

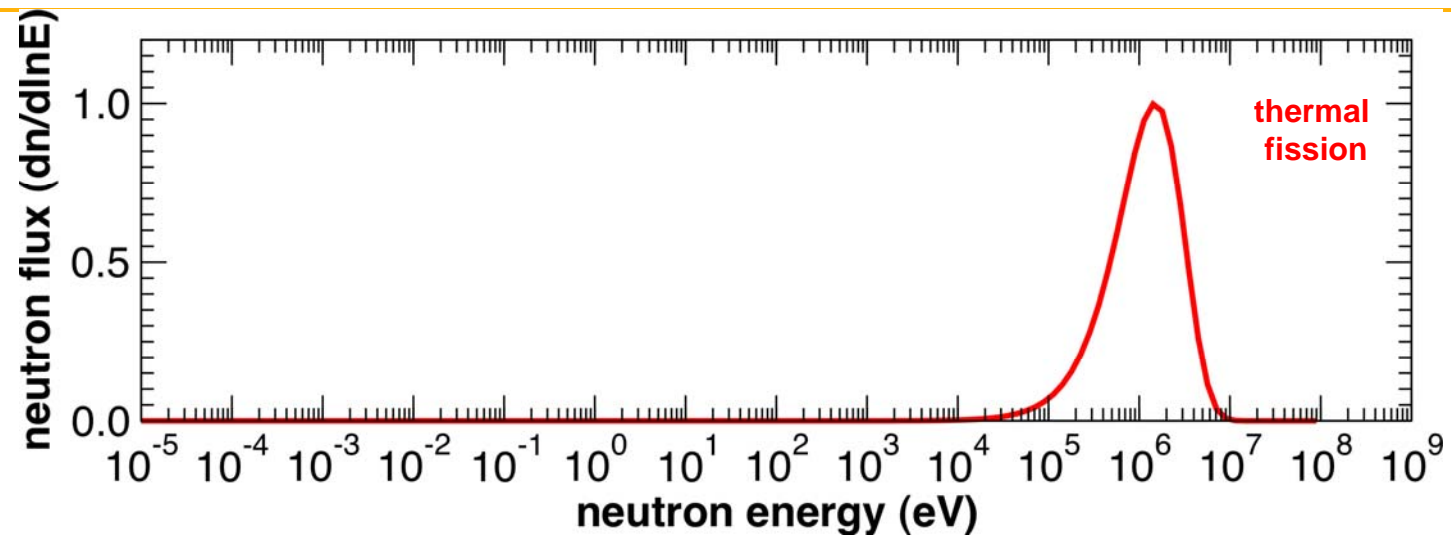
# n\_TOF Introduction

**Frank Gunsing**  
for the n\_TOF Collaboration

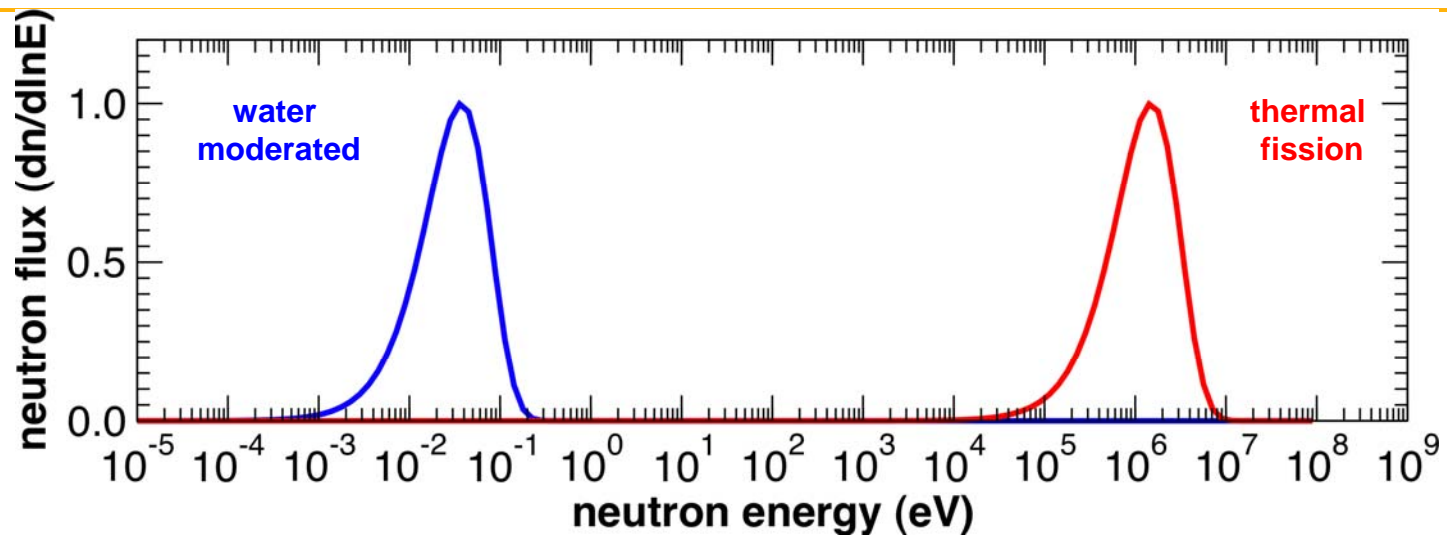
*CEA/Saclay  
DSM / IRFU / SPhN  
F - 91911 Gif-sur-Yvette, France*

[gunsing@cea.fr](mailto:gunsing@cea.fr)

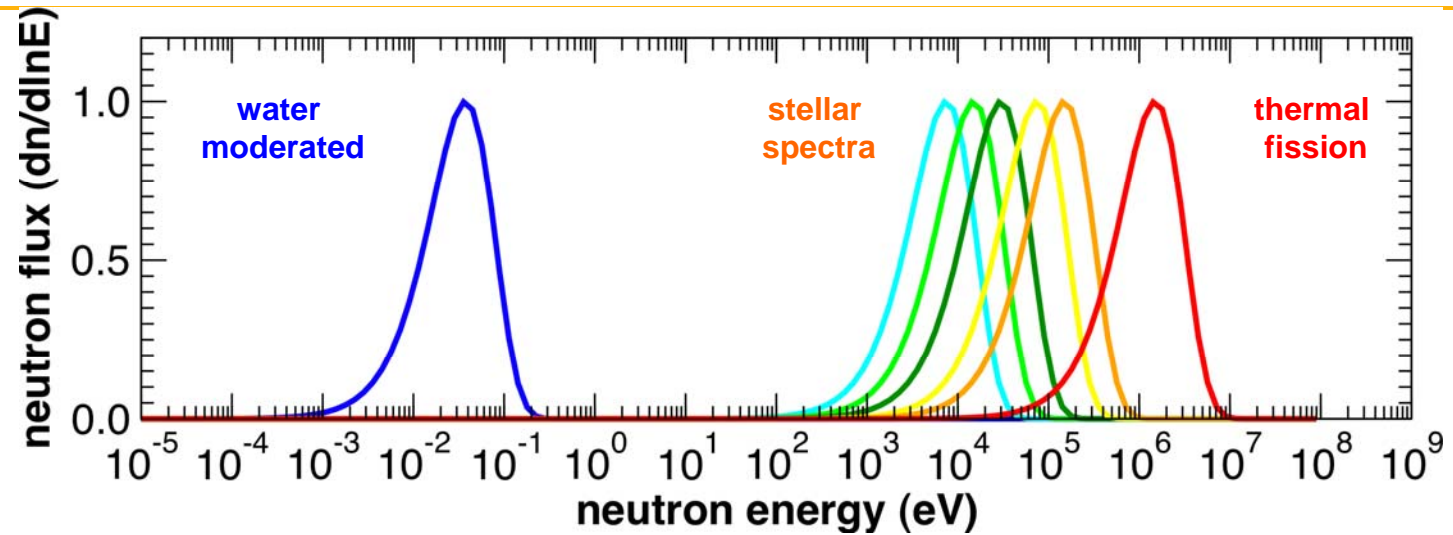
# Neutron fluxes and cross sections



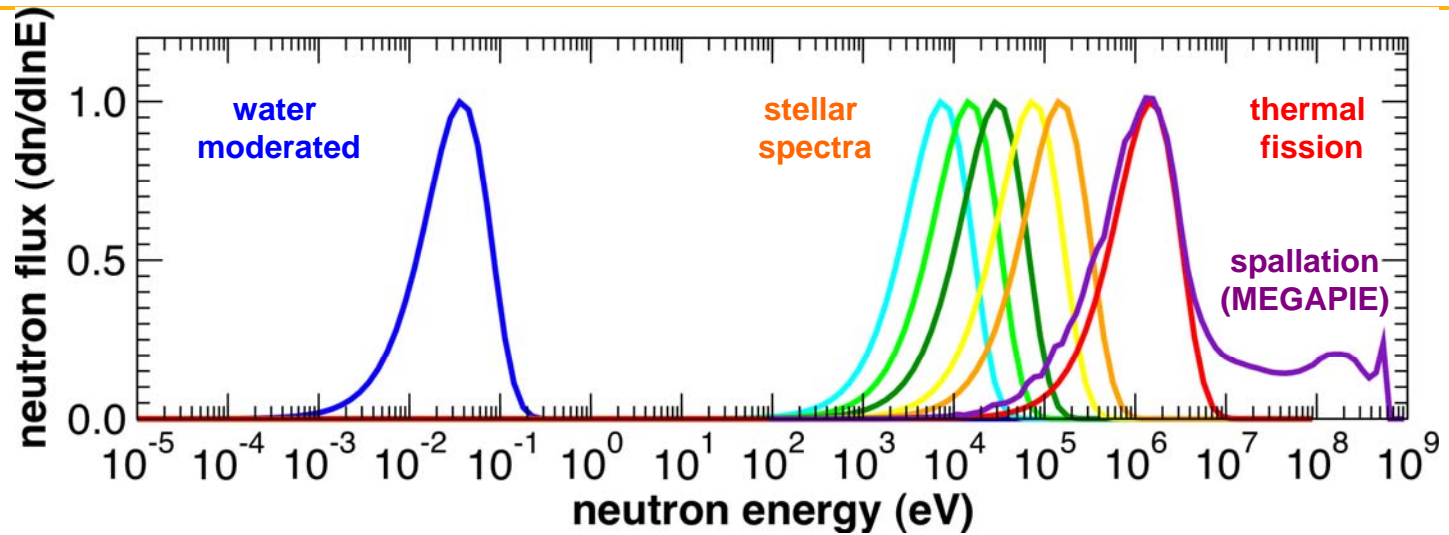
# Neutron fluxes and cross sections



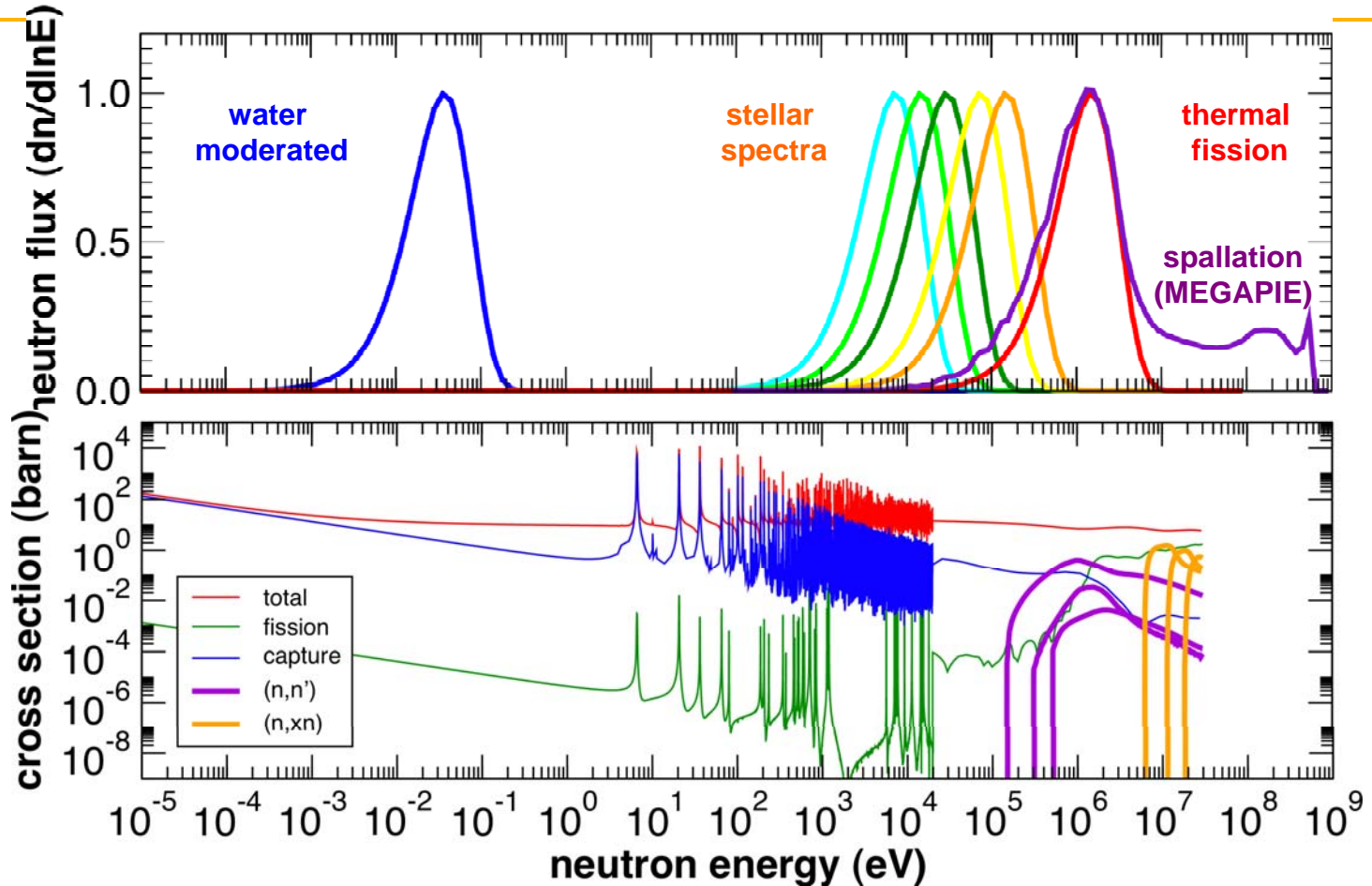
# Neutron fluxes and cross sections



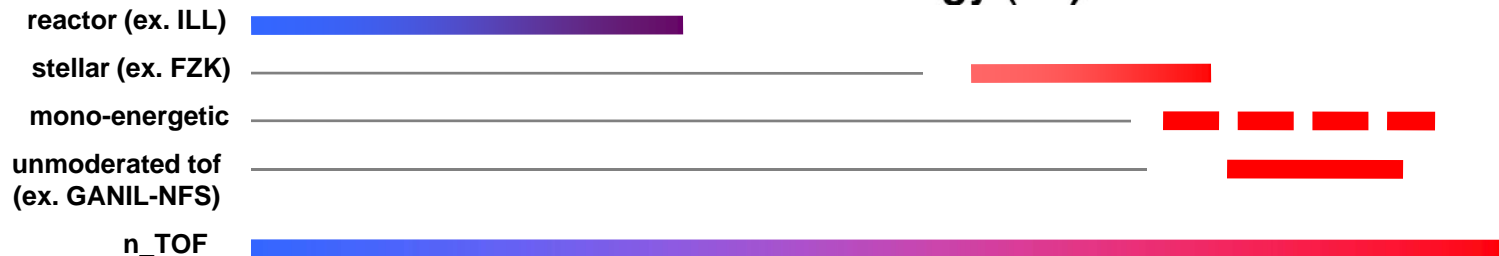
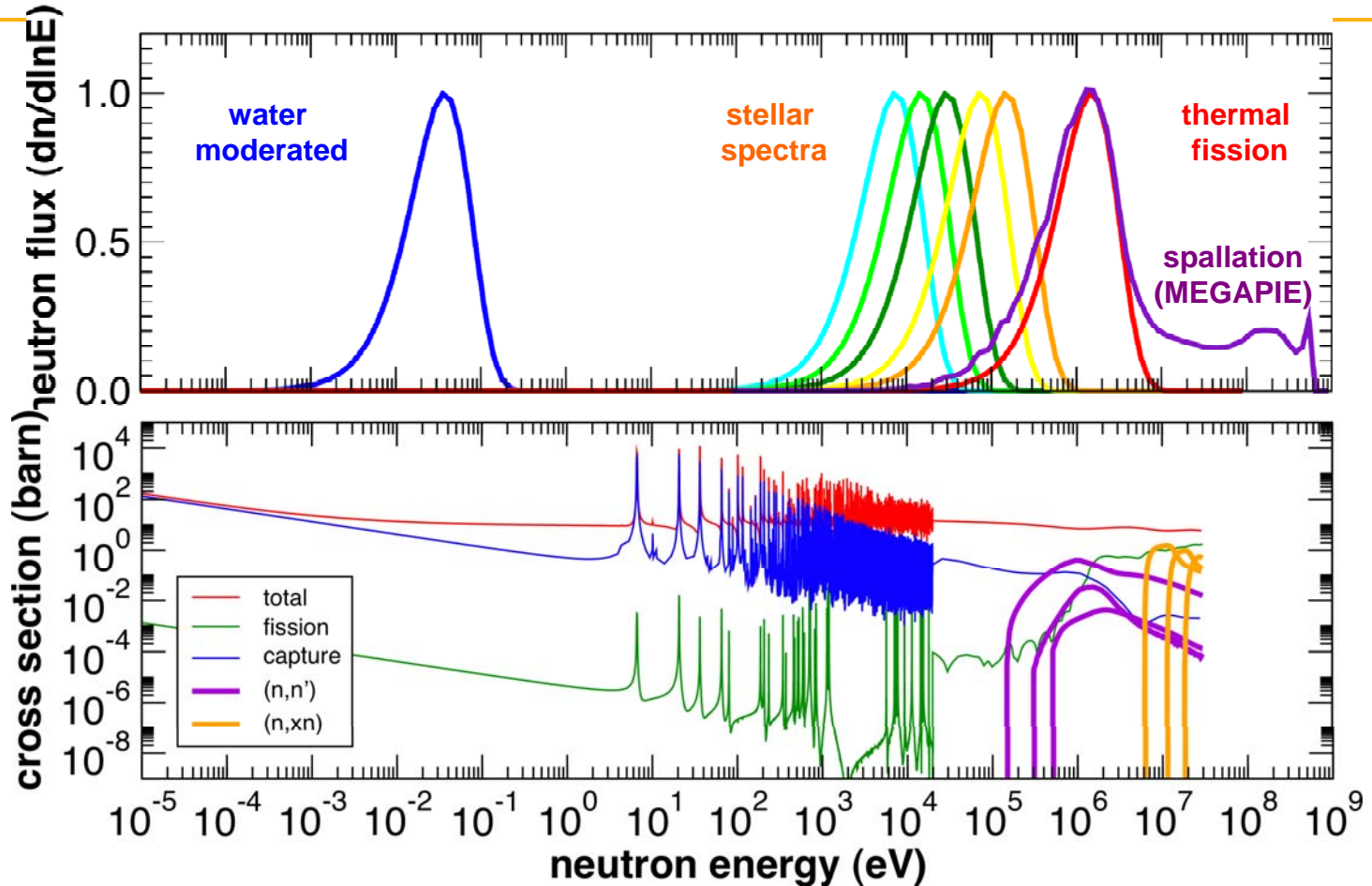
# Neutron fluxes and cross sections



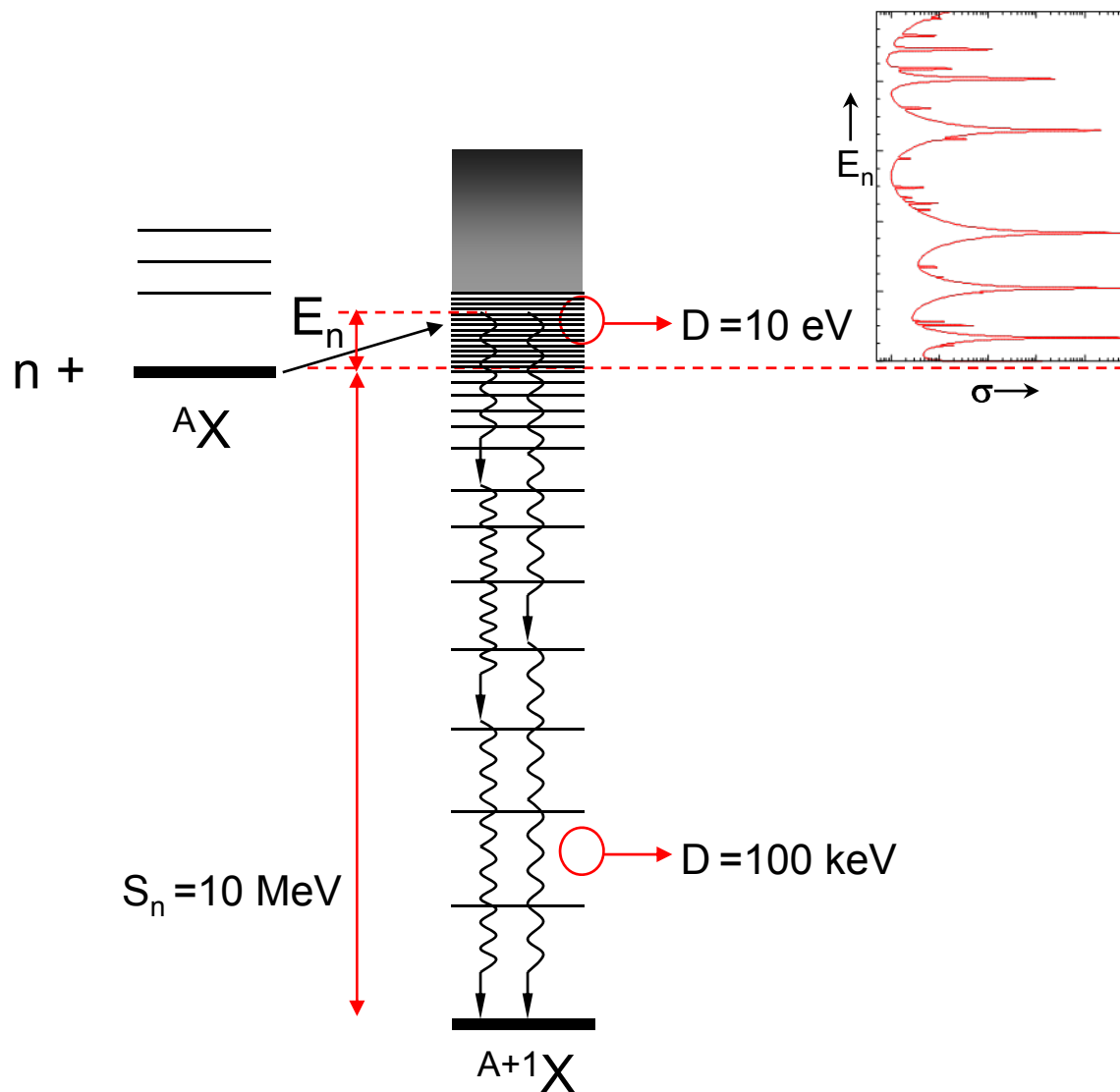
# Neutron fluxes and cross sections



# Neutron fluxes and cross sections



# Compound neutron-nucleus reactions





# Nuclear data at n\_TOF

## Impact on two scientific communities:

- nuclear technology
- nuclear astrophysics

Additional nuclear structure information from same or dedicated experiments (level densities, strength functions, fission states, fission angular distributions)

## Common experiments ...

- neutron time-of-flight spectroscopy at n\_TOF
- same beam, detectors, DAQ, etc.

## ... on common nuclei:

Many nuclei of interest for both fundamental and technological applications.

A few examples:

- |                            |   |
|----------------------------|---|
| • nuclei in the Fe region: | s-process seeds, structure materials  |
| • medium mass nuclei:      | s-process path and branching points,<br>long-lived fission products,<br>reactor poisons |
| • actinides:               | vibrational states at barrier,<br>reactor criticality and safety                        |

### Collaboration:

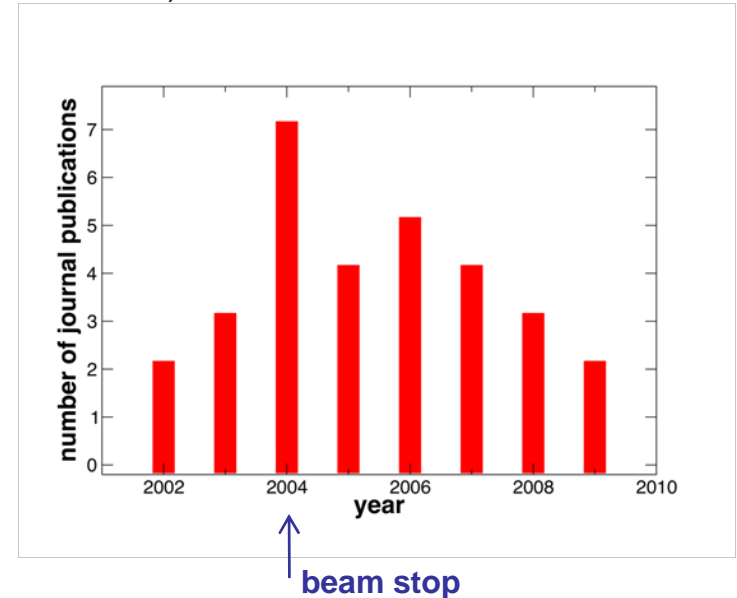
n\_TOF phase II (from 2008-): 27 Institutes, 77 physicists  
n\_TOF phase I (from 1999-2007): 45 Institutes, 120 physicists  
(included EC FP5 project)

### Phd theses:

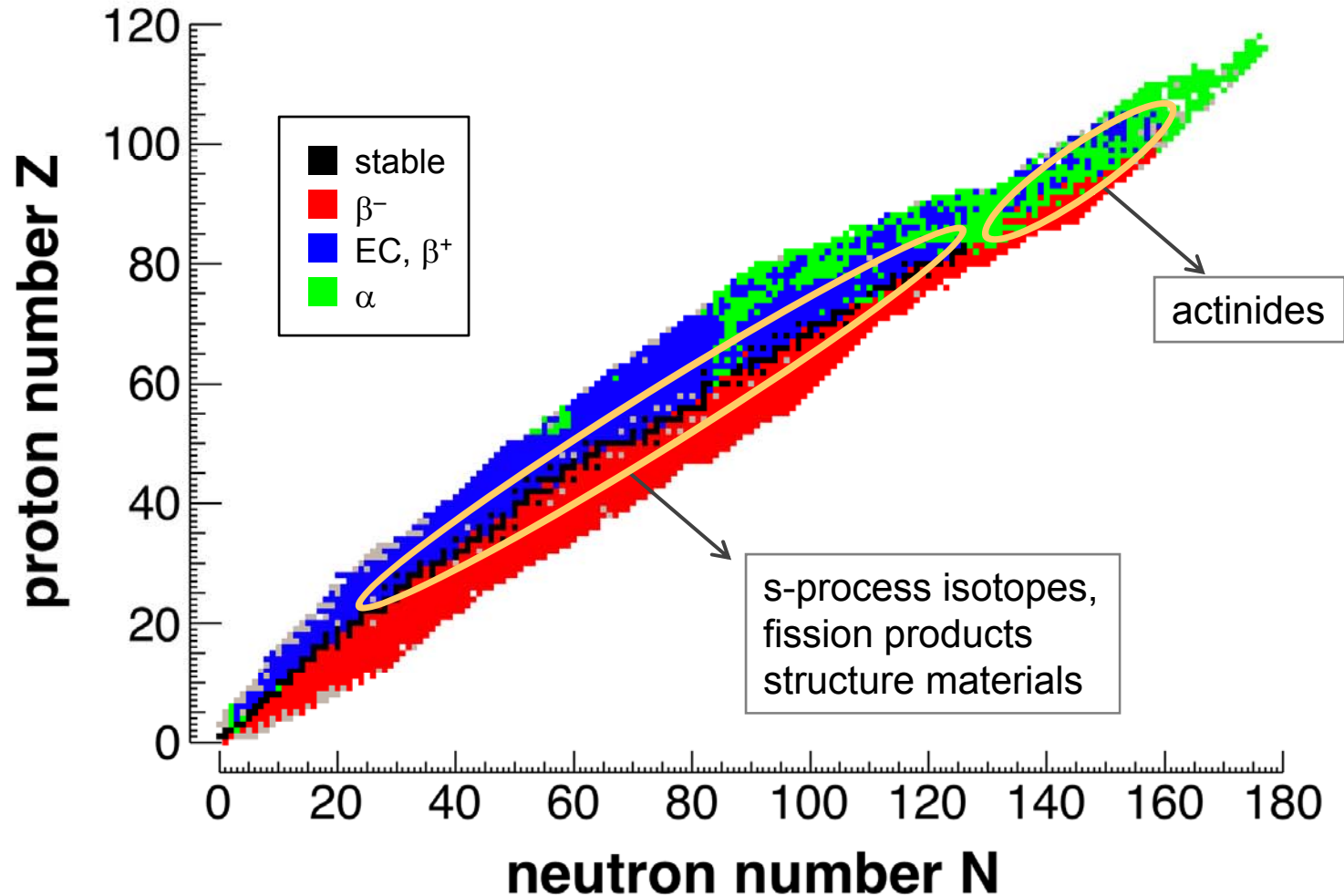
2009: M. Calviani, K. Fuji, ...  
2008: C. Guerrero, M. Mosconi  
2007: D. Karademos, Th. Papaevangelou, C. Lampoudis  
2006: W. Dridi, R. Terlizzi  
2005: G. Aerts, L. Ferrant, C. Paradela  
2004: C. Domingo, S. Lukić, A. Herrera, J. Pancin, N. Patronis  
2003: G. Noguere, A. Molina-Coballes  
2002: S. Marrone

### Papers (PRC, NPA, NIMA):

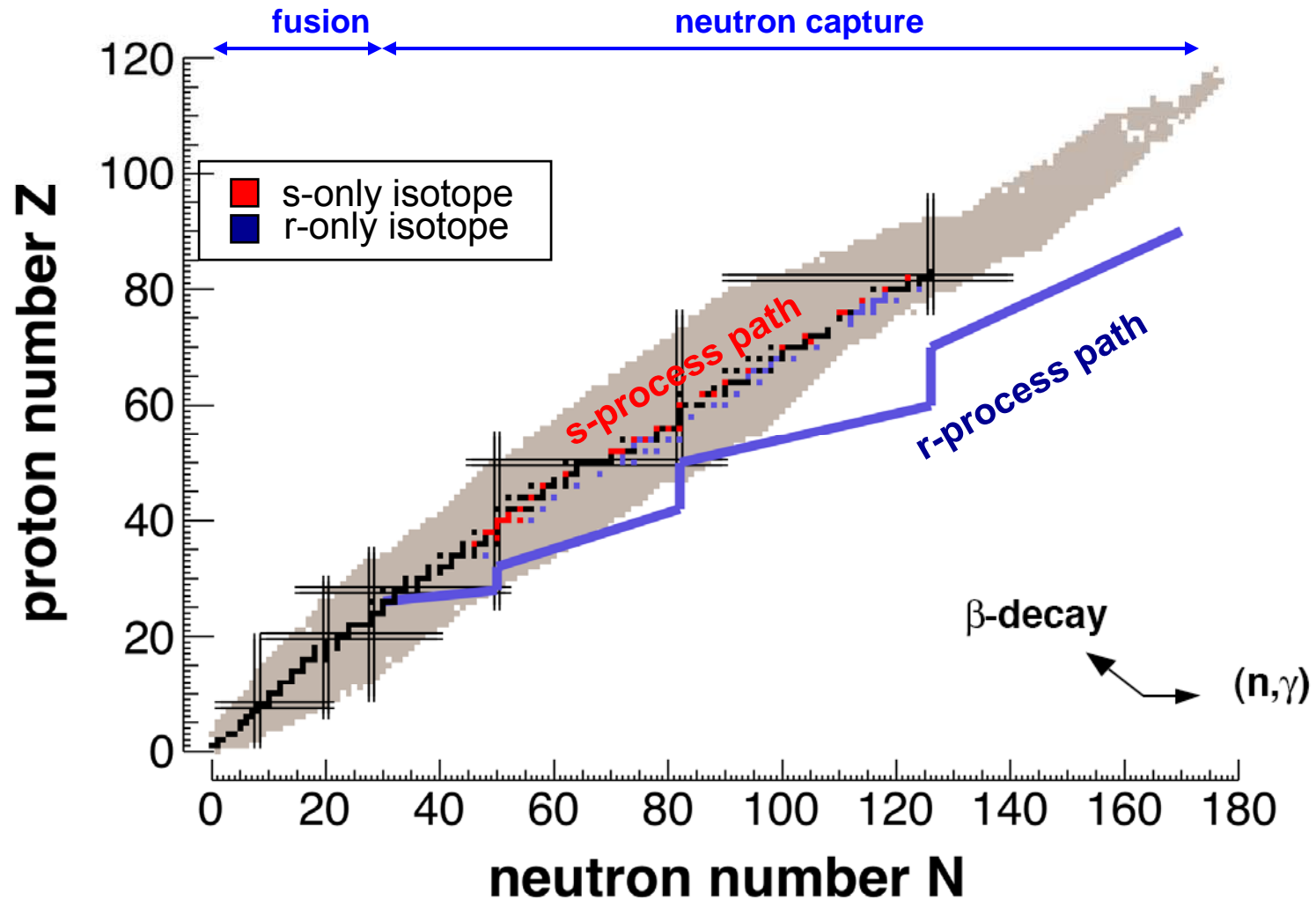
2009: 2 submitted  
2008: 3  
2007: 4  
2006: 5  
2005: 4  
2004: 7  
2003: 3  
2002: 2



# Nuclei for neutron induced reactions



# Stellar nucleosynthesis



**n\_TOF phase I:**

follow-up of TARC experiment

1999 design TOF spectrometer, collaboration

2001 commissioning

2002-2004 data taking, part of EC-FP5 project

end 2004 beam stop because of increased activity cooling water

2004 - analysis

**n\_TOF phase II:**

2005-2007 target cooling down

2007 target inspection, understanding of cooling chemistry

2008 design and construction of target and cooling system

nov. 2008 first protons on target, acquisition and  
detectors operational

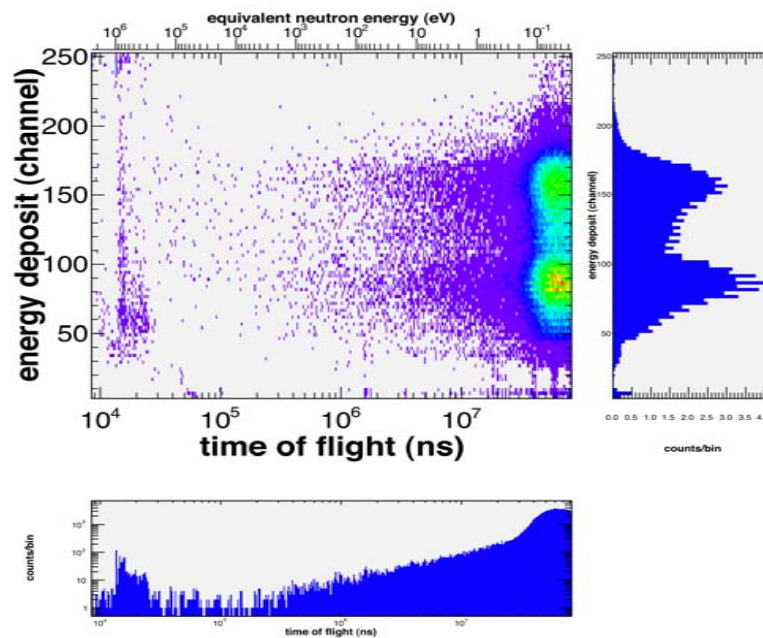
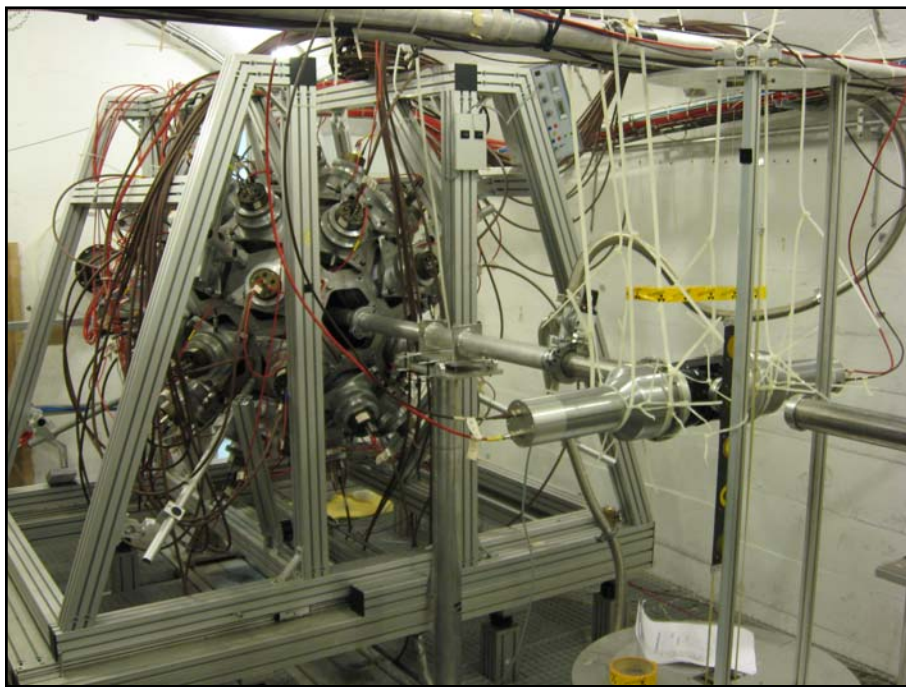
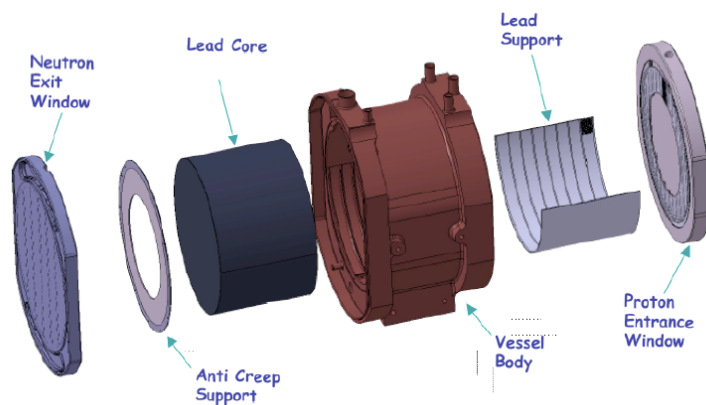
2009 - start of scientific programme

➔ For all these years without beam the collaboration has stayed unified.

**Further needs:**

- handling of radioactive samples at 200 m (EAR1)
- second short (20 m) beam line (EAR2)
- integration in the SPL project

# New n\_TOF target: first beam november 2008



## **Nuclear data at n\_TOF for fundamental science and technological applications**

*Enrique González-Romero – CIEMAT, Spain*

## **Neutron studies at n\_TOF – a window to stellar evolution and nucleosynthesis**

*Alberto Mengoni, ENEA, Italy, and IAEA*

## **Nuclear data at n\_TOF for fundamental science and technological applications**

*Enrique González-Romero – CIEMAT, Spain*  
present spokesperson

## **Neutron studies at n\_TOF – a window to stellar evolution and nucleosynthesis**

*Alberto Mengoni, ENEA, Italy, and IAEA*  
previous spokesperson