



CEIDEN

PLATAFORMA TECNOLÓGICA DE ENERGÍA NUCLEAR DE FISIÓN

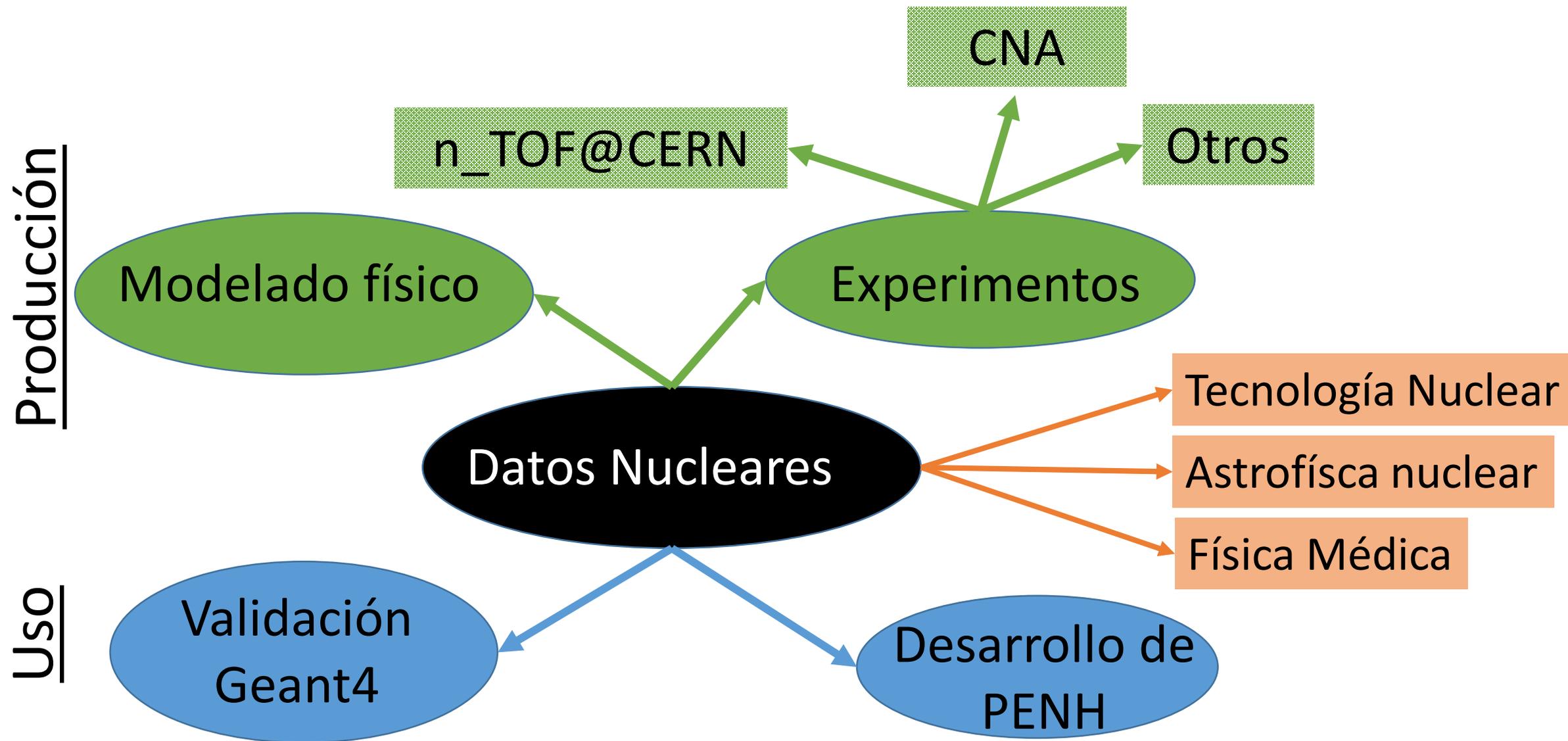
Producción y Uso de Datos Nucleares en U. Sevilla / CNA

C. Guerrero, J.M Quesada, J. Lerendegui-Marco, M.A. Cortés-Giraldo, B.
Fernández, M. Macías, T. Rodríguez and M.A. Millán
Universidad de Sevilla / CNA

I Jornada CEIDEN de usuarios de bases de datos nucleares utilizadas
en cálculos para aplicaciones nucleares energéticas y no-energéticas

7 de Mayo 2019

Datos nucleares en U. Sevilla / CNA



Producción: modelado físico (Tecn. Nuclear)

Journal of NUCLEAR SCIENCE and TECHNOLOGY, Vol. 45, No. 4, p. 333–340 (2008)

A Global Dispersive Coupled-Channel Optical Model Potential for Actinides

R. CAPOTE¹, S. CHIBA^{2,*}, E. Sh. SOUKHOVITSKIĬ³, **I. M. QUESADA⁴** and E. BAUGE⁵

“A global dispersive coupled-channel optical model (DCCOM) potential is proposed to describe neutron and proton interactions with actinide nuclei in the 0.001 to 200MeV range”

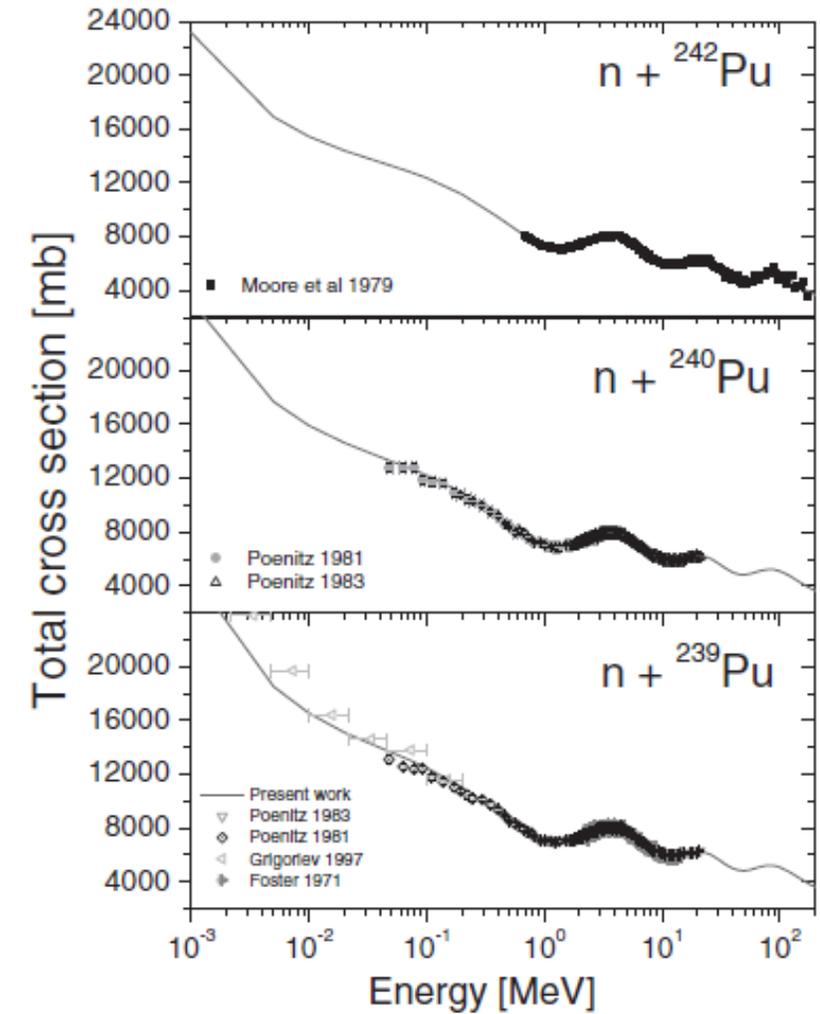
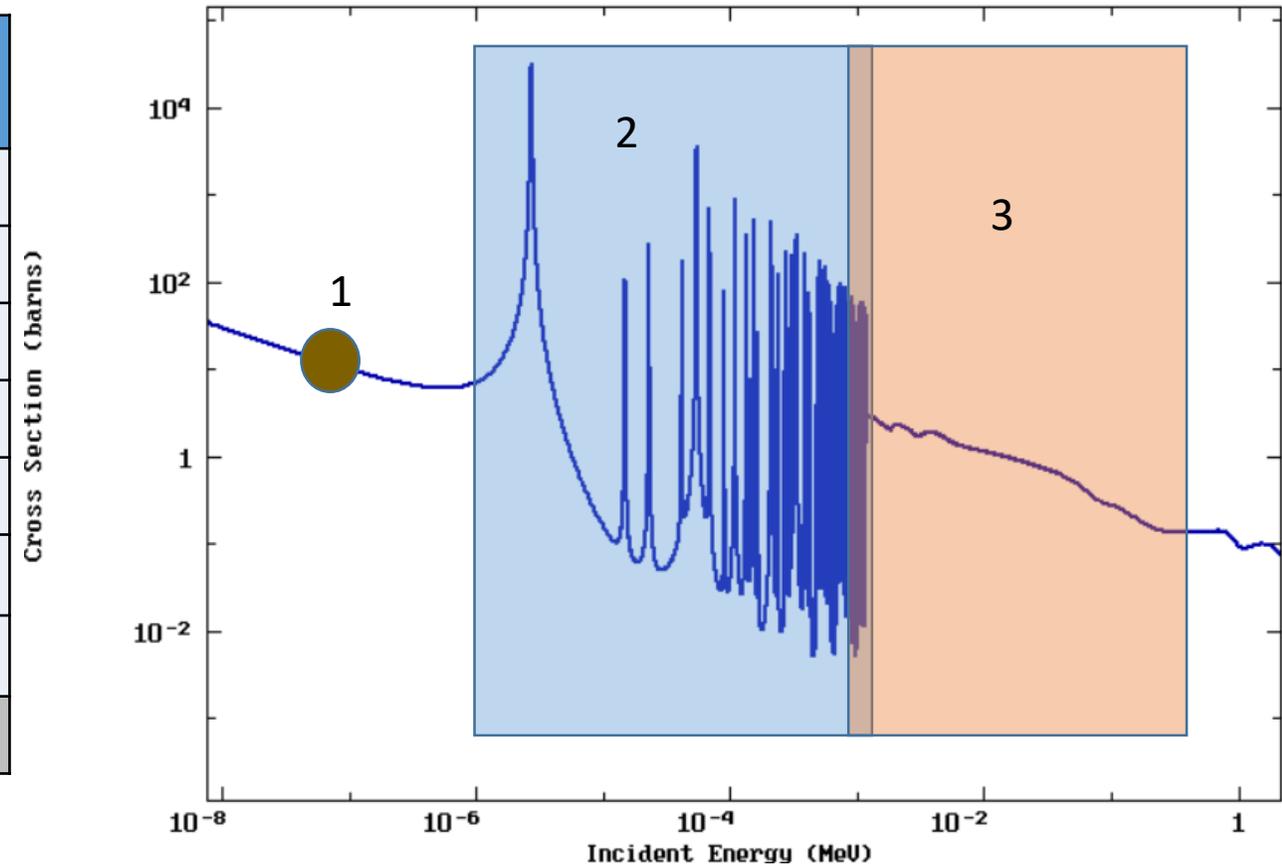


Fig. 1 Total cross sections for Pu isotopes

Producción: captura neutrónica en ^{242}Pu (Tecn. Nuclear)

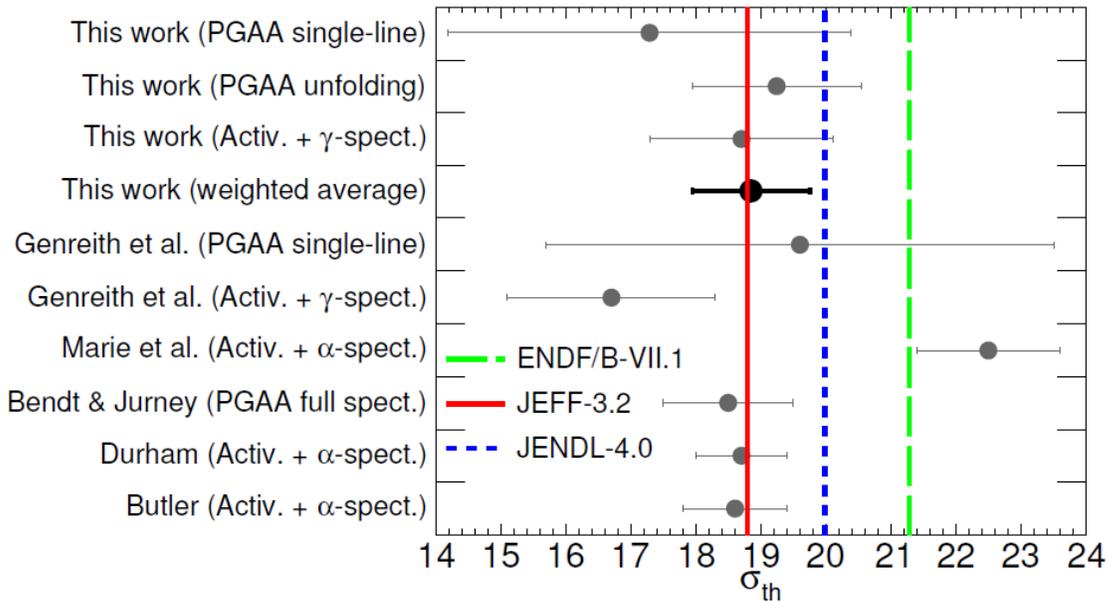
NEA High Priority Request List

	Energy range	Present accuracy (%)	Required accuracy (%)
SFR	2-500 keV	35	8
EFR	2-67 keV	35	25
GFR	2-183 keV	35	7-8
LFR	9-183 keV	35	11-12
ADMAB (ADS)	9-25 keV	35	10
PHENIX	0.5-2 keV	14	7
NEA/HPRL	0.5-2 keV	14%	8
Overall	0.5-500 keV	14-35%	7-12



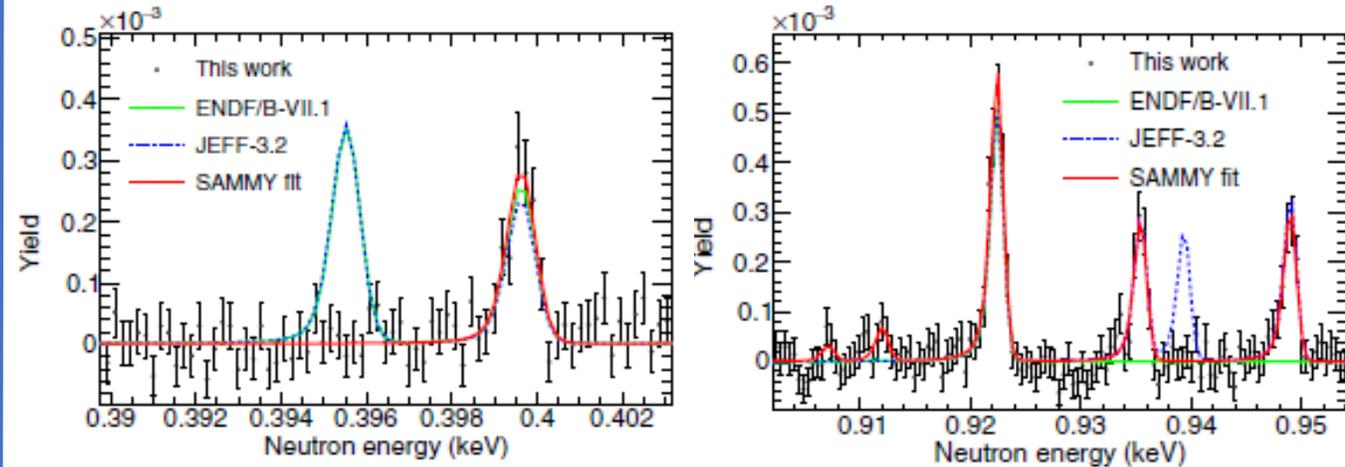
Producción: captura neutrónica en ^{242}Pu (Tecn. Nuclear)

J. Lerendegui-Marco, C. Guerrero et al., Eur. Phys J. A 55:63 (2019)



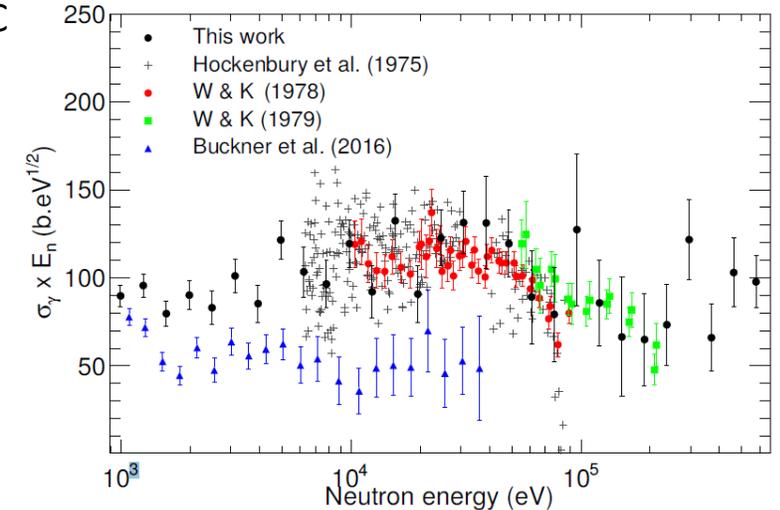
Experimento realizado en el **Budapest Research Reactor**

J. Lerendegui-Marco, C. Guerrero et al. (The n_TOF Collaboration), Phys. Rev. C 97, 024605 (2018)



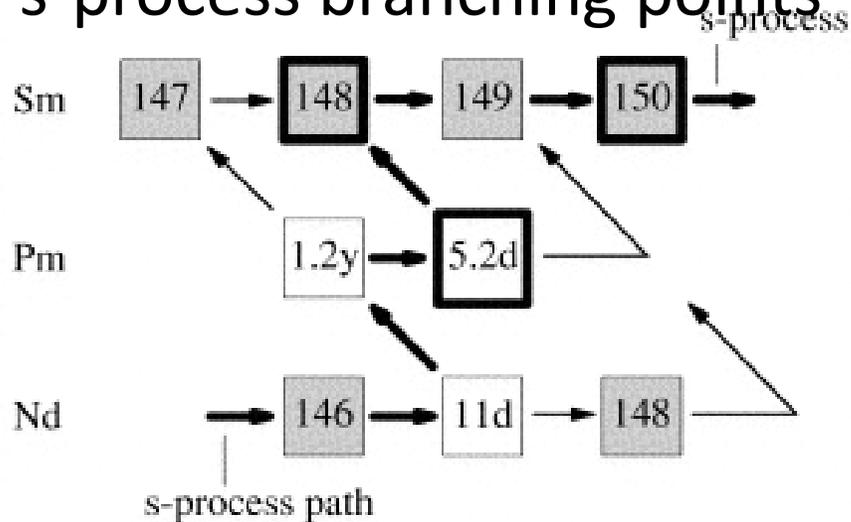
J. Lerendegui-Marco, C. Guerrero et al. (The n_TOF Collaboration), submitted to Phys. Rev. C

Experimento realizado en la
instalación **n_TOF del CERN**

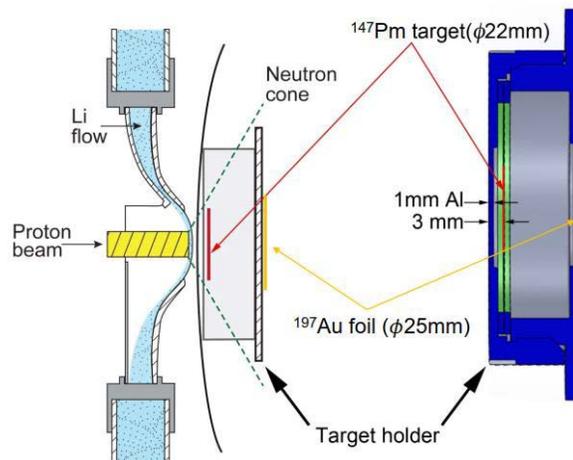


Producción: captura neutrónica ^{147}Pm & ^{171}Tm (astro)

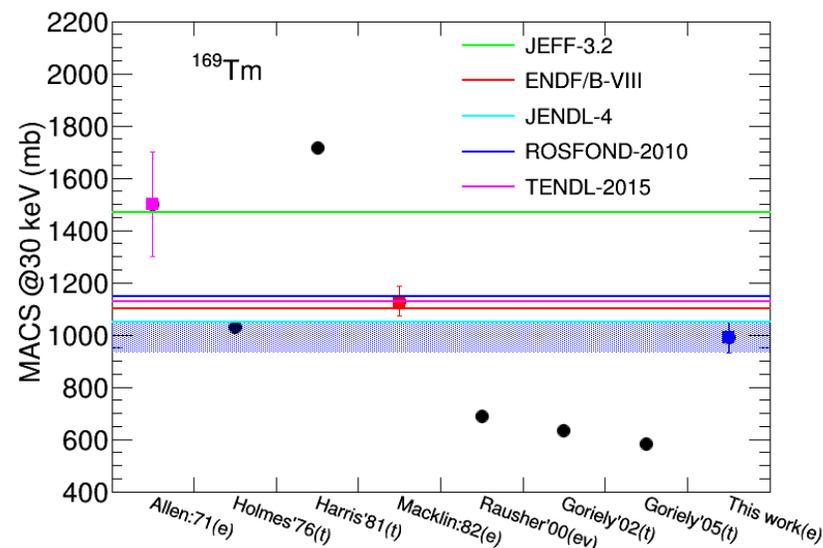
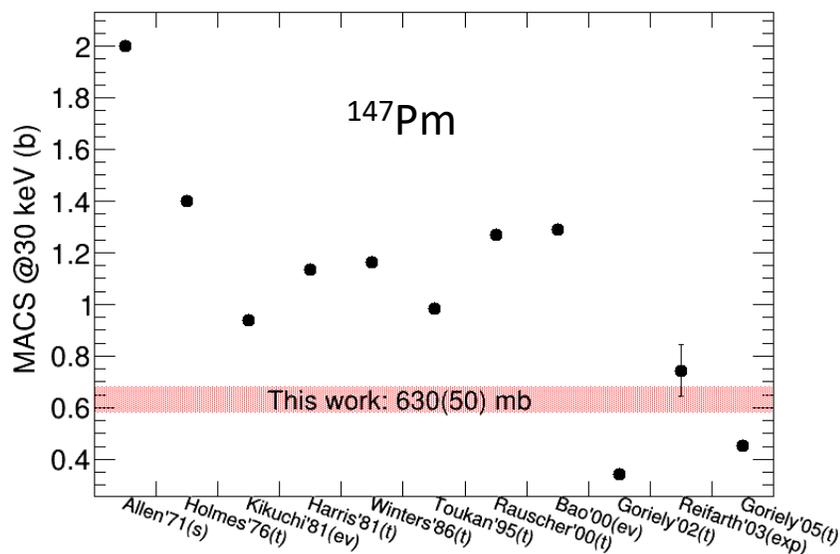
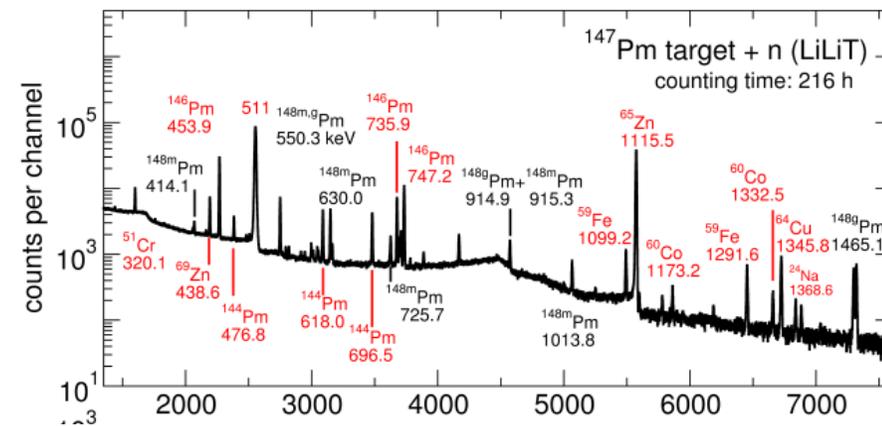
s-process branching points



LiLiT @ Israel

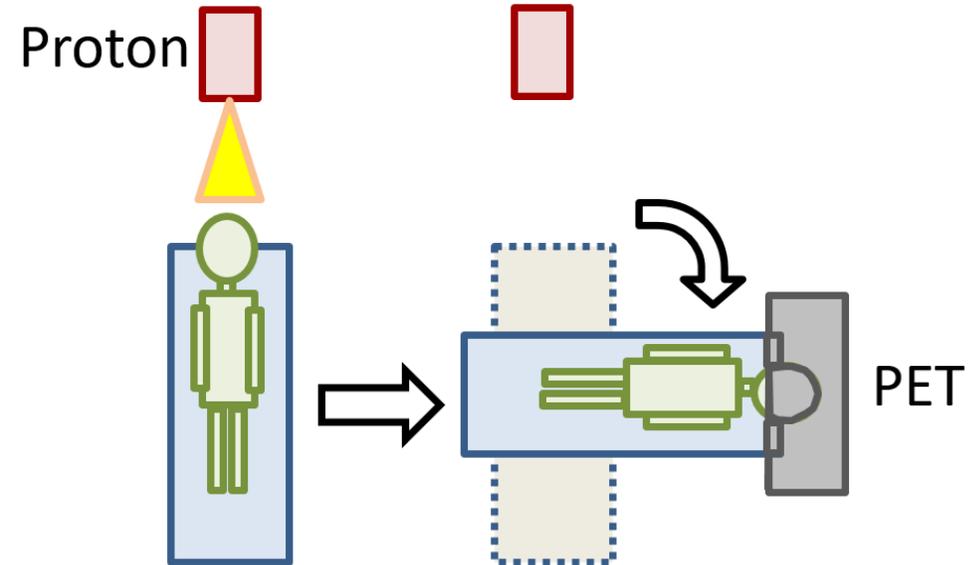
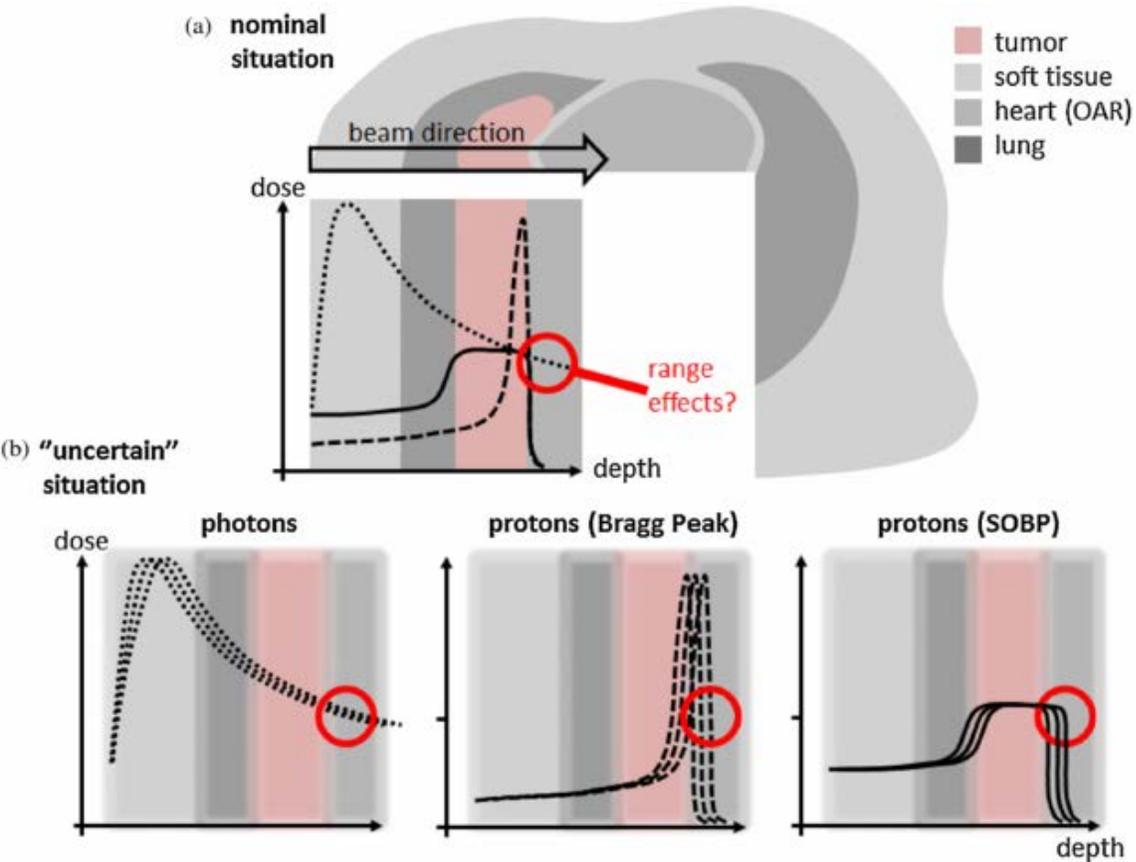


Activation experiments



Producción: producción de isótopos β^+ (Física Médica)

Verificación de rango en protonterapia



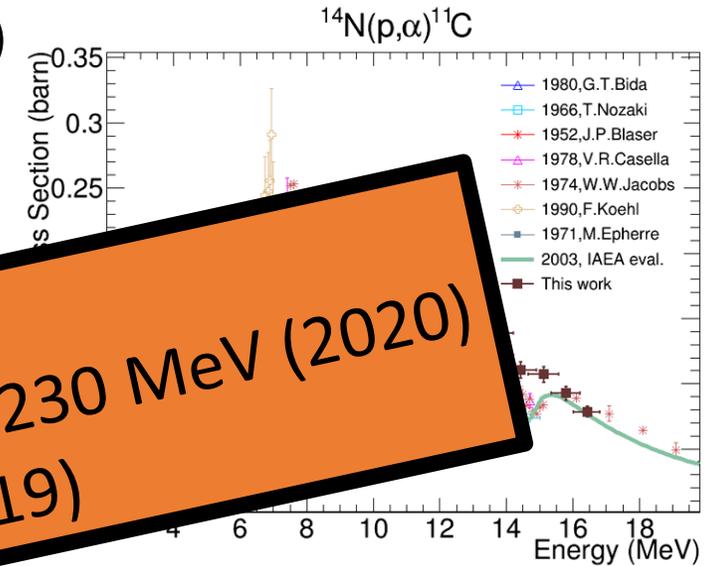
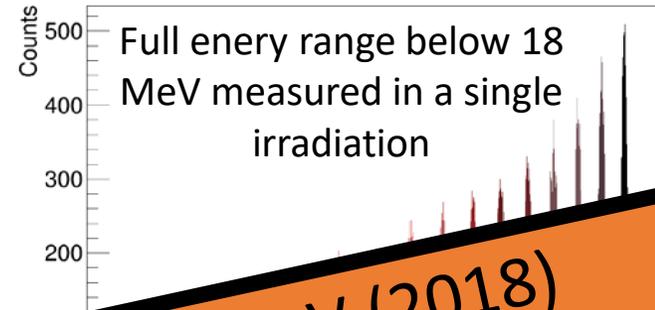
Reaction Channel	$T_{1/2}$
$^{14}\text{N}(p,\alpha)^{11}\text{C}$	20.36 min
$^{16}\text{O}(p,\alpha)^{13}\text{N}$	9.97 min
$^{16}\text{O}(p,pn)^{15}\text{O}$	2.04 min
$^{31}\text{P}(p,p2n)^{29}\text{P}$	4.1 s
$^{12}\text{C}(p,n)^{12}\text{N}$	11 ms
$^{40}\text{Ca}(p,2pn)^{38m}\text{K}$	924 ms
Others

Long-lived

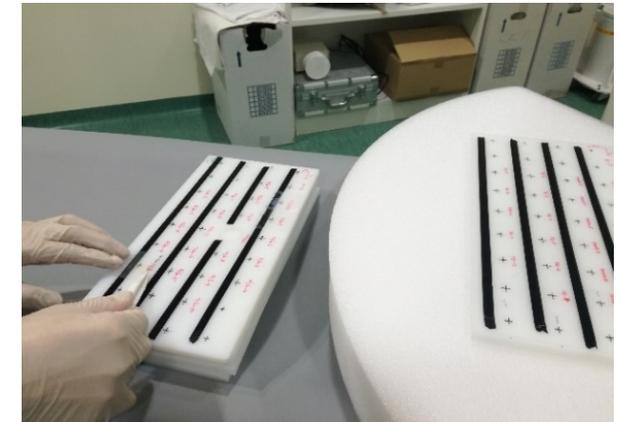
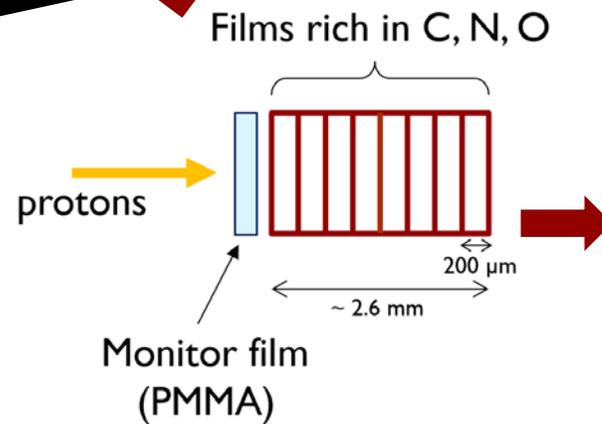
Short-lived

Producción: producción de isótopos β^+ (Física Médica)

Measurement of production cross sections of ^{11}C and ^{13}N in C, N & O ($E_p < 18$ MeV)

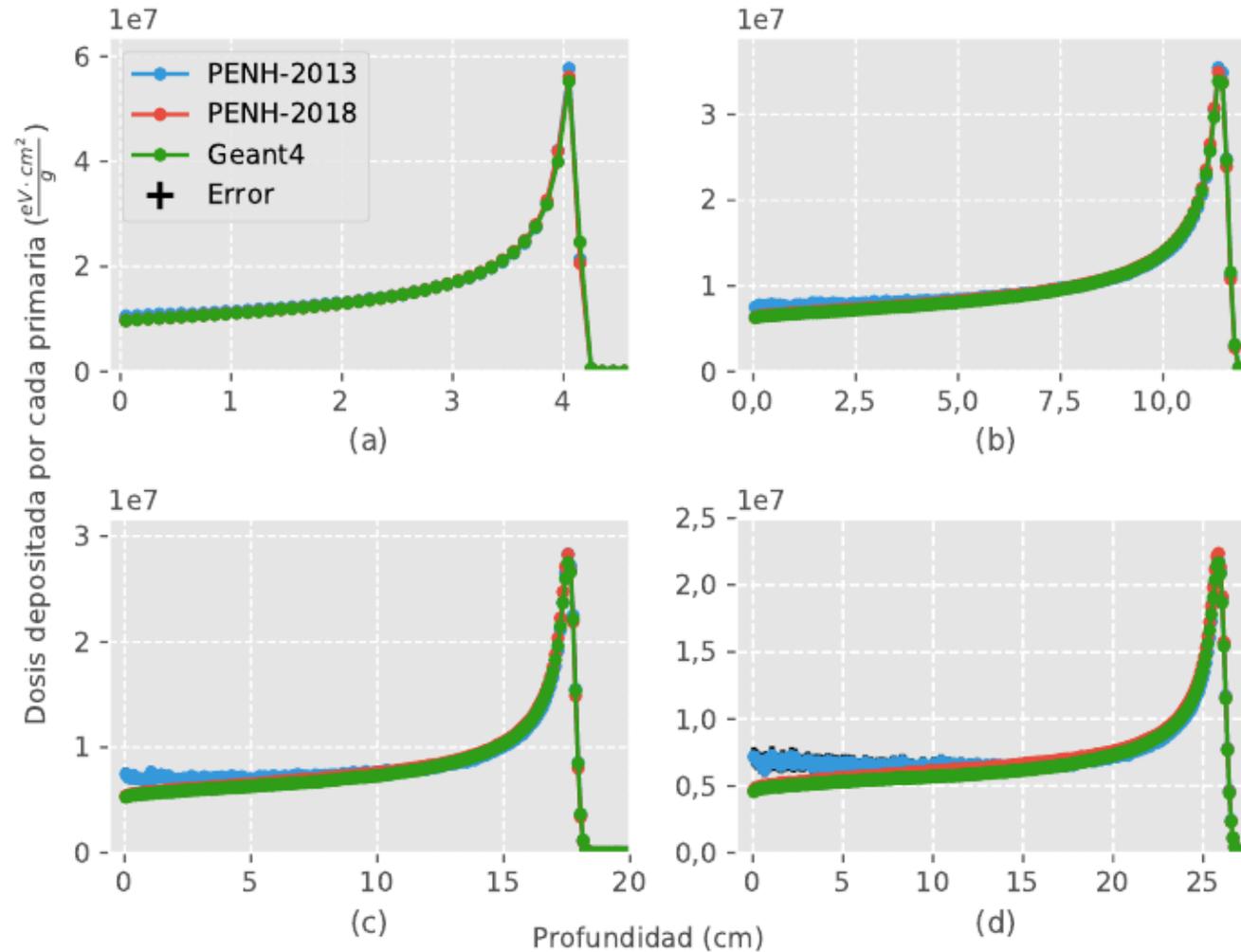


^{11}C & ^{13}N : DONE below 18 MeV (2018)
 ^{11}C & ^{13}N : PROPOSED at MedAustron & ICPO for 20-230 MeV (2020)
 ^{10}C , ^{12}N , ^{29}P & ^{38}mK : ACCEPTED at KVI-CART (July 2019)



Uso: implementación de librerías en PENH (Física Médica)

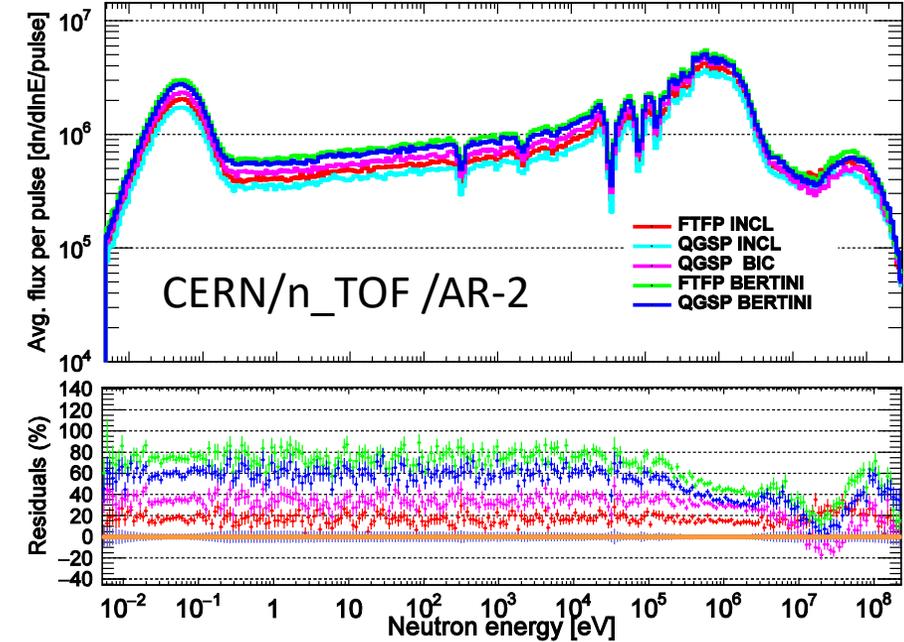
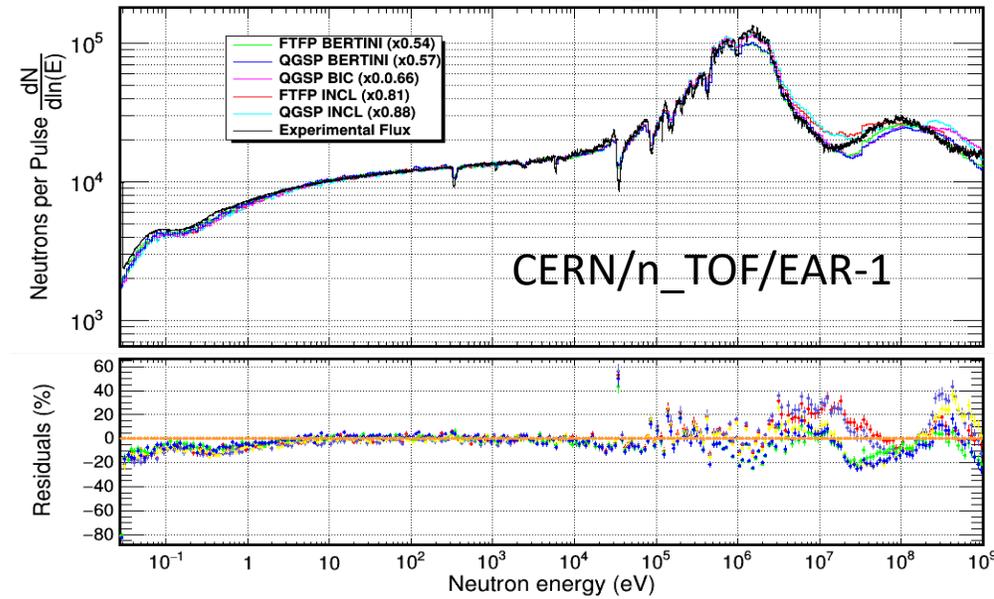
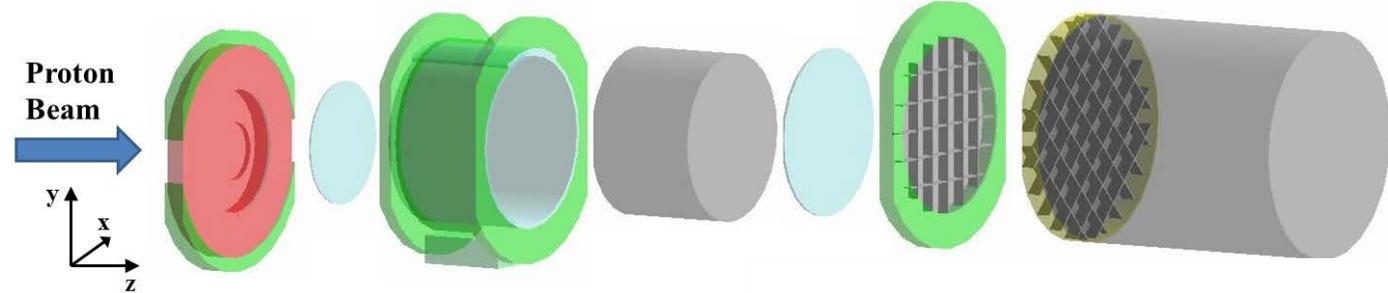
JM Quesada y F. Salvat: implementación de librerías de datos nucleares evaluadas en PENH
(PENH: extensión del código de simulación PENELOPE a protones)



Uso: Validación de Geant4

S. Lo Meo, M.A. Cortes-Giraldo, C. Massimi, J. Lerendegui-Marco et al., Eur. Phys. J. A 51, 160 (2015)

J. Lerendegui-Marco, S. Lo Meo, C. Guerrero, M.A. Cortes-Giraldo et al., Eur. Phys. J. A 52, 100 (2016)



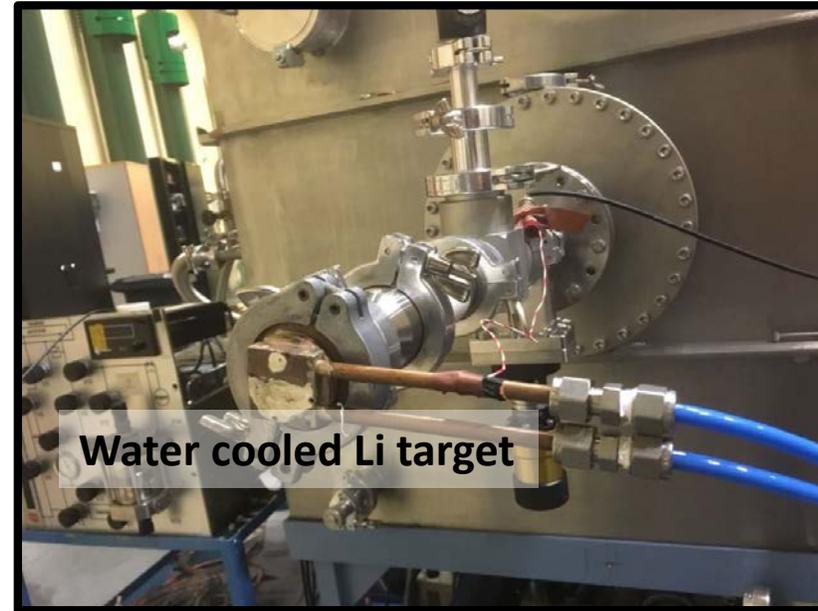
E. Mendoza, D. Cano-Ott, T. Koi, C. Guerrero, IEEE Trans. Nucl. Sci. 61, 2357 (2014)

HISPANOS@CNA (U. Sevilla): continuous neutron beam

3 MV Tandem accelerator for H, D (and others) with max. currents of $\sim 10 \mu\text{A}$

Neutron production:

- Fast neutrons: D on thin D/Ti target (up to 8 MeV neutrons, monoenergetic)
- Fast neutrons: p(2-6 MeV) on THICK Li target (0-4 MeV, white beam)
- Epithermal: p(1.91 MeV) on Li target (30 keV quasi-Maxwellian)
- Thermal: fast/epithermal + PE moderator



HISPANOS@CNA (U. Sevilla): continuous neutron beam

Available online at www.sciencedirect.com

  **ScienceDirect**

Nuclear Data Sheets

Nuclear Data Sheets 120 (2014) 205–207

www.elsevier.com/locate/nds

Measurement of the MACS of $^{159}\text{Tb}(n,\gamma)$ at $kT = 30$ keV by Activation

J. Praena,^{1,2,*} P.F. Mastinu,³ M. Pignatari,⁴ J.M. Quesada,¹ R. Capote,⁵ and Y. Morilla^{1,2}

Nuclear Instruments and Methods in Physics Research A 727 (2013) 1–6

Contents lists available at SciVerse ScienceDirect

 **Nuclear Instruments and Methods in Physics Research A**

journal homepage: www.elsevier.com/locate/nima

Measurement of the MACS of $^{181}\text{Ta}(n,\gamma)$ at $kT=30$ keV as a test of a method for Maxwellian neutron spectra generation

J. Praena^{a,b,*}, P.F. Mastinu^c, M. Pignatari^{d,1}, J.M. Quesada^a, J. García-López^{a,b}, M. Lozano^a, N. Dzysiuk^e, R. Capote^f, G. Martín-Hernández^g

Applied Radiation and Isotopes 107 (2016) 330–334

Contents lists available at ScienceDirect

 **Applied Radiation and Isotopes**

journal homepage: www.elsevier.com/locate/apradiso

Using a Tandem Pelletron accelerator to produce a thermal neutron beam for detector testing purposes

L. Irazola^{a,b,*}, J. Praena^{c,d}, B. Fernández^c, M. Macías^c, R. Bedogni^e, J.A. Terrón^{b,a}, B. Sánchez-Nieto^f, F. Arias de Saavedra^d, I. Porras^d, F. Sánchez-Doblado^{a,b}

Microelectronics Reliability 78 (2017) 38–45

Contents lists available at ScienceDirect

 **Microelectronics Reliability**

journal homepage: www.elsevier.com/locate/microrel

Review paper

Soft error rate comparison of 6T and 8T SRAM ICs using mono-energetic proton and neutron irradiation sources

D. Malagón^{a,*}, S.A. Bota^a, G. Torrens^a, X. Gili^a, J. Praena^{c,d}, B. Fernández^c, M. Macías^{b,c}, J.M. Quesada^b, Carlos Guerrero Sanchez^b, M.C. Jiménez-Ramos^c, J. García López^{b,c}, J.L. Merino^a, J. Segura^a

HiSPANoS Internal Report

Experiment: Neutron Radiography at CNA

Participants: Carlos Guerrero, María de los Ángeles Millán, Begoña Fernández, Adolfo Martínez, Jorge Lerendegui, Miguel Macías, María Teresa Rodríguez, Jose Manuel Quesada.

HiSPANoS Internal Report

Experiment:
Diamond detector development for fast neutron beams

Participants:
C. Weiss¹, E. Griesmayer¹, C. Guerrero^{2,3}, J. Lerendegui², J. Saiz², M. Macías^{2,3}, A. Gómez³, J.M. Quesada²

HISPANOS@CNA (U. Sevilla): pulsed neutron beam

Continuous beam (max. 10 μA) \rightarrow Chopper [50 ns “pieces”] \rightarrow Buncher [compress to 1-2 ns pulses]

@ 62kHz to 2 MHz frequency [max. 1% duty cycle, max. 100nA]

