

OSCAR and the Milan-Oslo collaboration (a story of success)

Magne Guttormsen

Department of Physics, University of Oslo

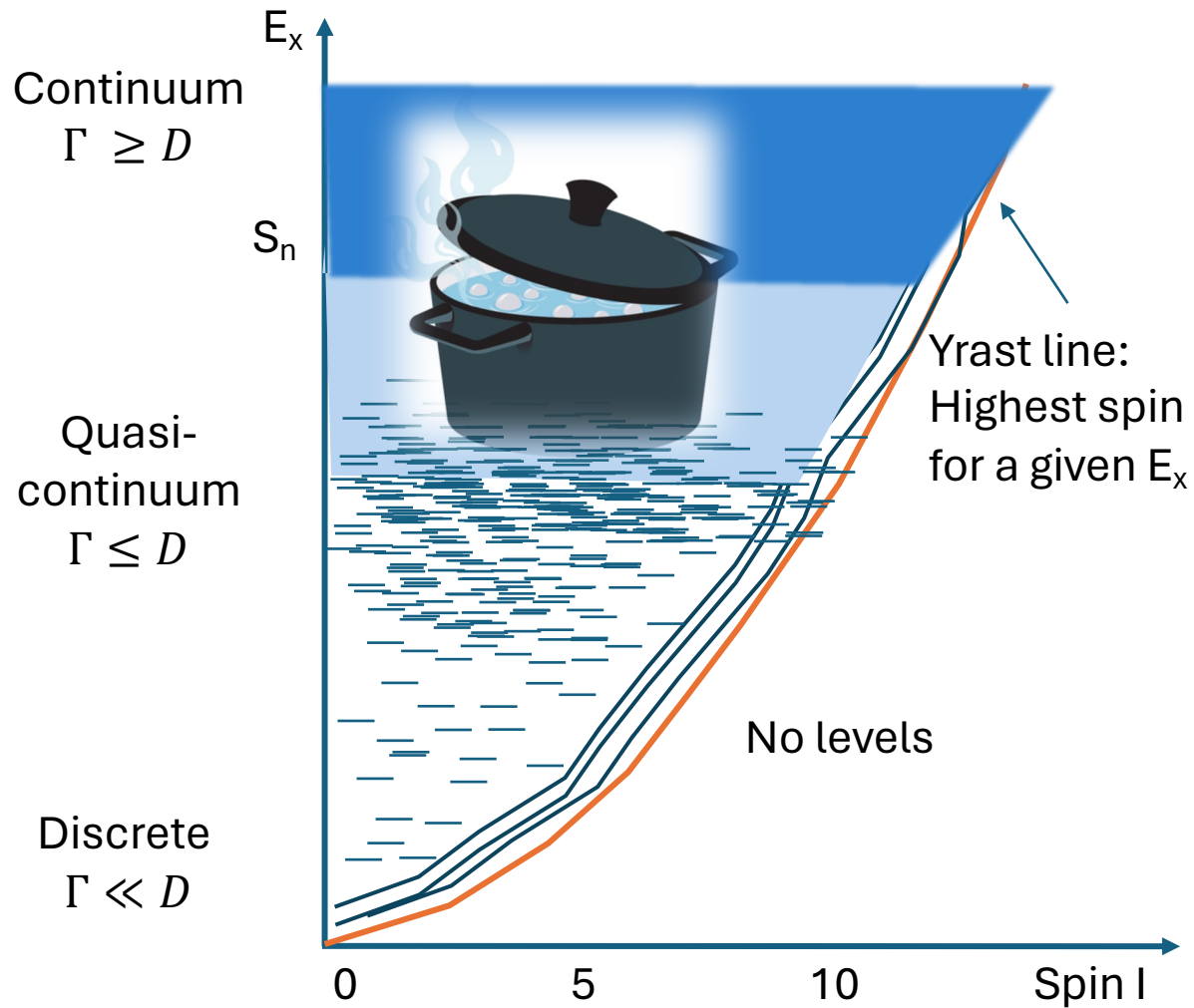
Norway

Dear Franco, Gianluca and Silvia

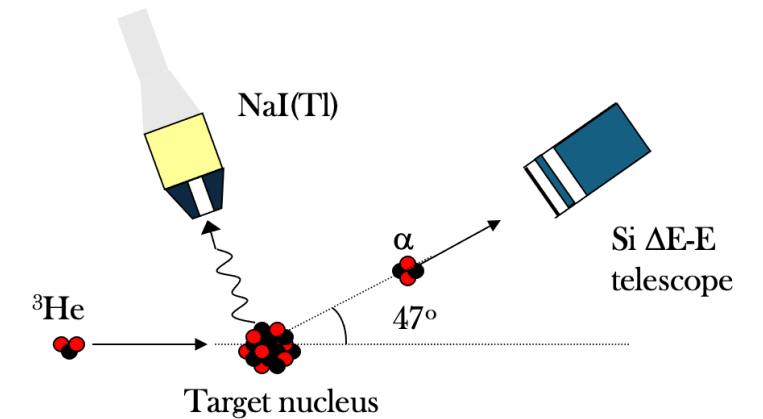
Congratulations on your 60th anniversary!!!



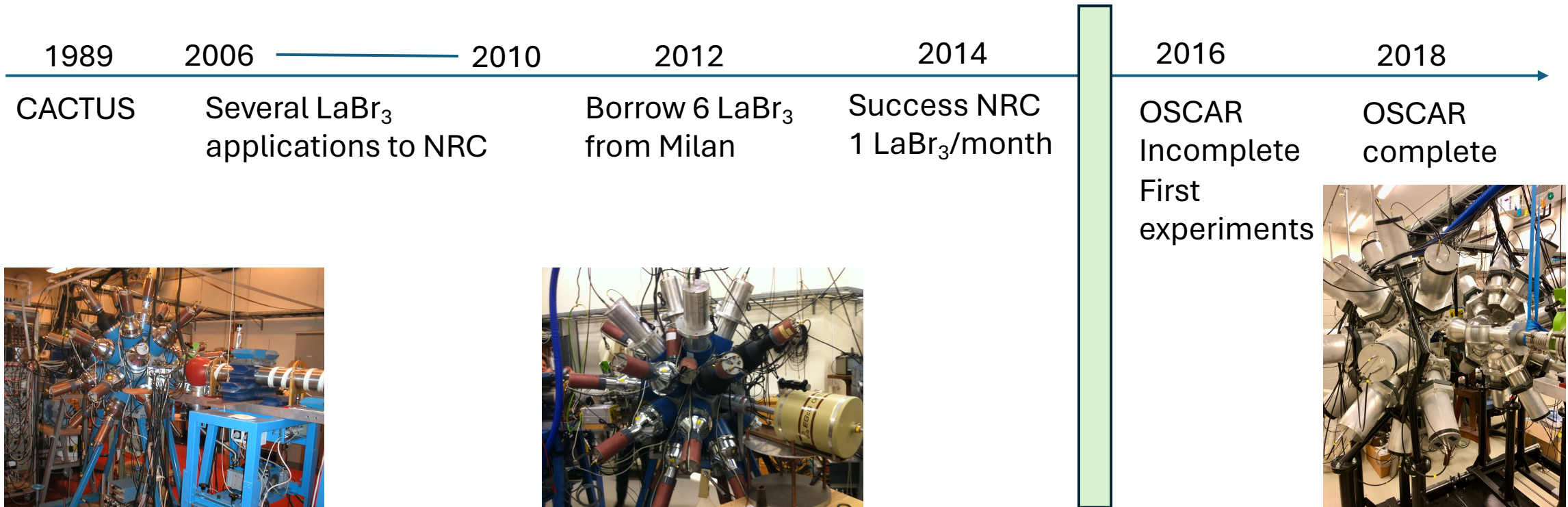
The Oslo hot-soup physics



MC-35 cyclotron (p, d, ^3He , ^4He)

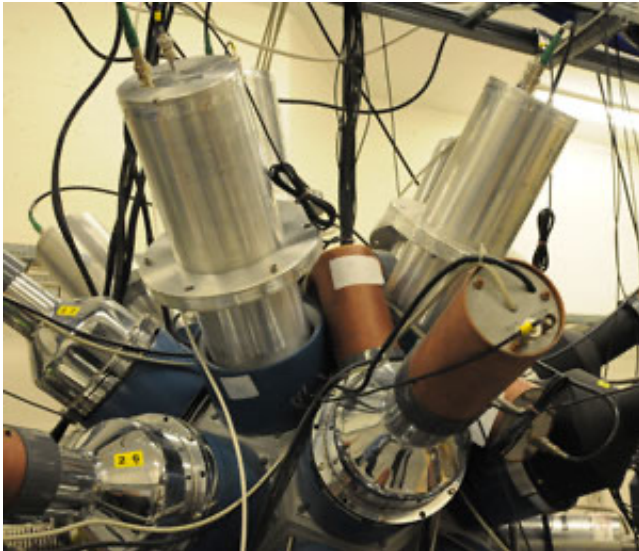


Timeline for the Oslo Scintillator Array (OSCAR)



The Milan-Oslo collaboration

Franco Camera, Angela Bracco, Silvia Leoni, Nives Blasi, Benedicte Million

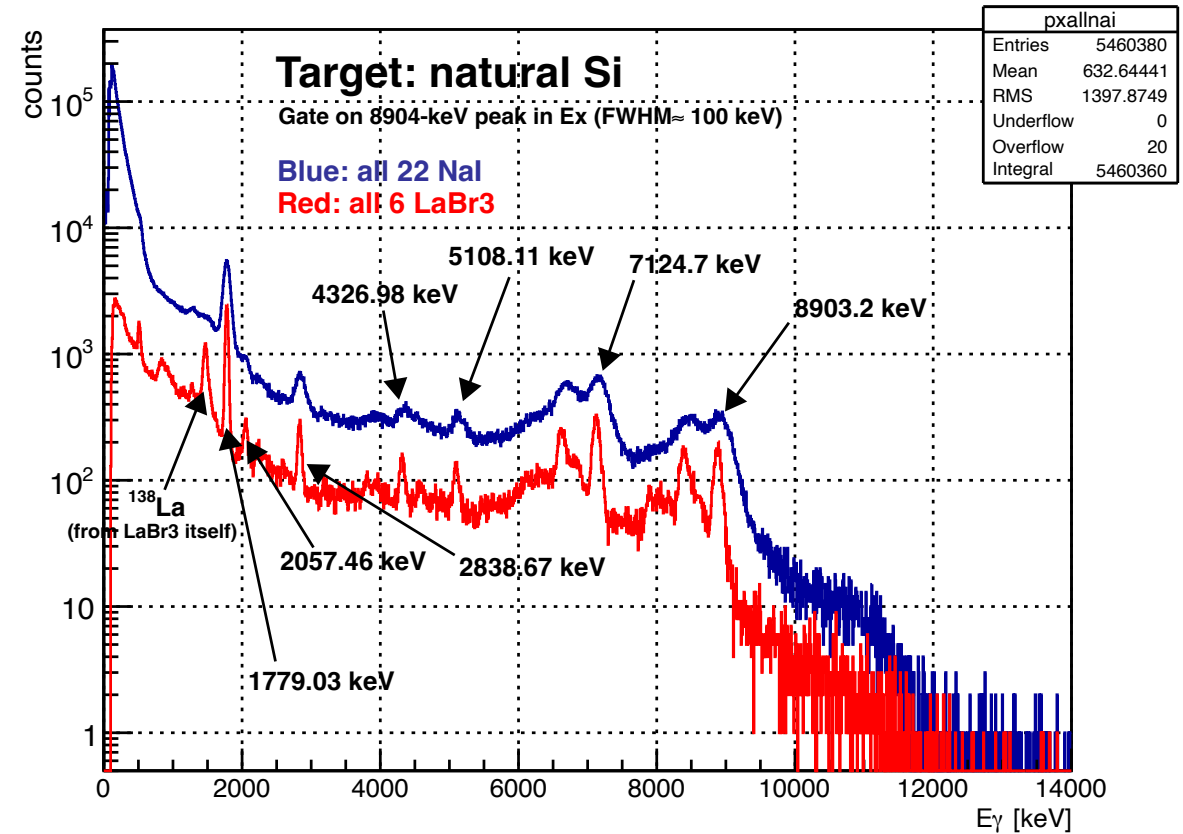
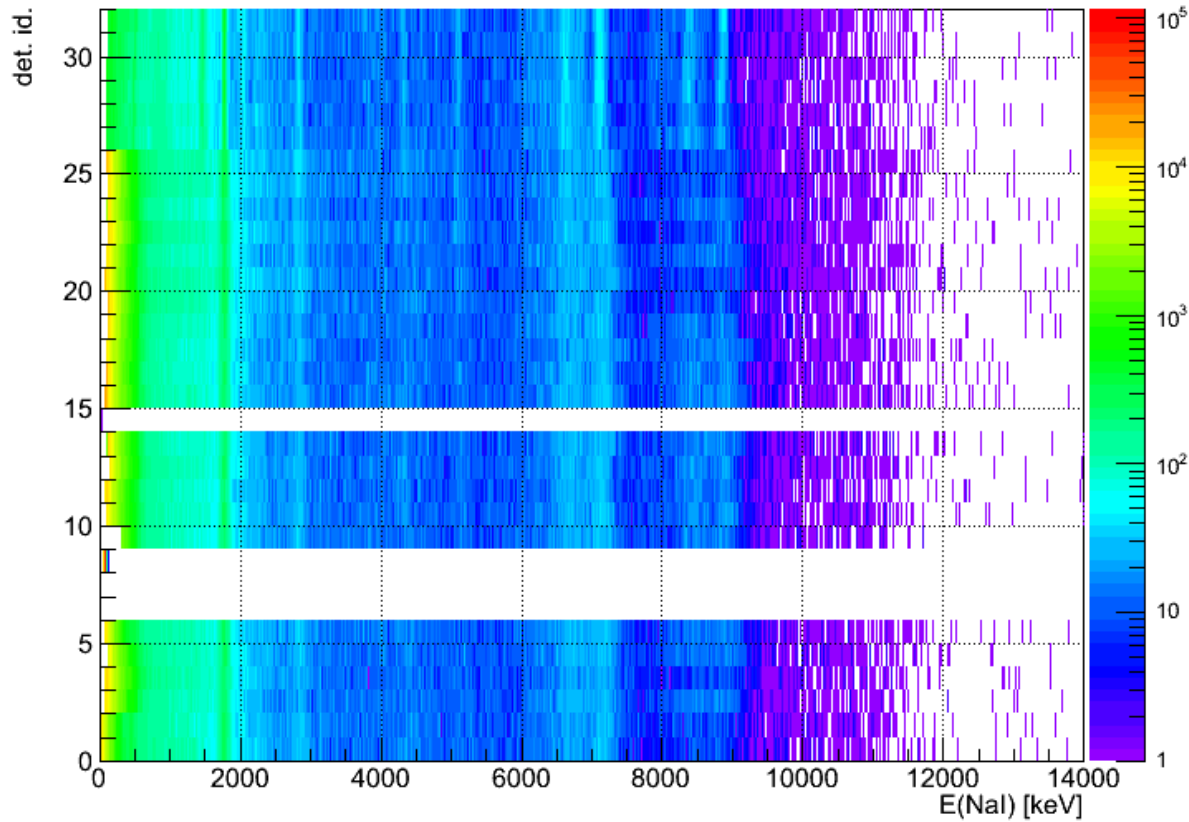


Oslo 2012

- March 2 – 12: $\text{LaBr}_3(\text{Ce})$ commissioning and first experiment: 16-MeV protons on $^{56,57}\text{Fe}$ [Si, C, mylar]. SiRi forward.
- March 14 – 21: Second experiment: 38-MeV ^3He and 16-MeV protons on ^{195}Pt [C]. SiRi backward and forward.
- March 23 – 29: Third experiment: 15-MeV deuterons on ^{12}C . SiRi forward. The Milan group.

Nal versus LaBr₃

(Gate on Ex = 8.904 MeV in natural Si)



Energy resolutions LaBr₃ from Milan

Detector	¹³⁷ Cs	²⁸ Si		²⁸ Si	
	FWHM [keV] @ 662 keV	1779.0 keV	%	7124.7 keV	%
NaI 1		113.4	6.4	283.2	4.0
LaBr ₃ 1	29	51.8	2.9	153.2	2.2
LaBr ₃ 4	28	49.3	2.8	168.6	2.4
LaBr ₃ 5	28	42.7	2.4	106.4	1.5
LaBr ₃ 6	27	46.6	2.6	116.5	1.6
LaBr ₃ 7	29	42.7	2.4	104.8	1.5
LaBr ₃ 8	24	51.8	2.9	119.4	1.7

Papers, Milan-Oslo collaboration

PRL 111, 242504 (2013)

PHYSICAL REVIEW LETTERS

week ending
13 DECEMBER 2013

Evidence for the Dipole Nature of the Low-Energy γ Enhancement in ^{56}Fe

A. C. Larsen,^{1,*} N. Blasi,² A. Bracco,^{2,3} F. Camera,^{2,3} T. K. Eriksen,¹ A. G3rgen,¹ M. Guttormsen,¹
T. W. Hagen,¹ S. Leoni,^{2,3} B. Million,² H. T. Nyhus,¹ T. Renstr3m,¹ S. J. Rose,¹ I. E. Ruud,¹ S. Siem,¹
T. Tornyi,^{1,4} G. M. Tveten,¹ A. V. Voinov,⁵ and M. Wiedeking⁶

EPJ Web of Conferences 66, 07014 (2014)

<https://doi.org/10.1051/epjconf/20146607014>

Low-energy enhancement of nuclear γ strength and its impact on astrophysical reaction rates

A. C. Larsen^{1a}, N. Blasi², A. Bracco^{2,3}, A. B3rger^{2,1}, F. Camera^{2,3}, T. K. Eriksen¹, F. Giacoppo¹, S. Goriely⁴, M. Guttormsen¹, A. G3rgen¹, T. W. Hagen¹, S. Harissopulos⁵, P. E. Koehler¹, S. Leoni^{2,3}, B. Million², H. T. Nyhus¹, T. T. Renstr3m¹, S. Rose¹, I. E. Ruud¹, A. Schiller⁶, S. Siem¹, T. Tornyi^{1,7}, G. M. Tveten¹, A. V. Voinov⁸ and M. Wiedeking⁹

Vol. 46 (2015)

ACTA PHYSICA POLONICA B

No 3

UPBEND AND M1 SCISSORS MODE IN NEUTRON-RICH NUCLEI — CONSEQUENCES FOR r -PROCESS (n, γ) REACTION RATES*

A. C. LARSEN^a, S. GORIELY^b, L. A. BERNSTEIN^{c,d}, D. L. BLEUEL^c
A. BRACCO^{e,f}, B. A. BROWN^g, F. CAMERA^{e,f}, T. K. ERIKSEN^a
S. FRAUENDORF^h, F. GIACOPPO^a, M. GUTTORMSEN^a, A. G3RGEN^a
S. HARISSOPOULOSⁱ, S. LEONI^{e,f}, S. N. LIDDICK^g, F. NAQVI^g
H. T. NYHUS^a, S. J. ROSE^a, T. RENSTR3M^a, R. SCHWENGER^j
S. SIEM^a, A. SPYROU^g, G. M. TVETEN^a, A. V. VOINOV^k
M. WIEDEKING^l

IOP Publishing

Journal of Physics G: Nuclear and Particle Physics

J. Phys. G: Nucl. Part. Phys. 44 (2017) 064005 (28pp)

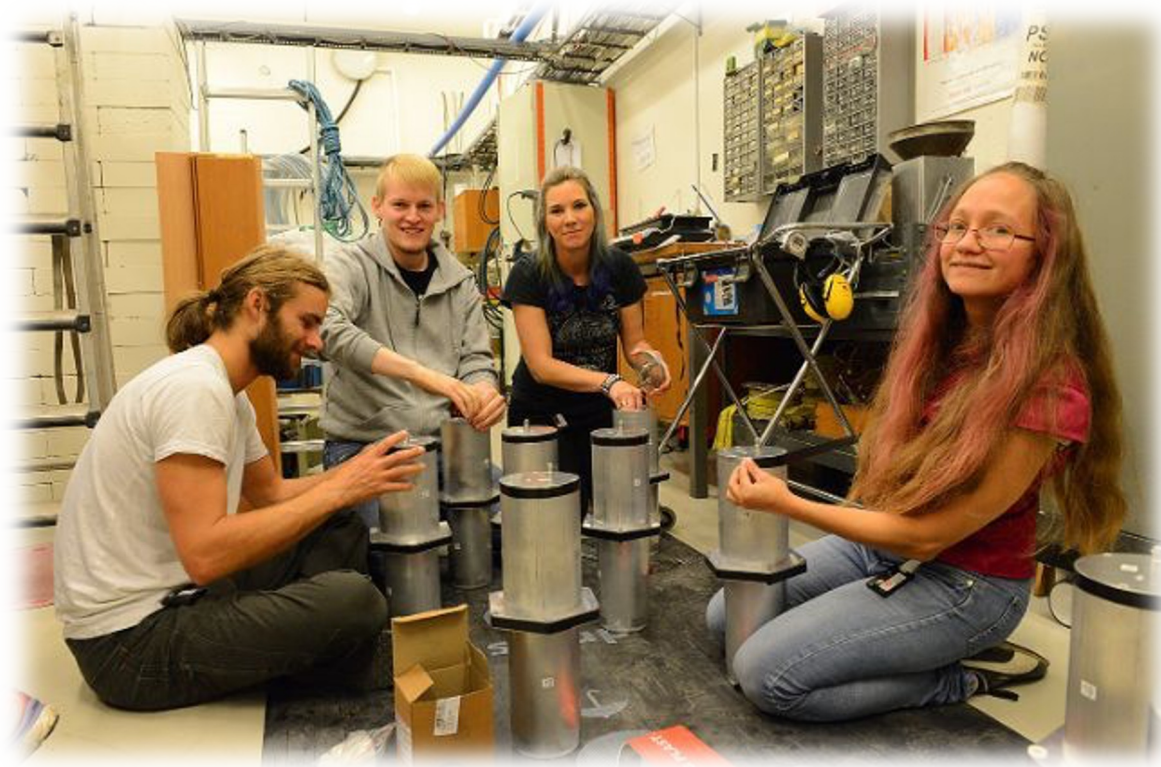
<https://doi.org/10.1088/1361-6471/aa644a>

Low-energy enhancement and fluctuations of γ -ray strength functions in $^{56,57}\text{Fe}$: test of the Brink–Axel hypothesis

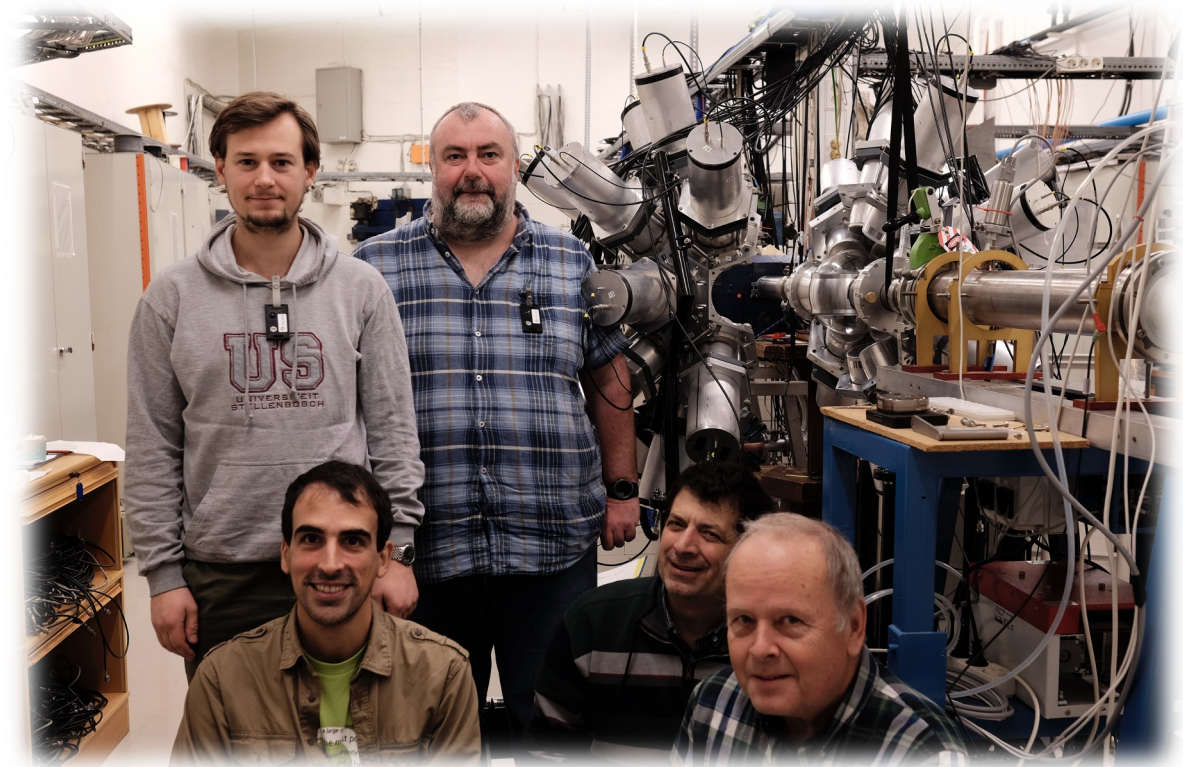
A C Larsen^{1,7}, M Guttormsen¹, N Blasi², A Bracco^{2,3},
F Camera^{2,3}, L Crespo Campo¹, T K Eriksen^{1,4}, A G3rgen¹,
T W Hagen¹, V W Ingeberg¹, B V Kheswa¹, S Leoni^{2,3},
J E Midtb3l¹, B Million², H T Nyhus¹, T Renstr3m¹, S J Rose¹,
I E Ruud¹, S Siem¹, T G Tornyi^{1,4}, G M Tveten¹, A V Voinov⁵,
M Wiedeking⁶ and F Zeiser¹

NRC application approved 2014
30 LaBr₃ (Ce) scintillators 3.5" x 8"

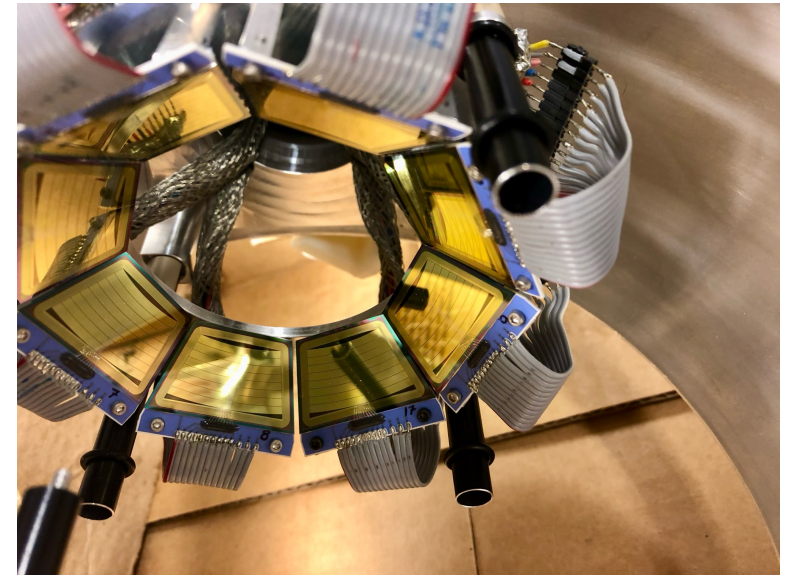
2017 Fabio, Trond, Cecilie, Gry



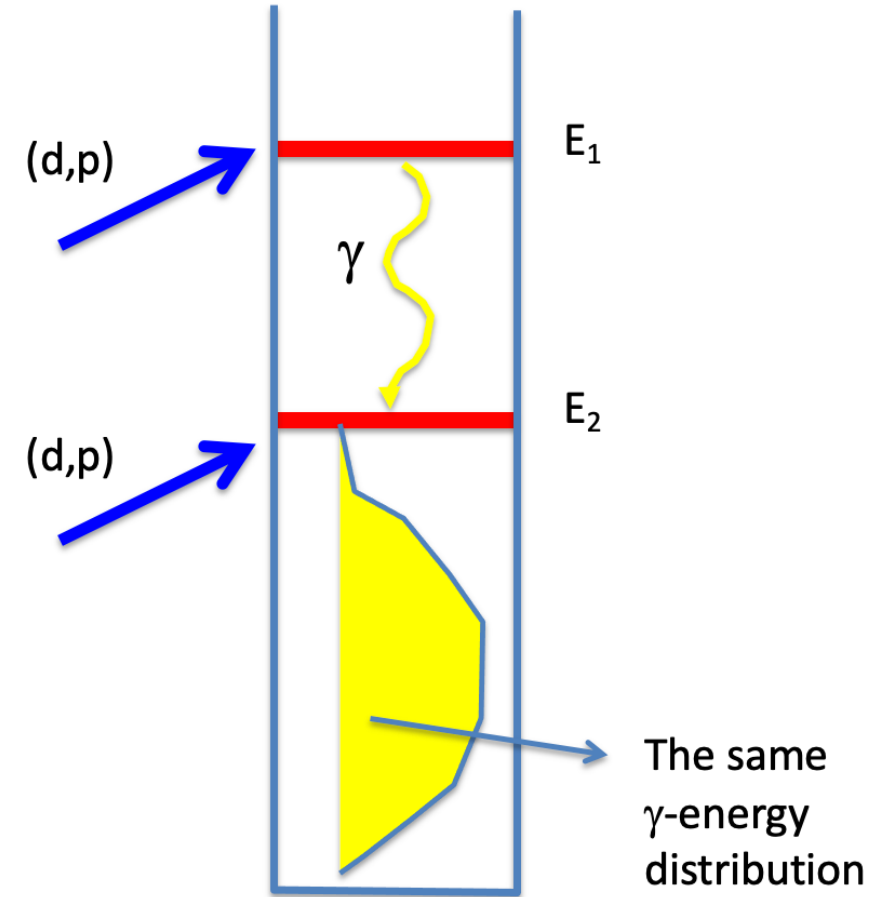
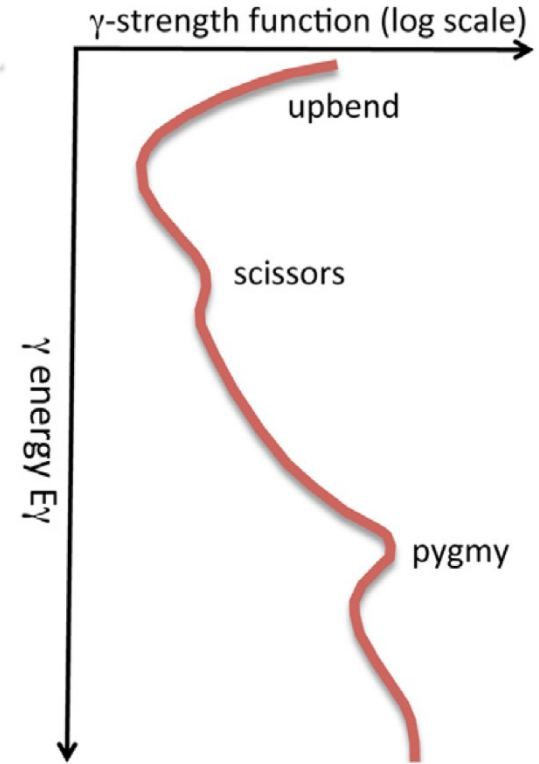
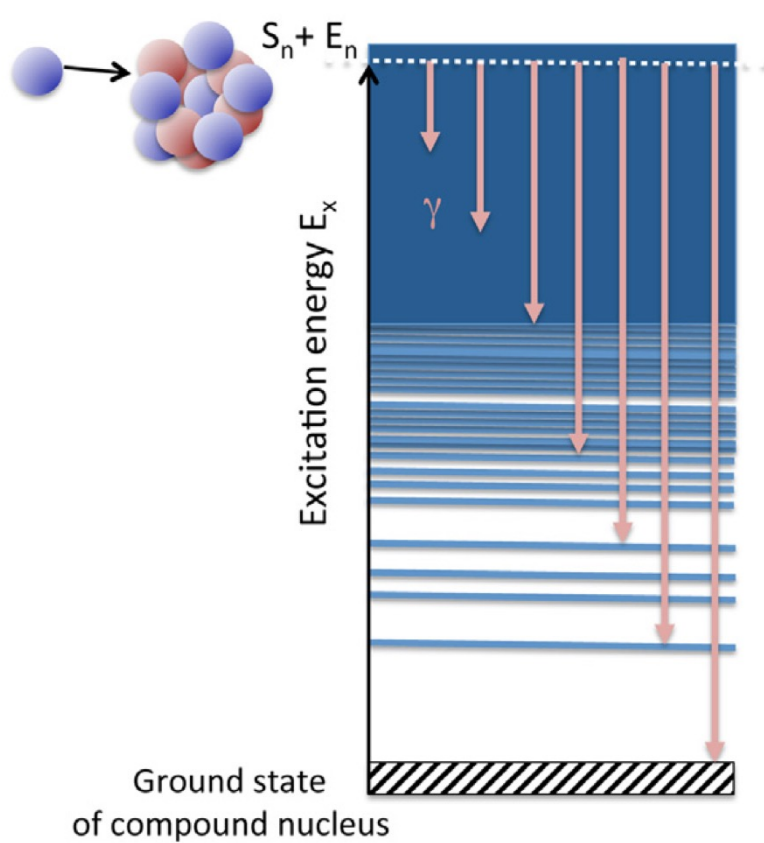
2018 Vetle, Frank, Pete, Franco, Magne



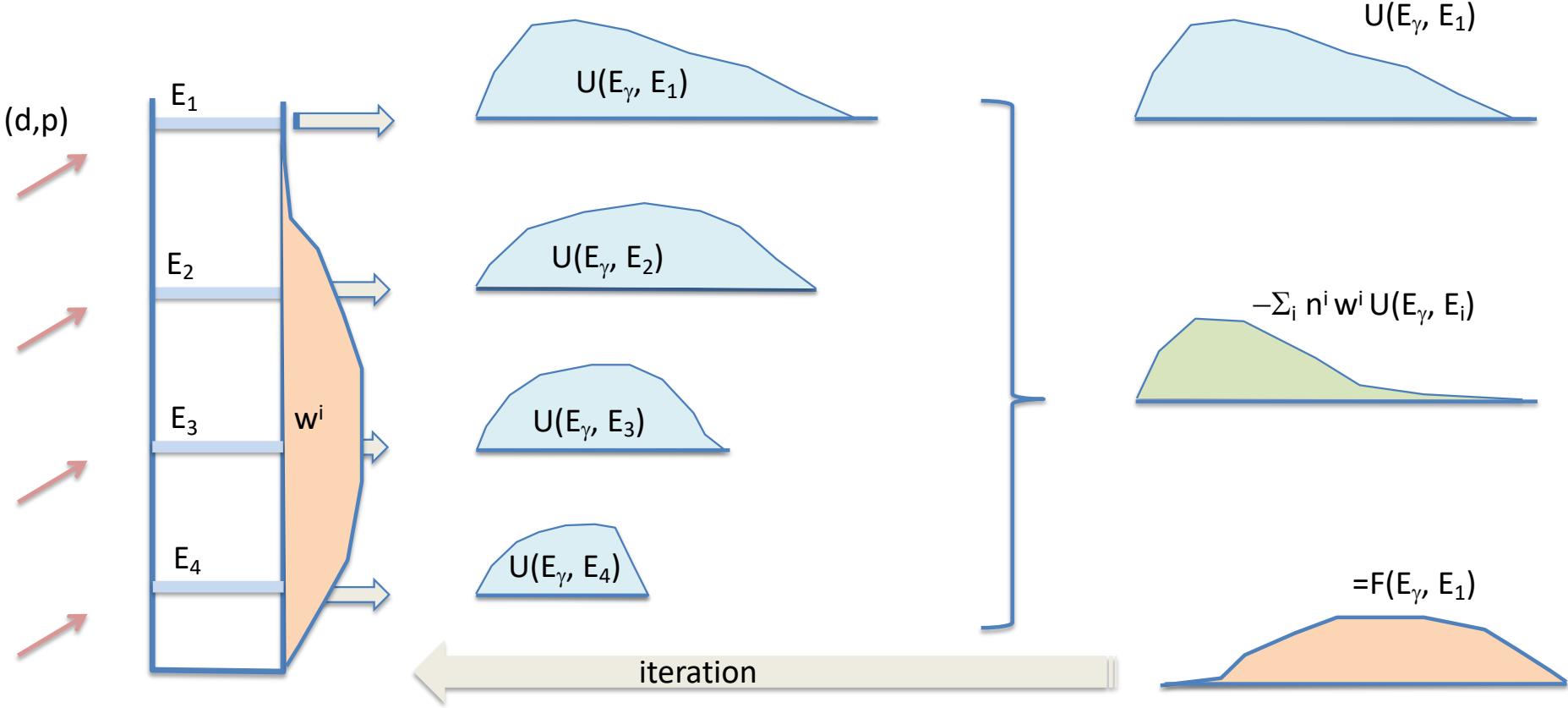
OSCAR and SiRi



The Physics

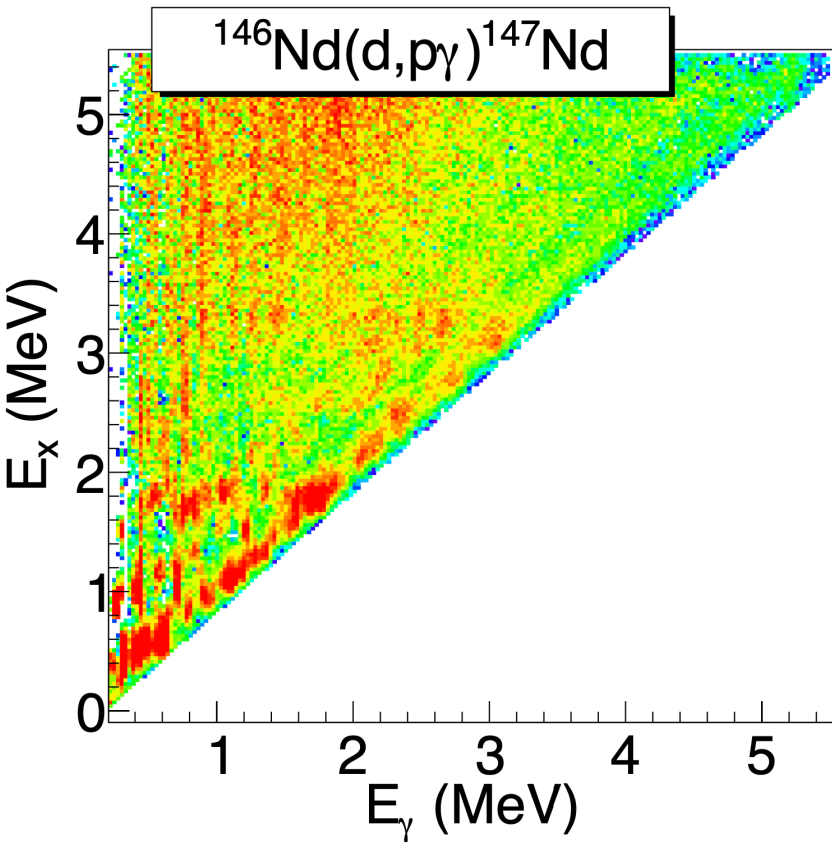


First-generation method

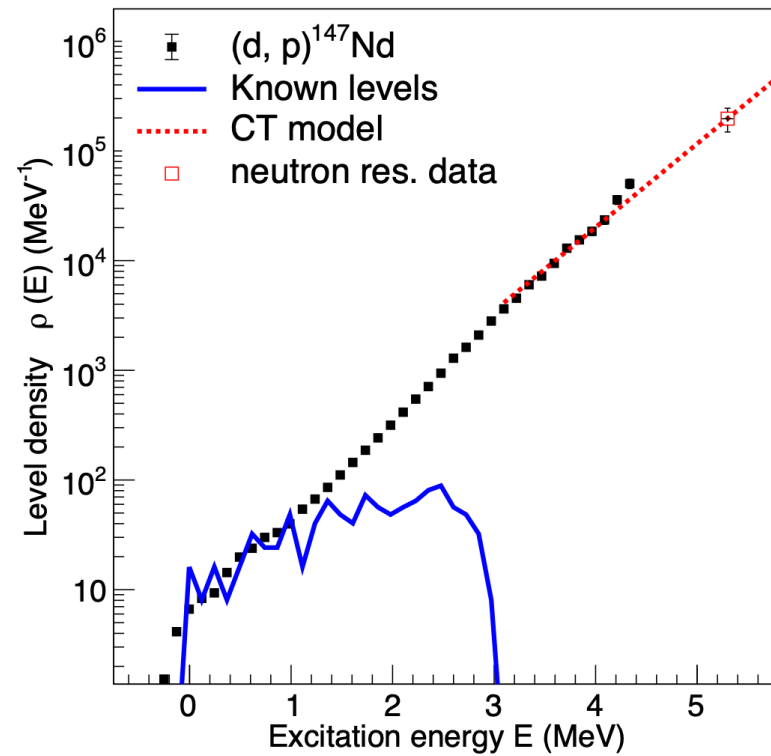


The Oslo method

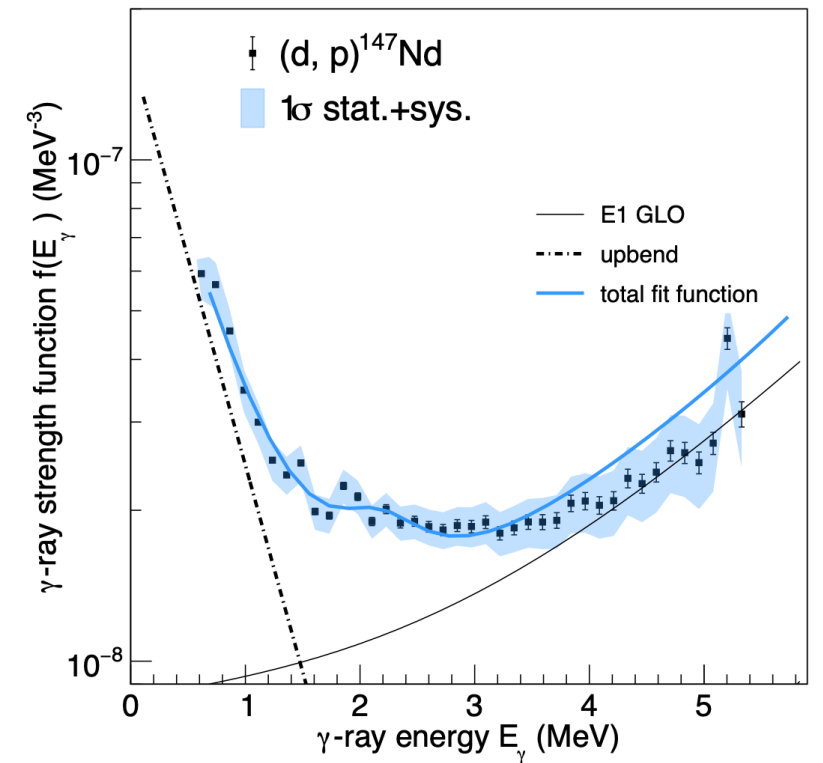
Simultaneous extraction
of NLD and γ SF



M. Guttormsen et al.,
Phys. Lett. B 816 (2021) 136206



M. Guttormsen et al.,
Phys. Rev. C 106, 034314 (2022)



Thank you for your attention !

