

n_TOF Introduction

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Neutron fluxes and cross sections

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**water
moderated**

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**spallation
(MEGAPIE)**

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Neutron fluxes and cross sections

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reactor (ex. ILL)

stellar (ex. FZK)

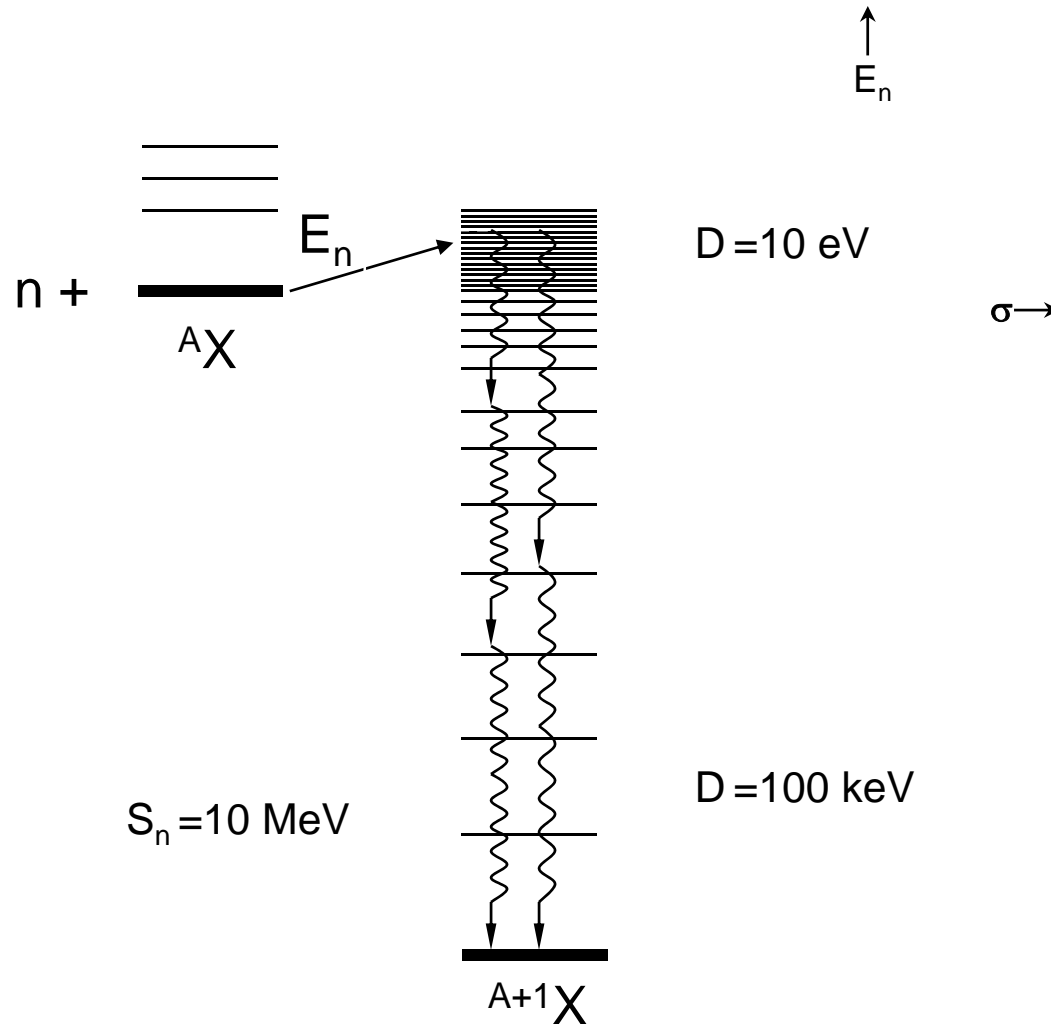
mono-energetic

**unmoderated tof
(ex. GANIL-NFS)**

n_TOF



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, ff 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,
long-lived fission products,
reactor poisons |
| • actinides: | vibrational states at barrier,
reactor criticality and safety |

n_TOF statistics

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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:

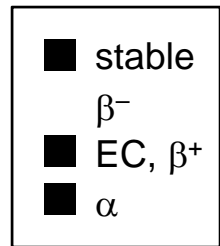
2009: M. Calviani, K. Fuji, ...
2008: C. Guerrero, M. Mosconi
2007: D. Karademos, Th. Papaevangelou, C. Lampoudis
2006: W. Dridi, R. Terlizzi
2005: G. Aerts, L. Ferrant, C. Paradela
2004: C. Domingo, S. Lukić, A. Herrera, J. Pancin, N. Patronis
2003: G. Noguere, A. Molina-Coballes
2002: S. Marrone

Papers (PRC, NPA, NIMA):

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

↑
beam stop

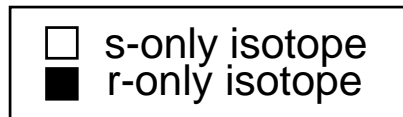
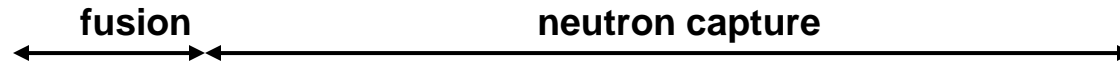
Nuclei for neutron induced reactions



actinides

s-process isotopes,
fission products
structure materials

Stellar nucleosynthesis



r-process path

n_TOF history

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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

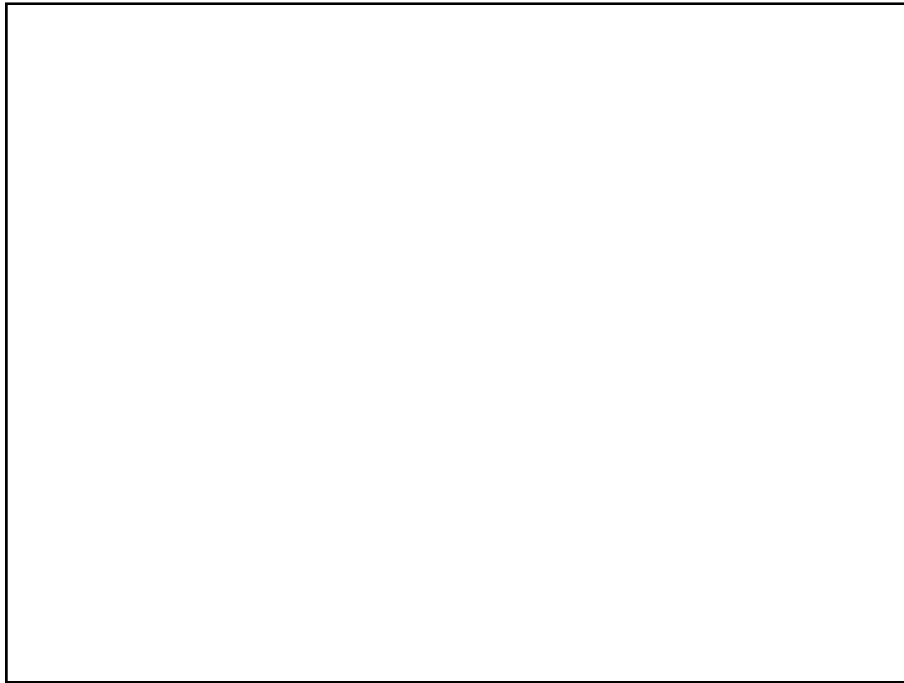
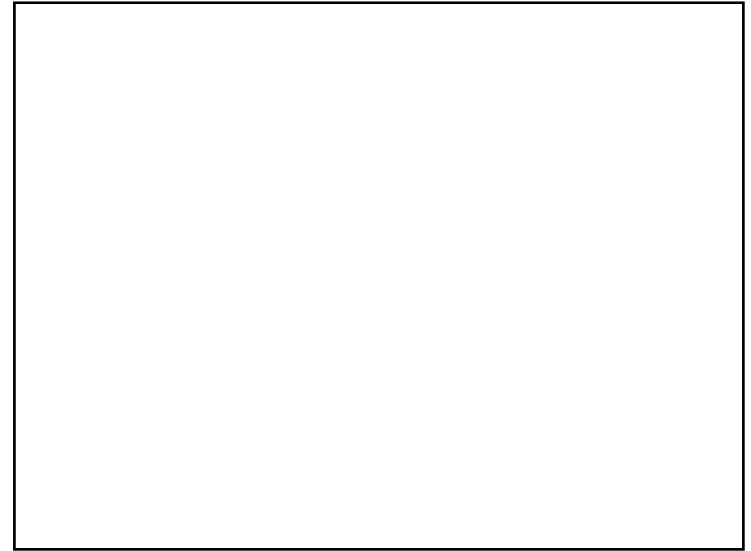
→ For all these years without beam the collaboration has stayed unified.

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

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Overview talks:

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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

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