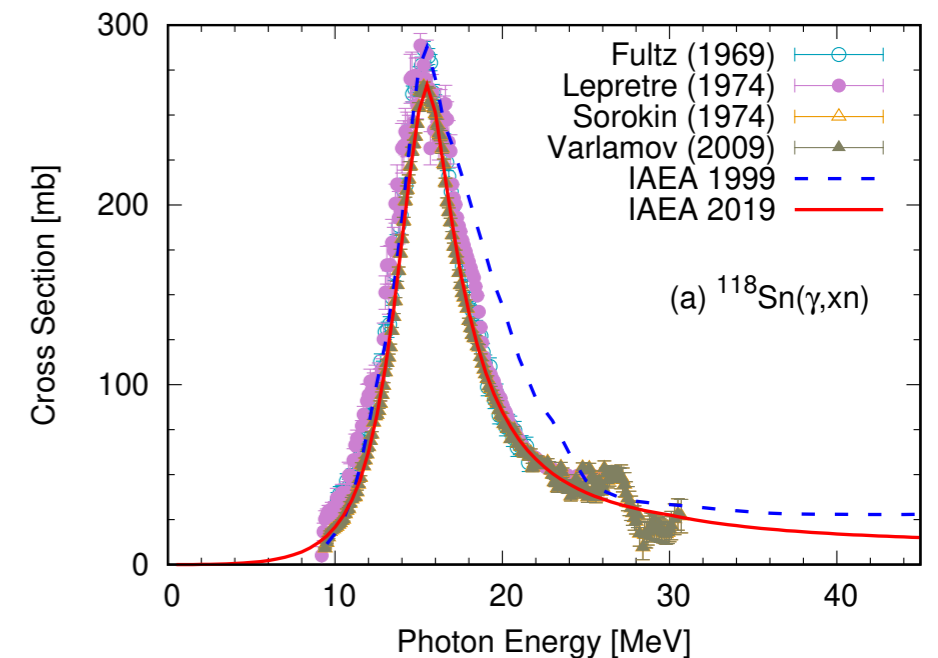
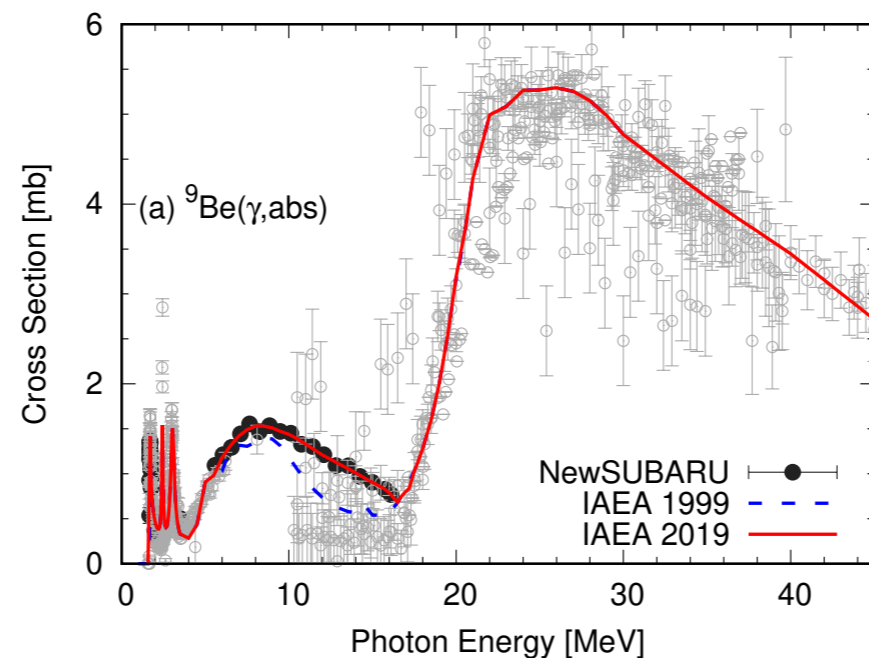
## KAERI evaluation

- Developed an automated parameter search system for TALYS
- Fitted to available experimental data, including Varlamov's "evaluated experimental data"



## CNDC evaluation

- GLUNF for light elements
- MEND-G for medium/heavy nuclei



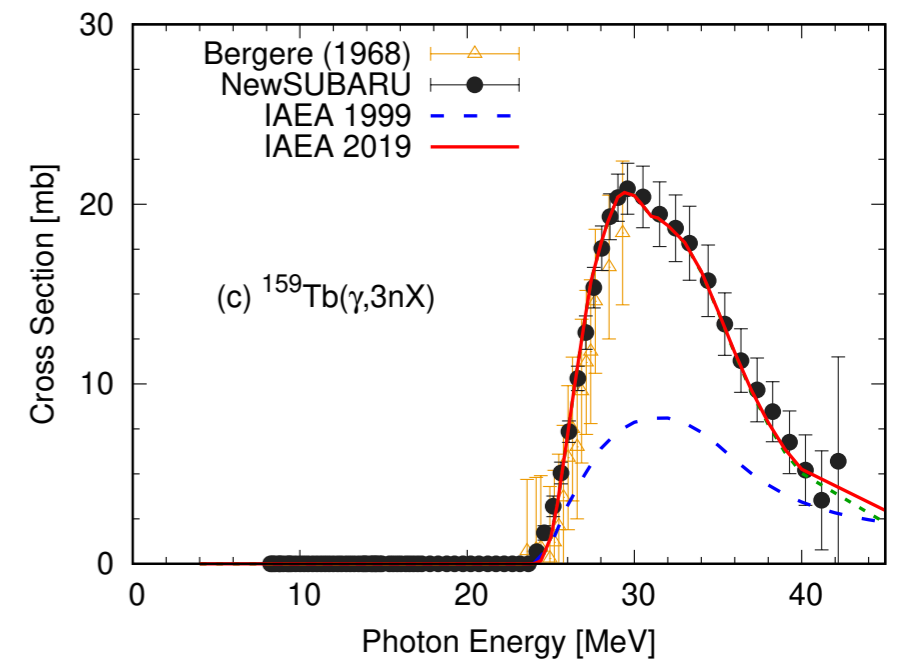
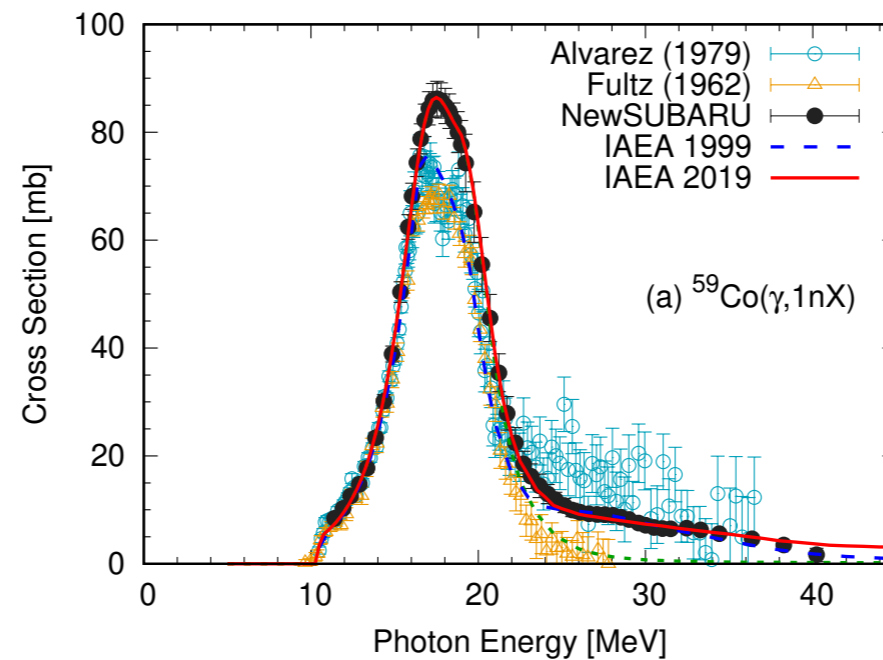
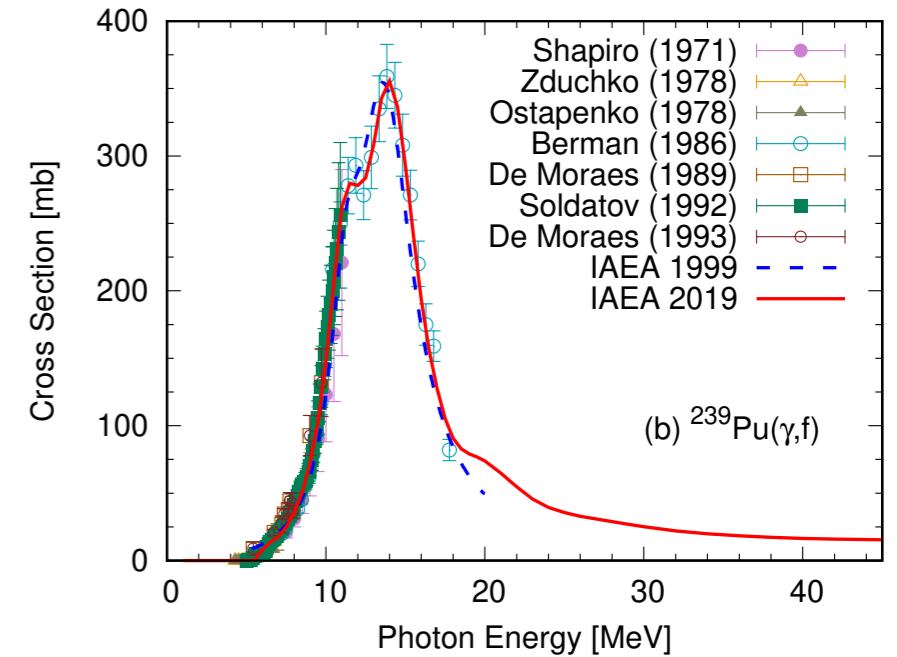
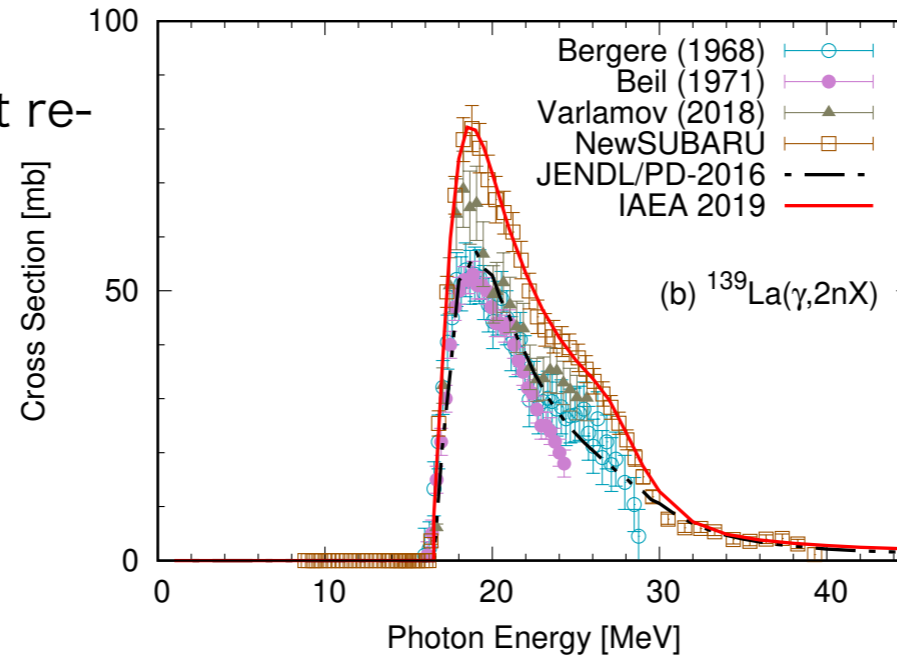
# Evaluations by JAEA and IFIN-HH

## • JAEA evaluation

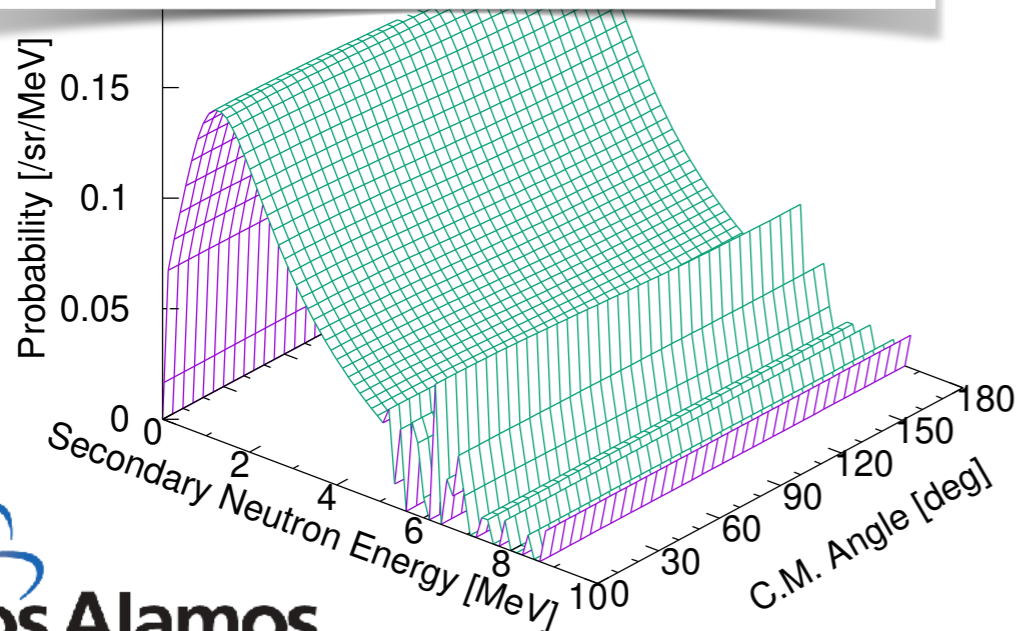
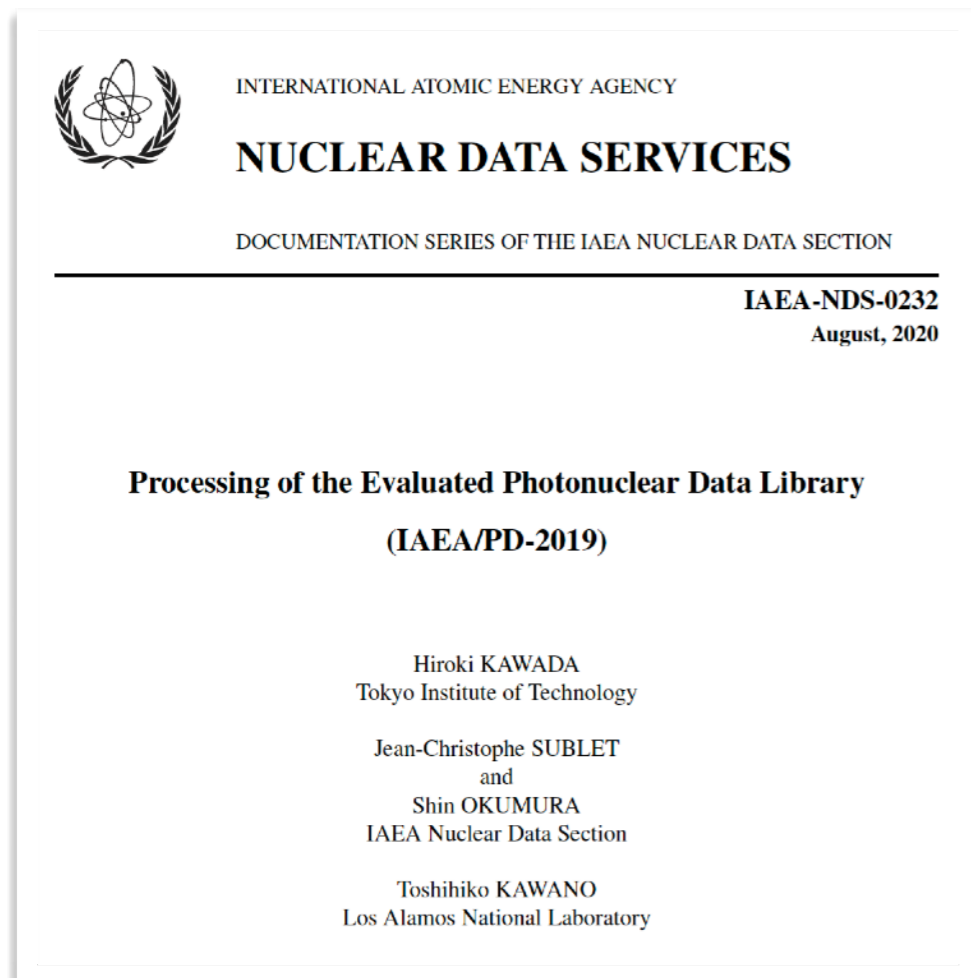
- based on JENDL-Photo, but re-evaluation
- CCONE code employed
- wide mass range, Cl to Pu

## • IFIN-HH evaluation

- new evaluations based on NewSUBARU data
- EMPIRE code employed
- IAEA contributed for data formatting



# Photonuclear Data in ENDF Format



- **Data format still hybrid**

- MF3/MT5 for photo-absorption, and particle/residual productions in MF6
- CNDC and IFI-HH/IAEA evaluations, exclusive cross sections are given in each MT numbers, 16, 28, 32,...
- MF3/MF5, together with particle multiplicities given in MF201 - 206

- **Data processing test by IAEA**

- run standard checking codes, NJOY, PREPRO, FRENDDY, and DeCE
- Issue found in particle angular-distributions
- MF6 double differential cross sections given by Legendre coefficient, although [NJOY expects Kalbach systematics](#)
- A. Trkov's patch bypasses this problem
- W. Haeck fixed NJOY, will be released

<https://www-nds.iaea.org/photonuclear/>