HISPEC/DESPEC plans for FAIR phase-0

Alison Bruce
University of Brighton

NuSTAR annual meeting 2015

From J.Gerl's talk on Wednesday:

Current planning:

2015 — *Break for SIS-18 upgrade and shielding enforcement and UNILAC renovation.*
Q3-4: UNILAC operation *(no call, but internal disc. and PAC 17.4.)*

2016 — *Break for SIS-18 upgrade and shielding enforcement, UNILAC operation under discussion*

2017: — *Q2-3: SIS-18 commissioning, Q4: SIS-18 operation starts, mainly FAIR preparation and experiment commissioning*

2018: — *4-5 months, FAIR preparations and experiment programme*

2019: — *5-6 months, FAIR preparations and experiment programme*

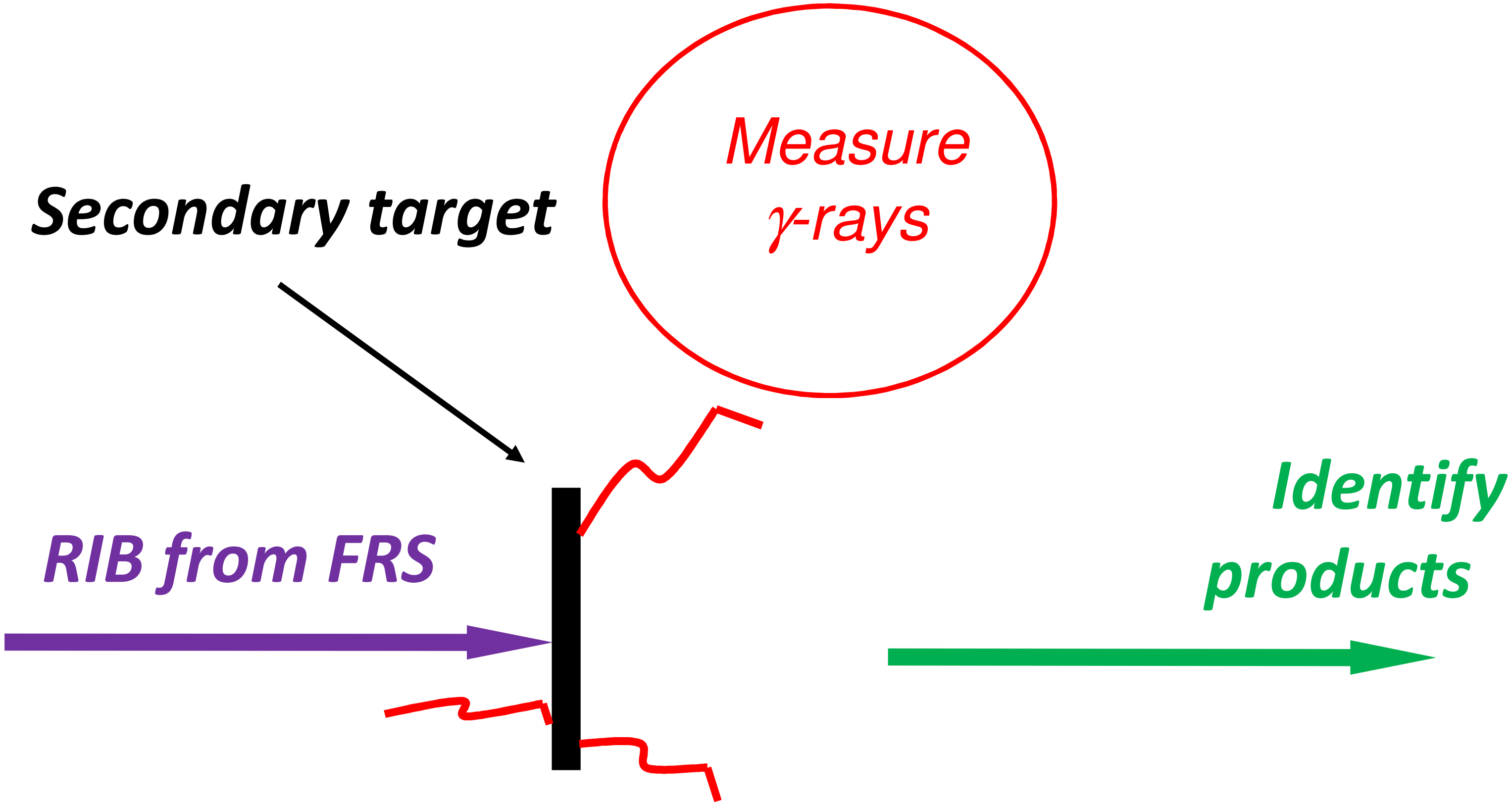
2020: — *5-6 months, FAIR preparations and experiment programme*

Phase 0

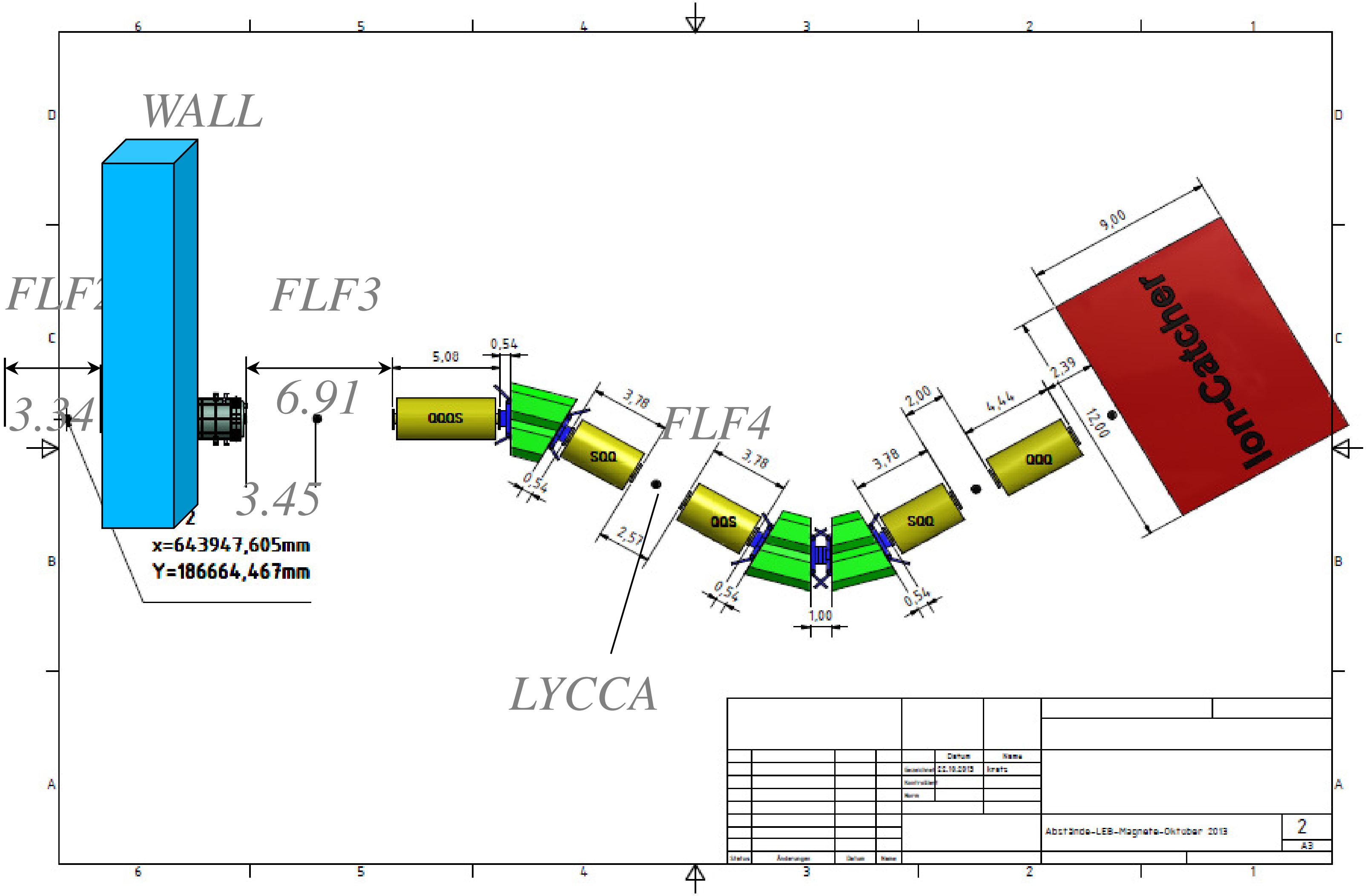
Agreed by BMBF and GSI management

2) What is HISPEC/DESPEC?

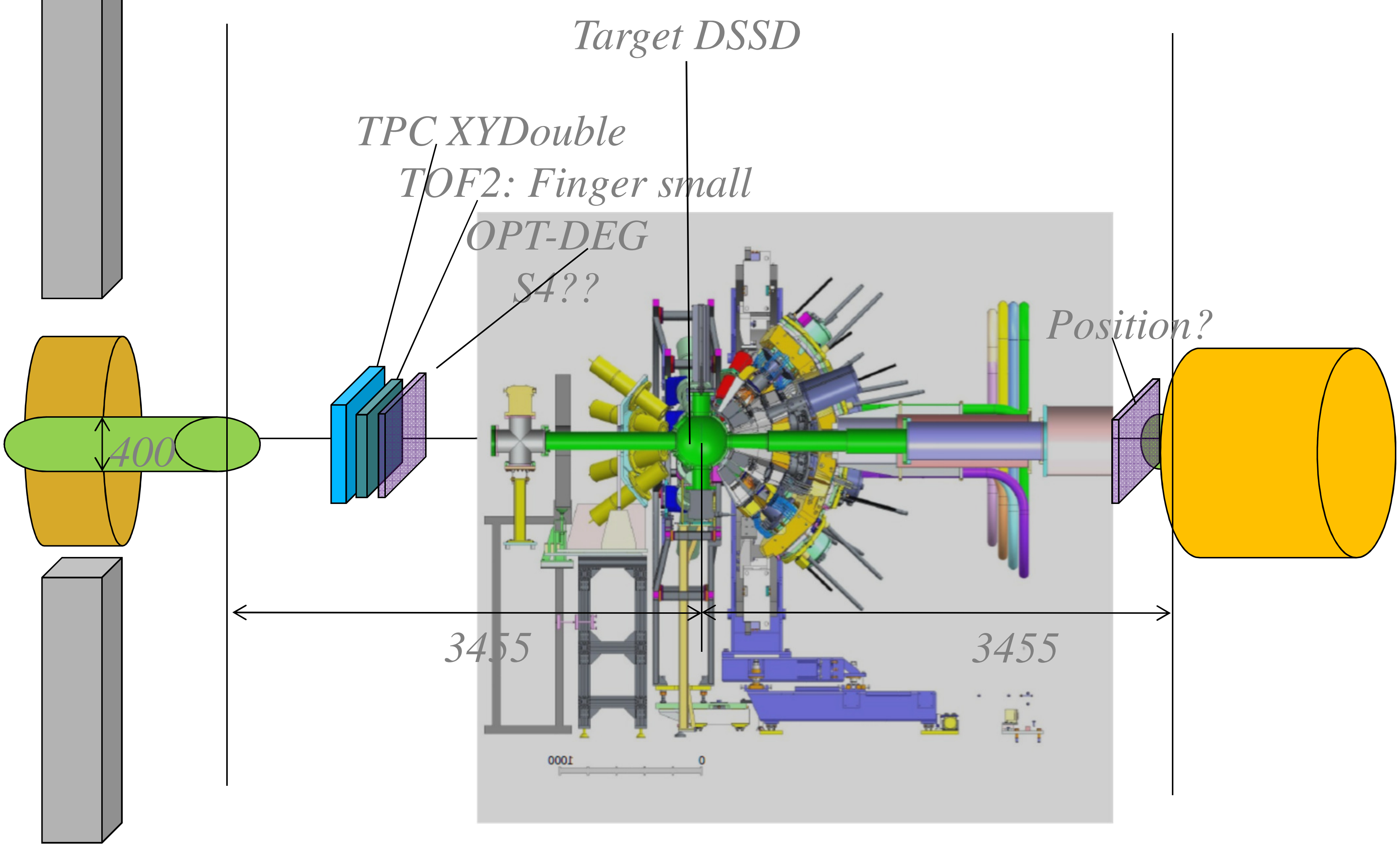
HISPEC: High-resolution In-flight SPECtroscopy



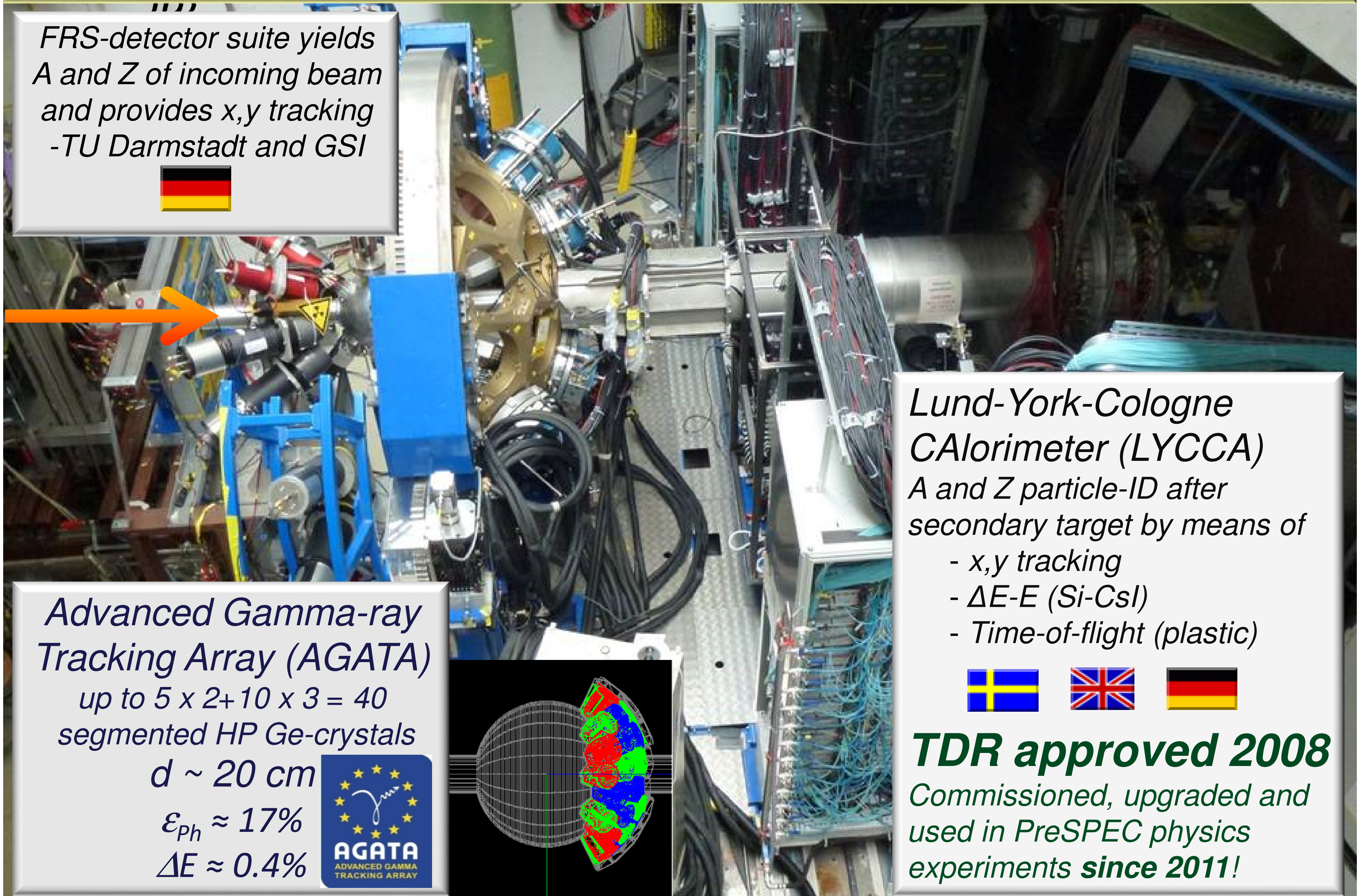
From M.Gorska at HISPEC/DESPEC meeting



FLF3 HISPEC150



PreSPEC-AGATA 2012-2014: Early Implementation of HISPEC



FRS-detector suite yields A and Z of incoming beam and provides x,y tracking -TU Darmstadt and GSI

Advanced Gamma-ray Tracking Array (AGATA)

up to 5 x 2+10 x 3 = 40 segmented HP Ge-crystals

d ~ 20 cm

$\varepsilon_{Ph} \approx 17\%$

$\Delta E \approx 0.4\%$

Lund-York-Cologne CAlorimeter (LYCCA)

A and Z particle-ID after secondary target by means of

- *x,y tracking*
- *ΔE-E (Si-CsI)*
- *Time-of-flight (plastic)*

TDR approved 2008

*Commissioned, upgraded and used in PreSPEC physics experiments **since 2011**!*

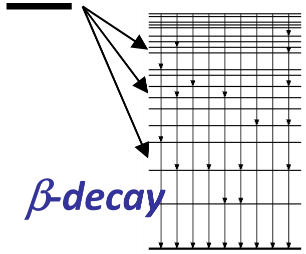
PreSPEC-AGATA: Lots of physics cases discussed:

Theme	Convenor	No of LOI
Nuclear Structure near N=Z: n-p degree of freedom and rp process	Giacomo DeAngelis	7
Shell Evolution in light n-rich nuclei	Alejandro Algora	7
Nuclear Structure towards 78Ni and the N=50 shell gap	Gilbert Duchene	4
Shape Evolution and Collectivity in nuclei far from stability	Zsolt Podolyak	7
100Sn region and the heaviest self-conjugate nuclei	Bo Cederwall	4
Astrophysically important region near 132Sn	Magda Gorska	6
TOTAL		**35**

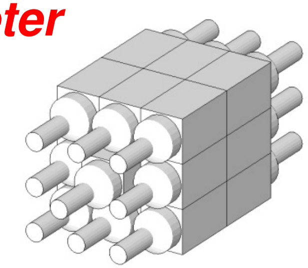
Didn't all run, lots of good physics ideas still current…but AGATA is now in GANIL and in 2018 will go from there to Legnaro so not available for GSI in 2017+x

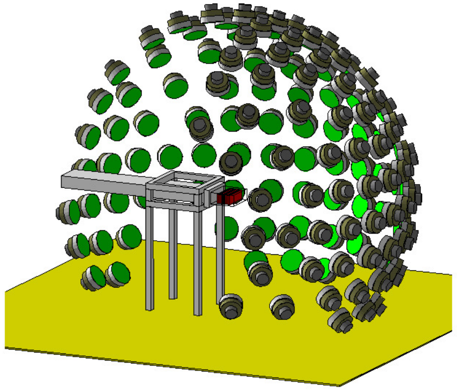
DESPEC: DEcay SPECtroscopy

β,n,γ-decay of exotic (neutron-rich) nuclei…..

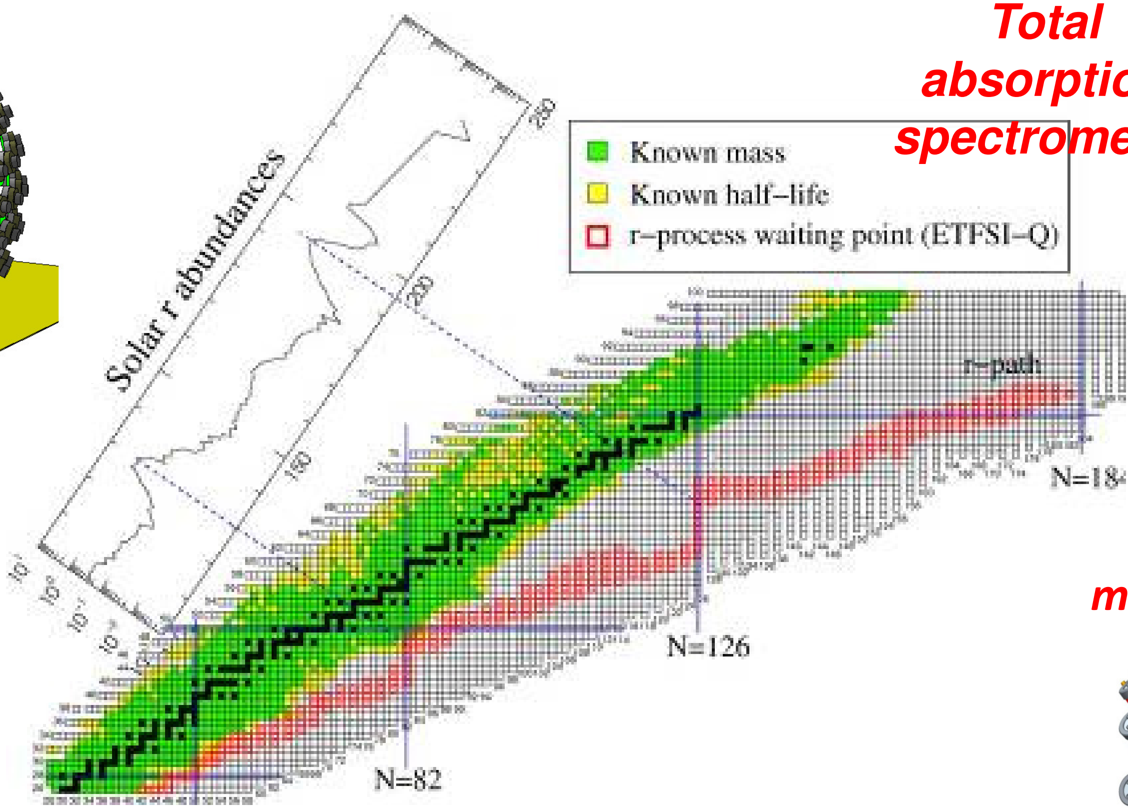


Total absorption spectrometer

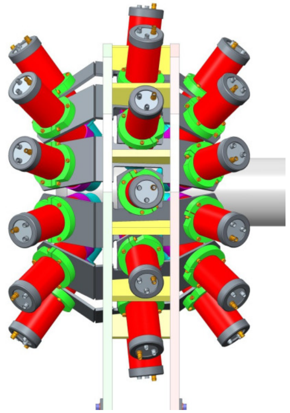




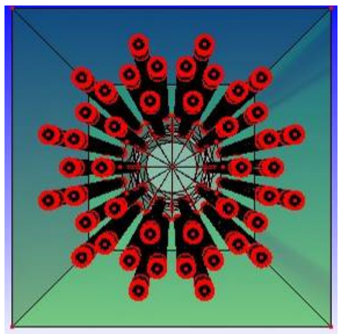
Neutron spectrometer MONSTER



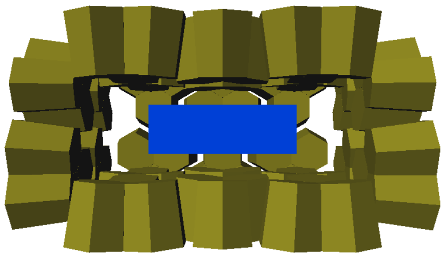
γ-ray time measurements



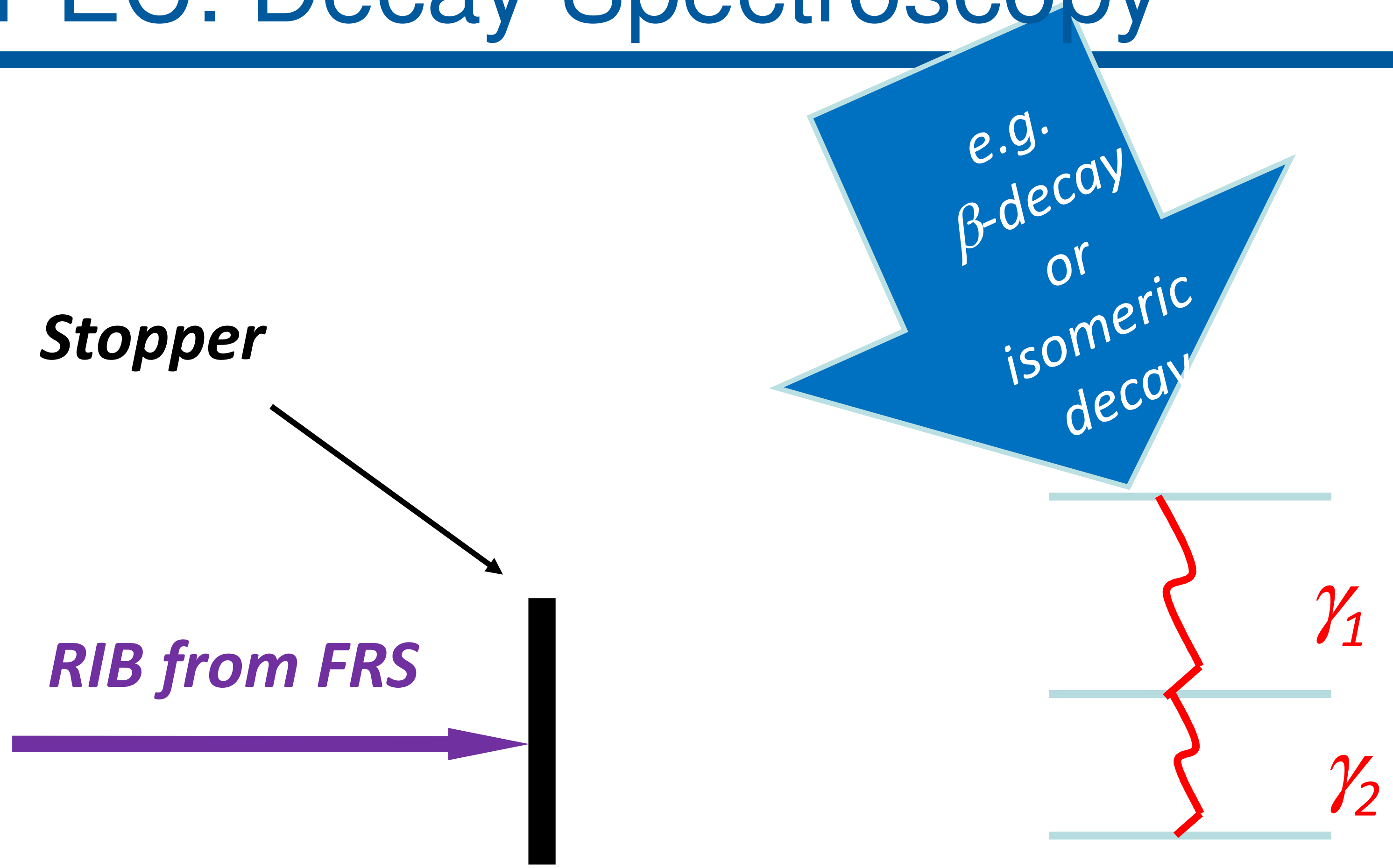
β–delayed neutron detector



High resolution γ-ray energy measurements



DESPEC: Decay Spectroscopy

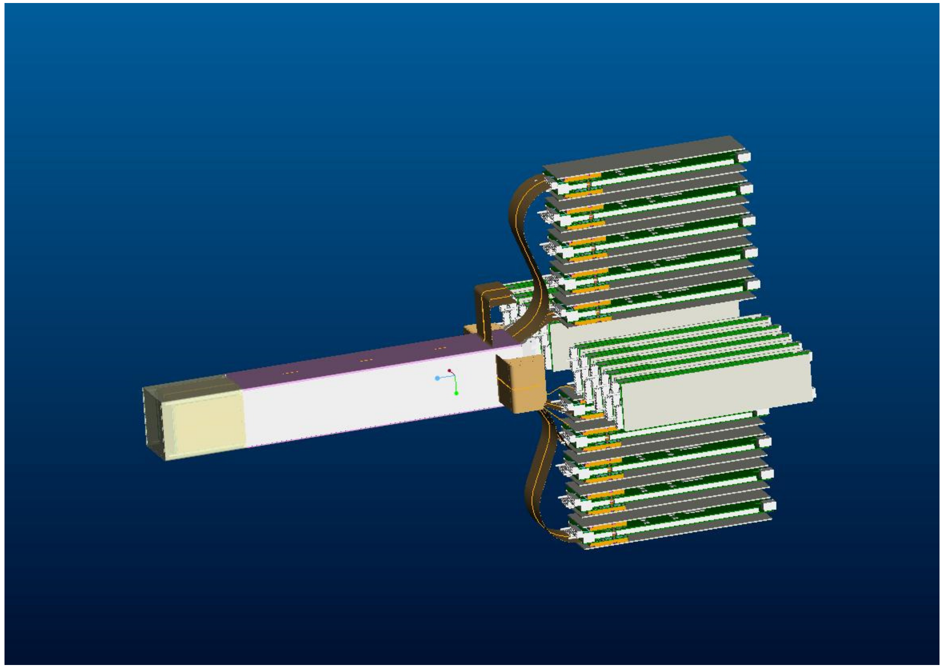


Get first information on lifetimes, decay modes, Q-values and scheme of excited levels

Active stopper..AIDA

Advanced Implantation Detector Array

- *Uses 12 x 8cm x 8cm DSSSD*



- *Measures position of implant*
- *Fast overload recovery (~μs}*
- *Time stamping*

http://www2.ph.ed.ac.uk/~td/DSSD/

The University of Edinburgh

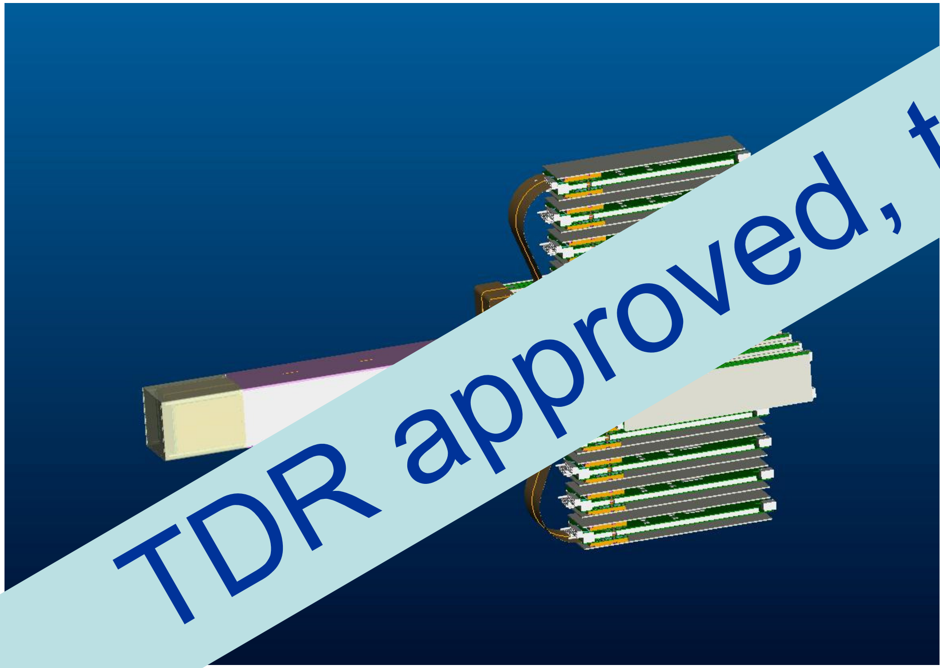
Science & Technology Facilities Council

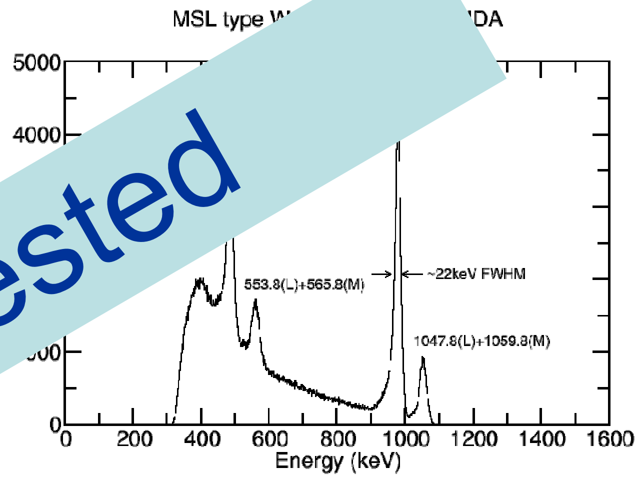
THE UNIVERSITY of LIVERPOOL

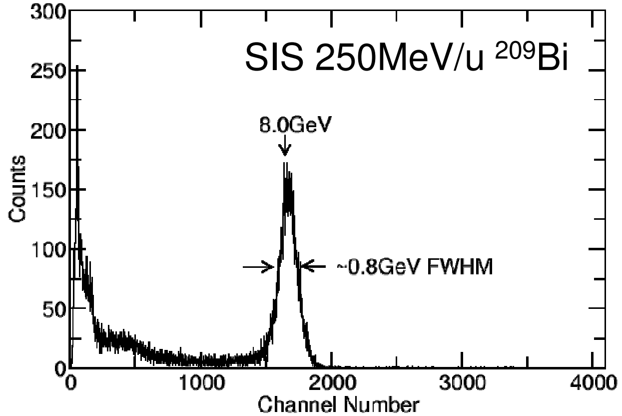
Active stopper..AIDA

Advanced Implantation Detector Array

- *Uses 12 x 8cm x 8cm DSSSD*





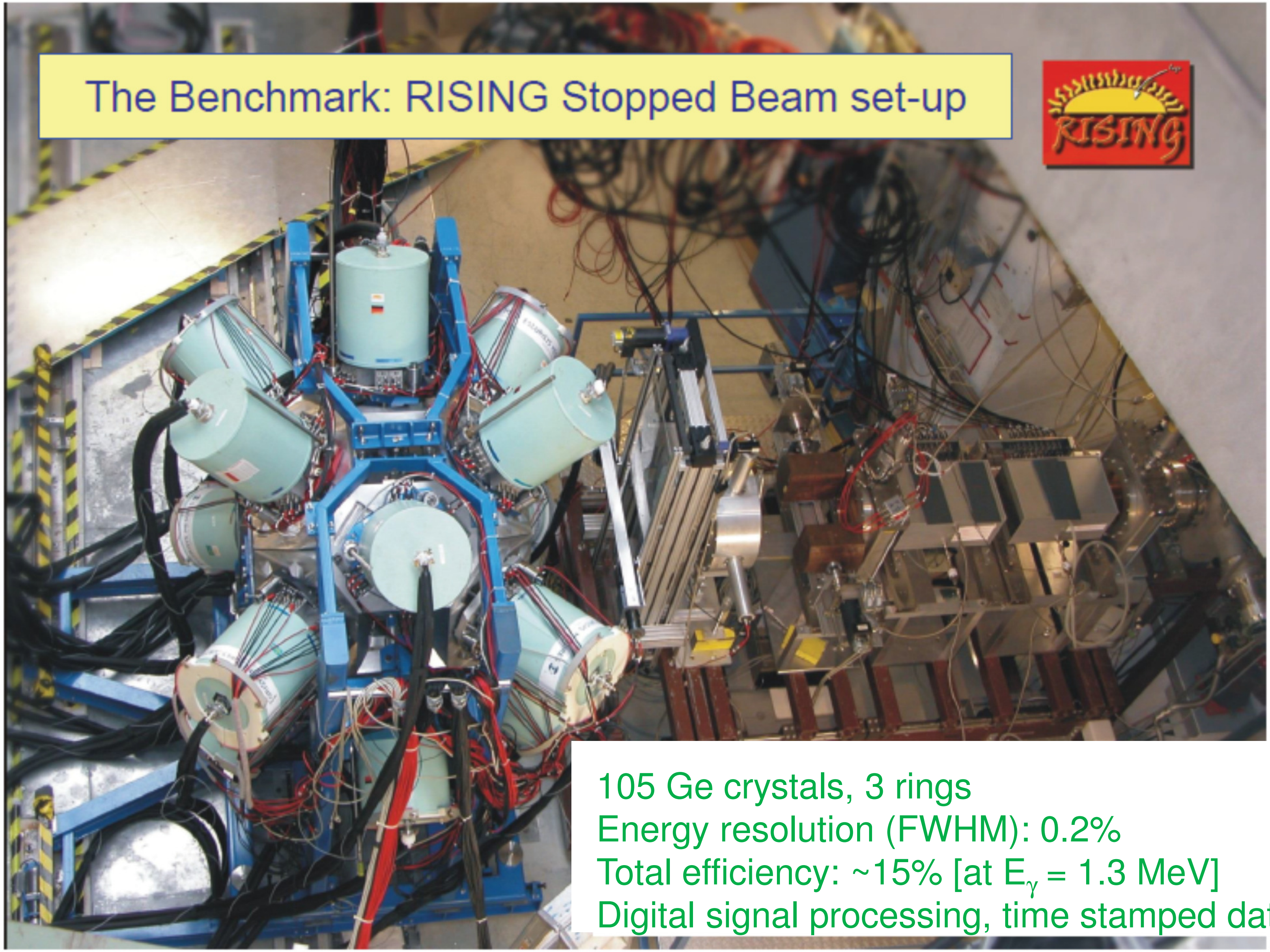


TDR approved, tested

Science & Technology Facilities Council

THE UNIVERSITY of LIVERPOOL

The Benchmark: RISING Stopped Beam set-up



105 Ge crystals, 3 rings
Energy resolution (FWHM): 0.2%
Total efficiency: ~15% [at E_{γ} = 1.3 MeV]
Digital signal processing, time stamped data

Last stopped beam campaign with ^{238}U - 2009

PHYSICAL REVIEW C 90, 034317 (2014)

Isomeric decay spectroscopy of the ^{217}Bi isotope

A. Gottardo,[1,2,*] J. J. Valiente-Dobón,[1] G. Benzoni,[3] S. Lunardi,[2,4] A. Gadea,[5] A. Algora,[5,6] N. A
Y. Ayyad,[8] D. Bazzacco,[4] J. Benlliure,[8] P. Boutachkov,[9] M. Bowry,[7] A. Bracco,[3,10] A. M. Bruce,[1]
E. Casarejos,[12] M. L. Cortes,[9] F. C. L. Crespi,[3,10] A. Corsi,[3,10] A. M. Denis Bacelar,[11] A. Y. De
M. Doncel,[14] T. Engert,[9] K. Eppinger,[15] G. F. Farrelly,[7] F. Farinon,[9] E. Farnea,[4] H. Geissel,[9] J. G
J. Grebosz,[16] E. Gregor,[9] T. Habermann,[9] R. Hoischen,[9,17] R. Janik,[18] P. R. John,[2,4] S. Klupp,[15]
S. M. Lenzi,[2,4] S. Leoni,[3,10] S. Mandal,[19] R. Menegazzo,[4] D. Mengoni,[4] B. Million,[3] V. Mo

Physics Letters B
Volume 715, Issues 4–5, 10 September 2012, Pages 293–297

ELSEVIER

First measurement of beta decay half-lives in neutron-rich Tl and Bi isotopes

G. Benzoni[a], A.I. Morales[a], J.J. Valiente-Dobón[b], A. Gottardo[b, c], A. Bracco[a, d], F. Camera[a, d], F.C.L. Crespi[a, d], A.M. Corsi[a, d, 1], S. Leoni[a, d], B. Million[a], R. Nicolini[a, d], O. Wieland[a], A. Gadea[e], S. Lunardi[f, c], P. Boutachkov[g], A.M. Bruce[h], M. Górska[g], J. Grebosz[i], S. Pietri[j], Zs. Podolyak[j], M. Pfützner[k], P.H. Regan[j], H. Weick[g], J. Alcántara Núñez[l], A. Algora[e], N. Al-Dahan[j, 2], G. de Angelis[b], Y. Ayyad[l], N. Alkhomashi[m], P.R.P. Allegro[n], D. Bazzacco[f], J. Benlliure[l], M. Bowry[j], M. Bunce[j], E. Casarejos[o], M.L. Cortes[g], A.M. Denis Bacelar[h], A.Y. Deo[j], C. Domingo-Pardo[g], M. Doncel[p], Zs. Dombradi[q], T. Engert[g], K. Eppinger[r], G.F. Farrelly[j], F. Farinon[g], E. Farnea[f], H. Geissel[g], J. Gerl[g], N. Goel[g], E. Gregor[g], T. Habermann[g], R. Hoischen[g, s], R. Janik[t], S. Klupp[r], I. Kojouharov[g], N. Kurz[g], S. Mandal[u], R.

Physics Letters B
Volume 725, Issues 4–5, 1 October 2013, Pages 292–296

ELSEVIER

New μs isomers in the neutron-rich ^{210}Hg nucleus

A. Gottardo[a, b], J.J. Valiente-Dobón[a], G. Benzoni[c], A. G
A.M. Bruce[g], M. Górska[f], J. Grebosz[h], S. Pietri[f], Zs. Podolyák[i],
Alcántara Núñez[k], A. Algora[d], N. Al-Dahan[i], G. de Angelis[a], Y.
D. Bazzacco[e], J. Benlliure[k], M. Bowry[i], A. Bracco[c, n], M. Bunce
Cortes[f], F.C.L. Crespi[c], A. Corsi[c, n], A.M. Denis Bacelar[g], A.Y. I
Dombradi[q], T. Engert[f], K. Eppinger[r], G.F. Farrelly[i],

PRL 109, 162502 (2012) PHYSICAL REVIEW LETTERS week ending 19 OCTOBER 2012

New Isomers in the Full Seniority Scheme of Neutron-Rich Lead Isotopes: The Role of Effective Three-Body Forces

A. Gottardo,[1,2,*] J. J. Valiente-Dobón,[1] G. Benzoni,[3] R. Nicolini,[3,4] A. Gadea,[5] S. Lunardi,[2,6] P. Boutachkov,[7]
A. M. Bruce,[8] M. Górska,[7] J. Grebosz,[9] S. Pietri,[7] Zs. Podolyák,[10] M. Pfützner,[11] P. H. Regan,[10] H. Weick,[7]
J. Alcántara Núñez,[12] A. Algora,[5] N. Al-Dahan,[10] G. de Angelis,[1] Y. Ayyad,[12] N. Alkhomashi,[13] P. R. P. Allegro,[14]
D. Bazzacco,[6] J. Benlliure,[12] M. Bowry,[10] A. Bracco,[3,4] M. Bunce,[8] F. Camera,[3,4] E. Casarejos,[15] M. L. Cortes,[7]
F. C. L. Crespi,[3] A. Corsi,[3,4] A. M. Denis Bacelar,[8] A. Y. Deo,[10] C. Domingo-Pardo,[7] M. Doncel,[16] Zs. Dombradi,[17]
T. Engert,[7] K. Eppinger,[18] G. F. Farrelly,[10] F. Farinon,[7] E. Farnea,[6] H. Geissel,[7] J. Gerl,[7] N. Goel,[7] E. Gregor,[7]
T. Habermann,[7] R. Hoischen,[7,19] R. Janik,[20] S. Klupp
R. Menegazzo,[6] D. Mengoni,[6] B. Million,[3] A. I. M
W. Prokopowicz,[7] F. Recchia,[6] R. V. Ribas,[14] M.
B. Sitar,[20] D. Siwal,[21] K. Steiger,[18] P. Strmen,[20] T. I
H-J. Wollersheim,[7] F. Nov

PHYSICAL REVIEW C 89, 014324 (201

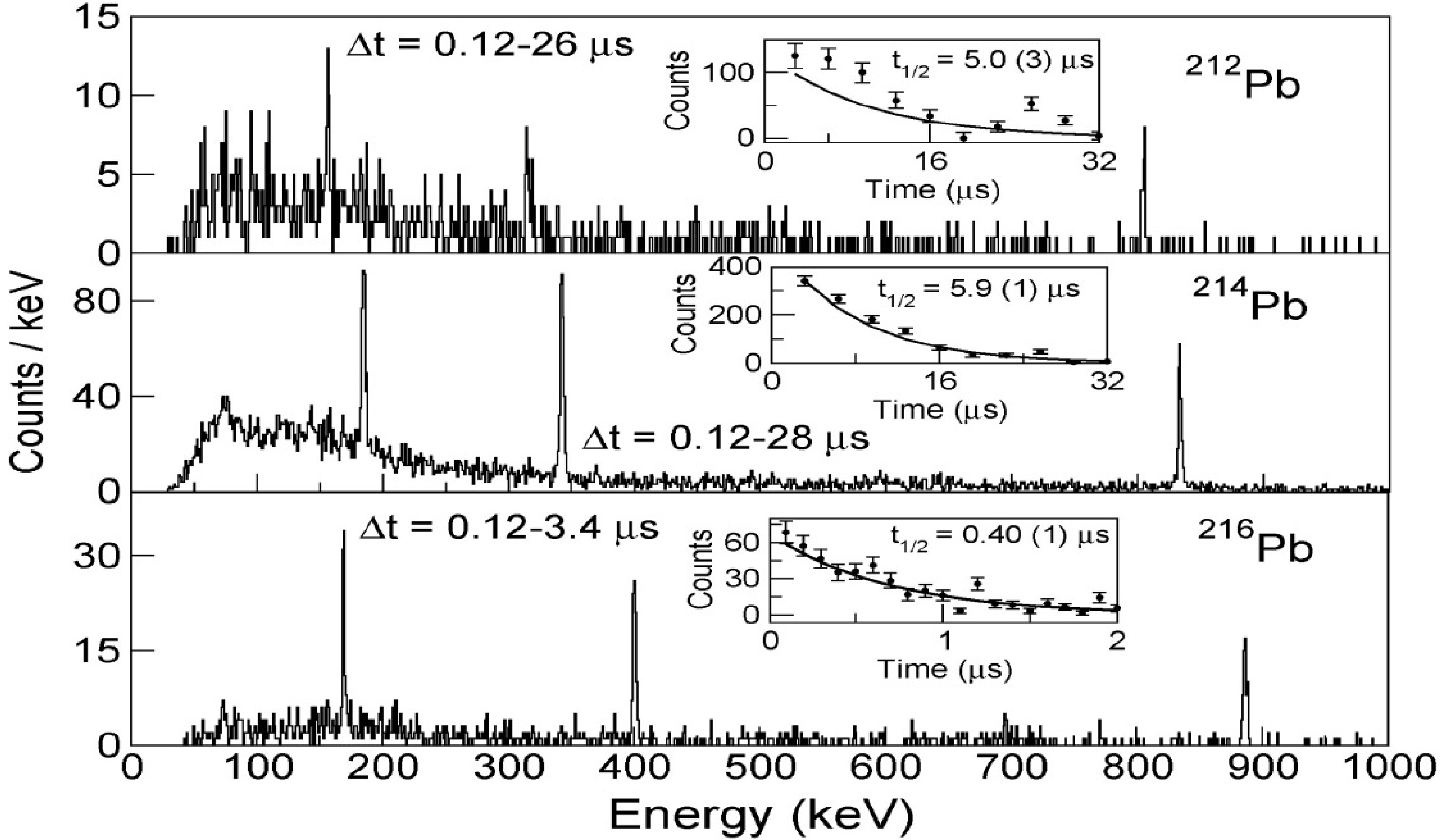
β-decay studies of neutron-rich Tl, Pb, a

A. I. Morales,[1,2,*] G. Benzoni,[1] A. Gottardo,[3,4] J. J. Valiente-Dobón,[3] N. Blasi,[1]
A. Corsi,[1,2] S. Leoni,[1,2] B. Million,[1] R. Nicolini,[1,2] O. Wieland,[1] A. Gadea,[5]
Zs. Podolyák,[8] M. Pfützner,[10] S. Pietri,[7] P. Boutachkov,[7] H. Weick,[7] J. Grebo
A. Algora,[5,14] N. Al-Dahan,[8] Y. Ayyad,[13] N. Alkhomashi,[8,15] P. R. P. Allegro,[1
M. Bunce,[8] E. Casarejos,[17] M. L. Cortes,[7] A. M. Denis Bacelar,[12] A. Y. Deo
M. Doncel,[18] Zs. Dombradi,[19] T. Engert,[7] K. Eppinger,[20] G. F. Farrelly,[8] F. F
N. Goel,[7] E. Gregor,[7] T. Habermann,[7] R. Hoischen,[7,21] R. Janik,[22] S. Klupp,
R. Menegazzo,[6] D. Mengoni,[6] D. R. Napoli,[3] F. Naqvi,[7,25] C. Nociforo,[7] A. F
R. V. Ribas,[16] M. W. Reed,[8] D. Rudolph,[21] E. Sahin,[3] H. Schaffner,[7] A. Sharma,
P. Strmen,[22] T. P. D. Swan,[8] I. Szarka,[22] C. A. Ur,[6] P. M. Walker,[8] and H.-J. Wollersheim[7]

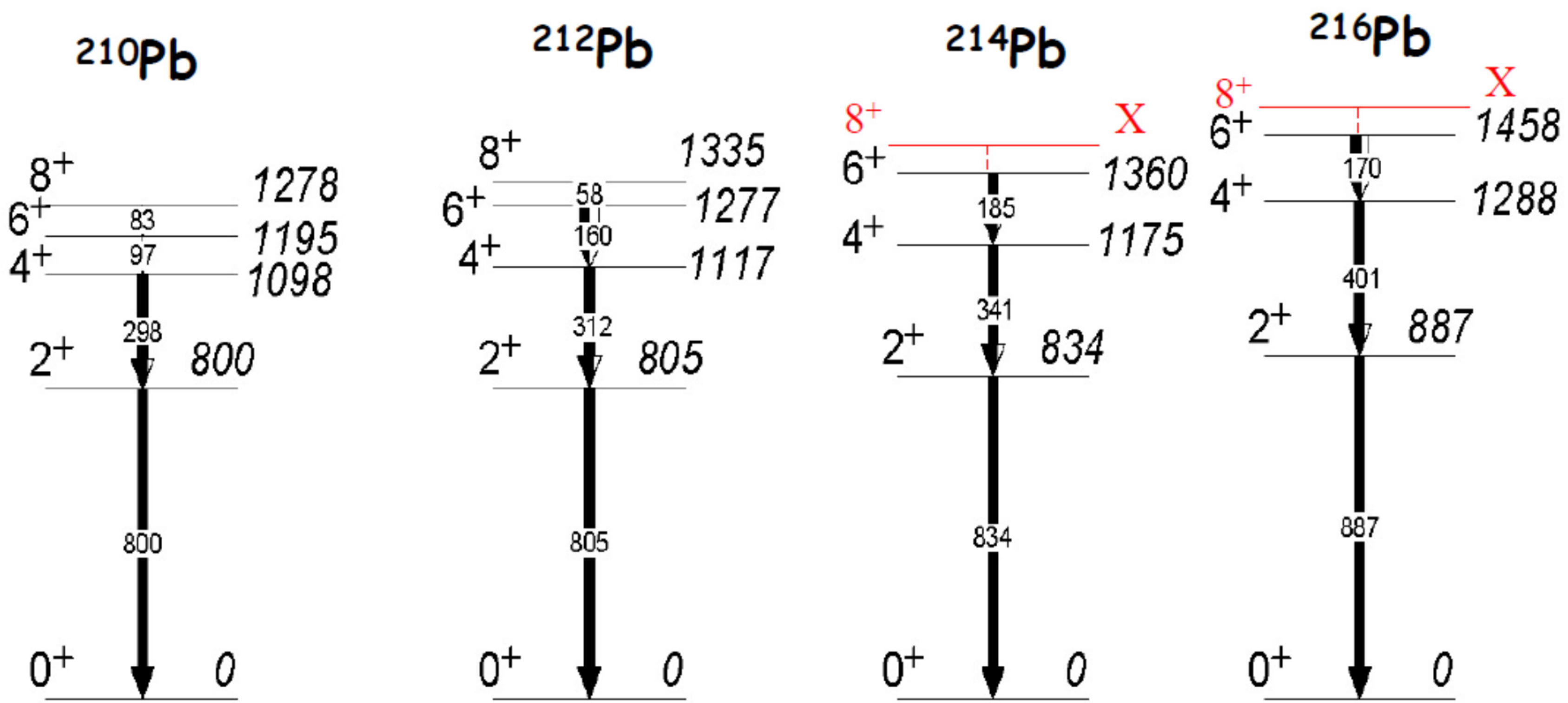
1.5 x 10^9 ^{238}U per spill

$^{212,214,216}Pb$: 8^+ isomers:

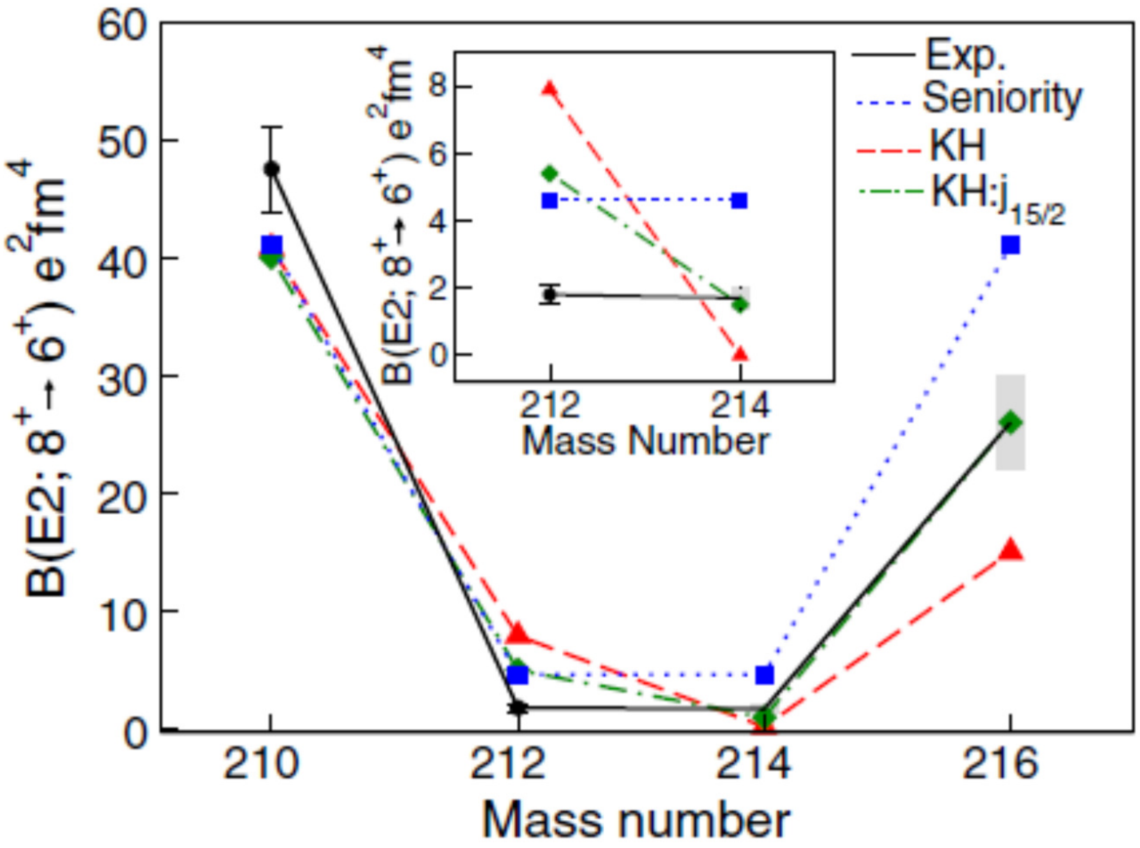
A. Gottardo, J.J. Valiente Dobon, G. Benzoni et al., PRL 109 (2012) 162502



Energy levels well described in seniority scheme



Electromagnetic transition strengths not so

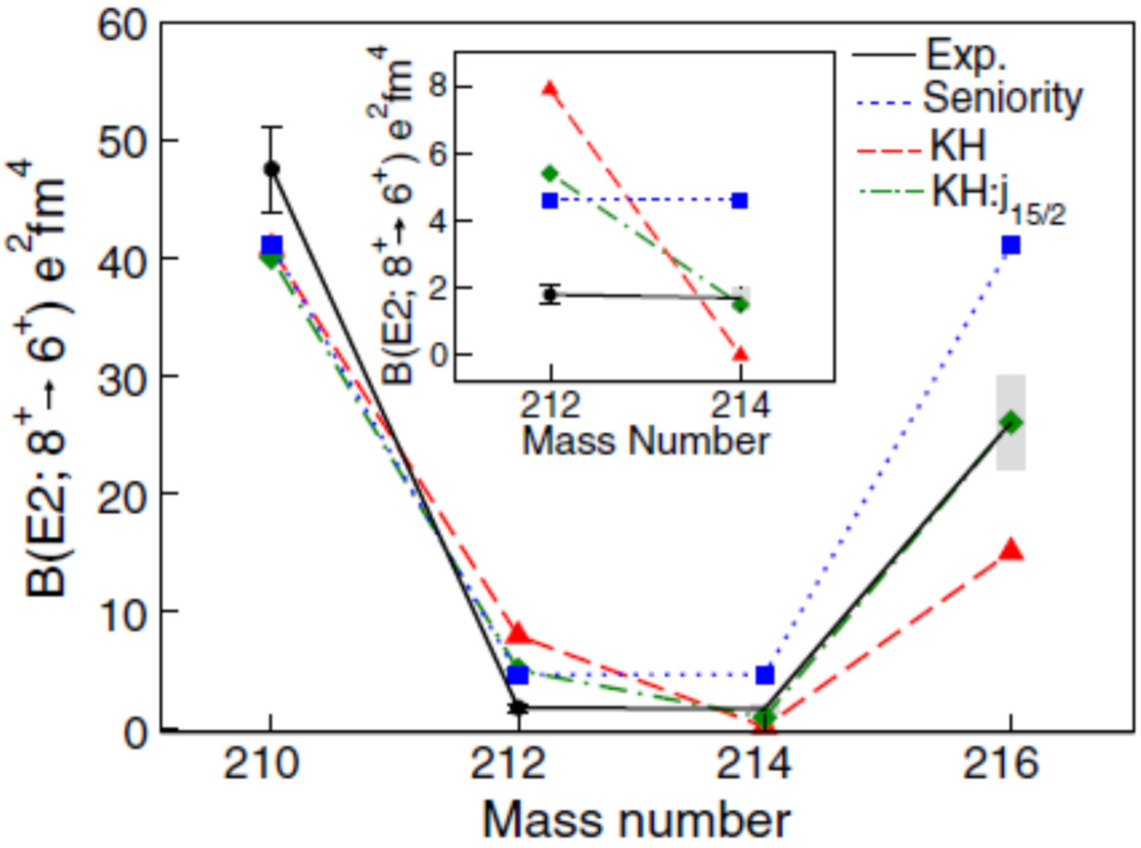


---------- Pure seniority scheme in $g_{9/2}$ shell

---------- Full diagonaisation in the n space with the KH interaction

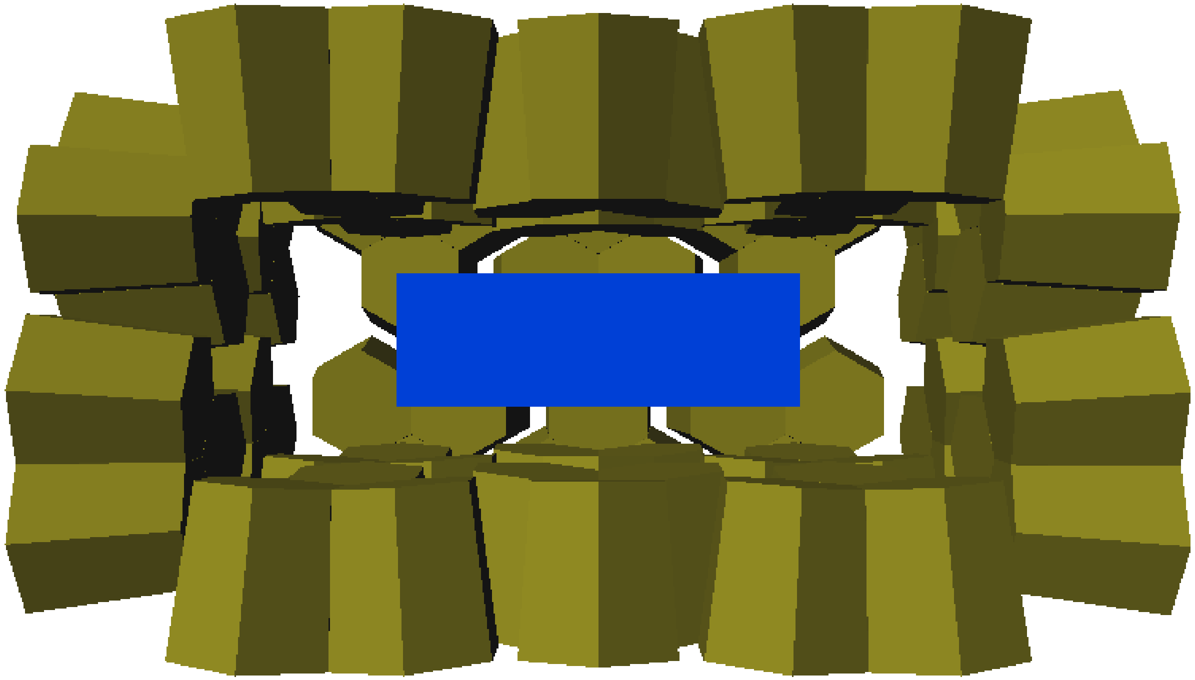
---------- As red but with $E(j_{15/2})$ increased by 1 MeV

Electromagnetic transition strengths not so



Need three-body interactions and two-body transition operators in the conventional neutron valence space

DEGAS: Next generation detector array



Phase 1
Phase 2

GEOMETRY	ε_p (%)	$\varepsilon_{p\gamma\gamma}$ (%)
RISING (benchmark)	16.2	2.2
26 Triple EB clusters (box)	21.2	4.1
20 Triple EB clusters (box) + 5 ATC	21.4	4.2

3) What will be the physics focus?

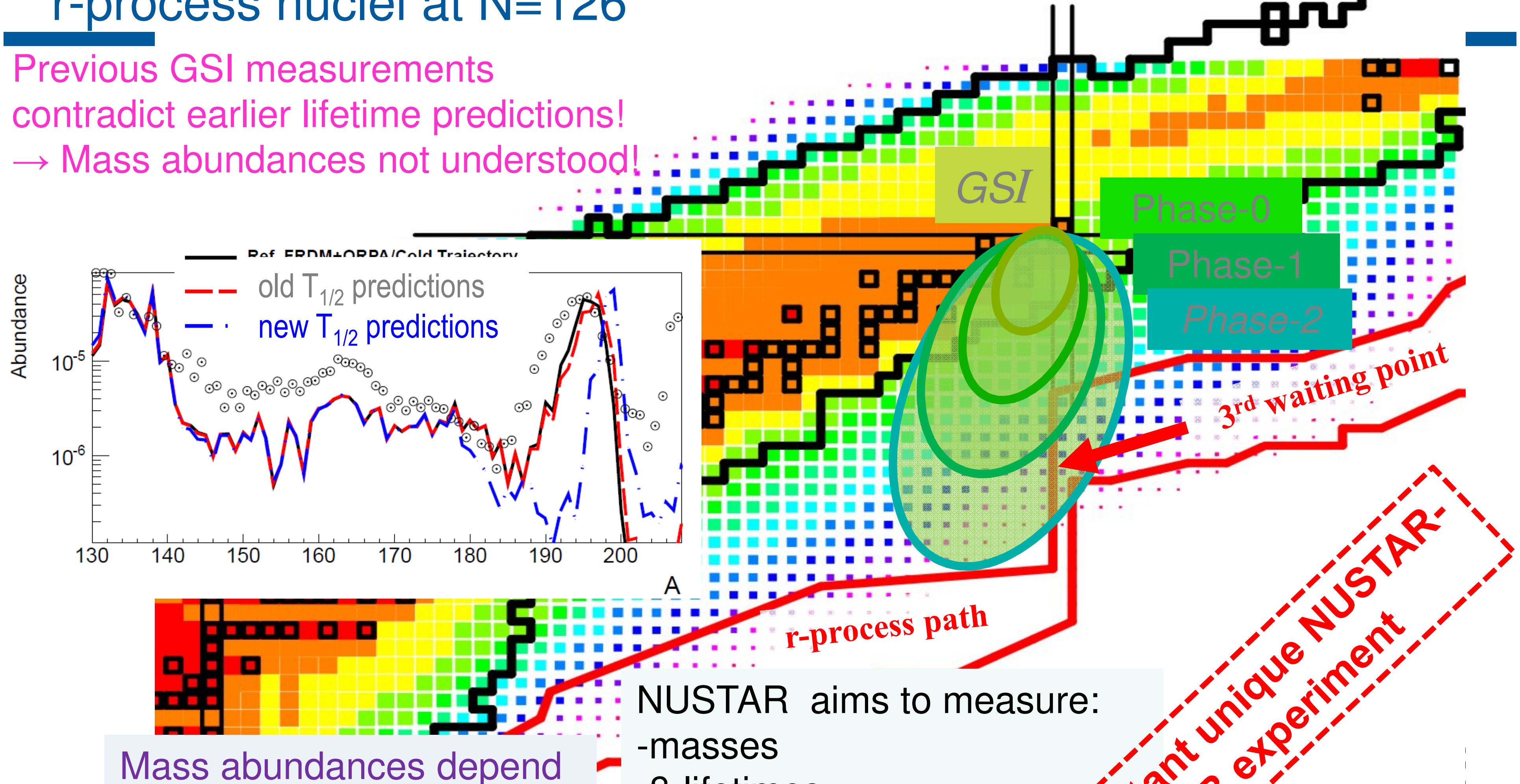
From J.Gerl's talk: In reply to the question from the review:
Highlights of the initial Phase – 1 programme

- Understanding the 3rd r-process peak by means of comprehensive measurements of masses, lifetimes, neutron branchings, dipole strength, and level structure along the N=126 isotones;

We will focus on this area using our varied set of equipment to build a complete picture

Phase 1 Physics with HISPEC/DESPEC:
r-process nuclei at N=126

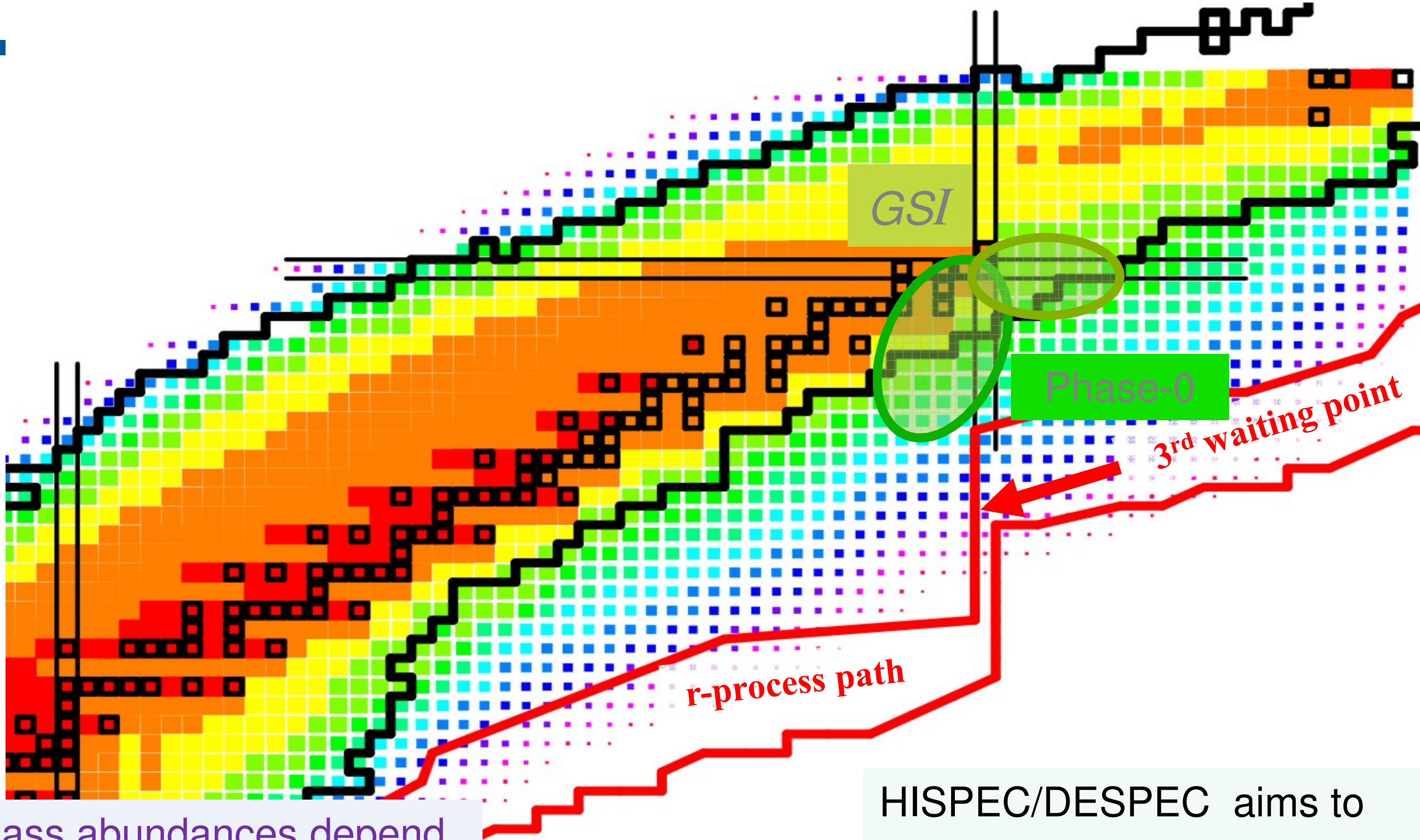
Previous GSI measurements
contradict earlier lifetime predictions!
→ Mass abundances not understood!



Mass abundances depend on the detailed structure of N=126 nuclei around the 3rd r-process waiting point

NUSTAR aims to measure:
- masses
- β-lifetimes
- neutron-branchings
- strength distributions
- level structure

Phase 0

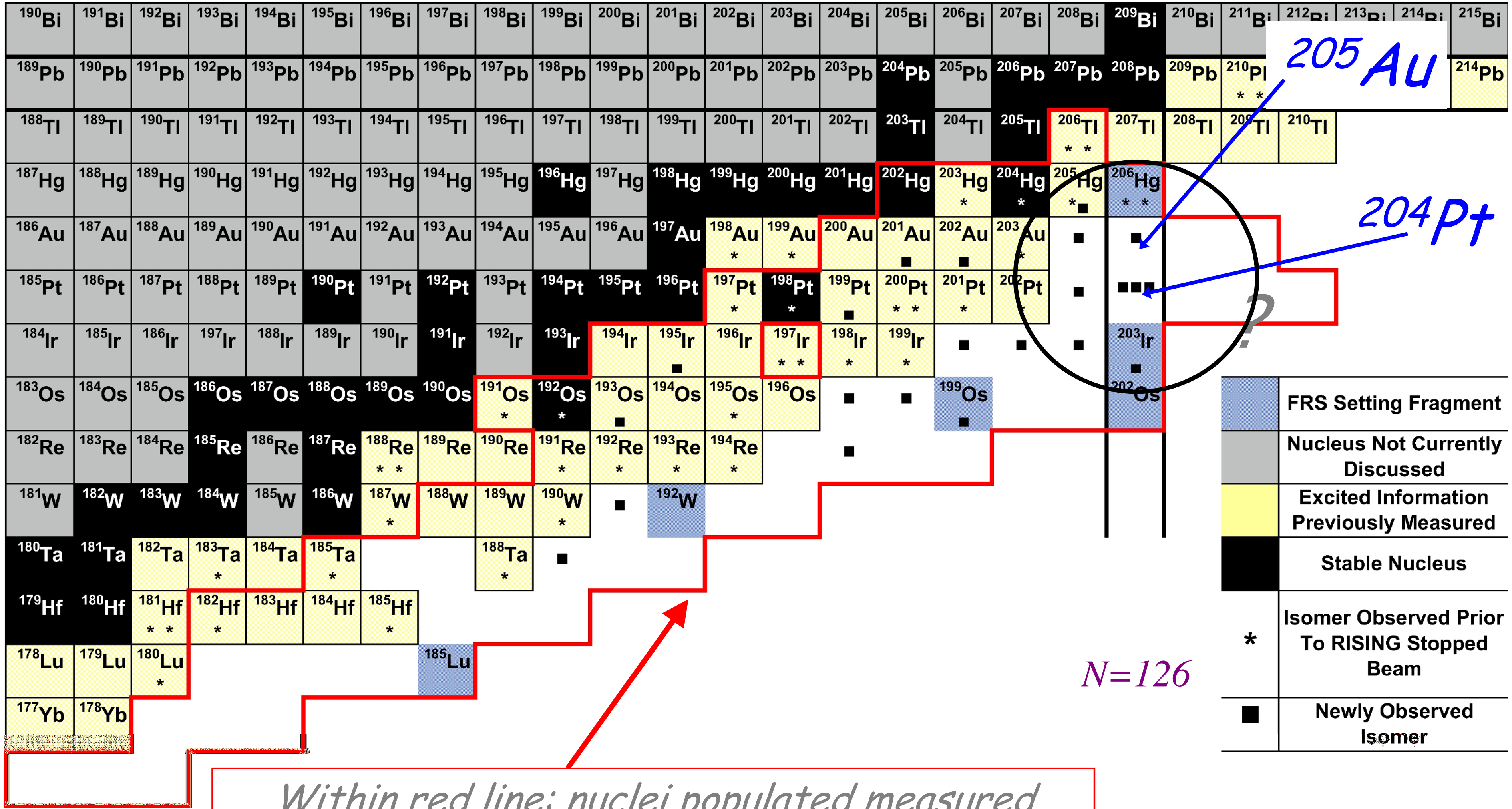


Mass abundances depend on the detailed structure of N=126 nuclei around the 3rd r-process waiting point

HISPEC/DESPEC aims to measure:
--β-lifetimes
-neutron-branchings
-strength distributions
-level structure

Previous work (part of the RISING campaign)

S.J. Steer et al., PRC **84** (2011) 044313



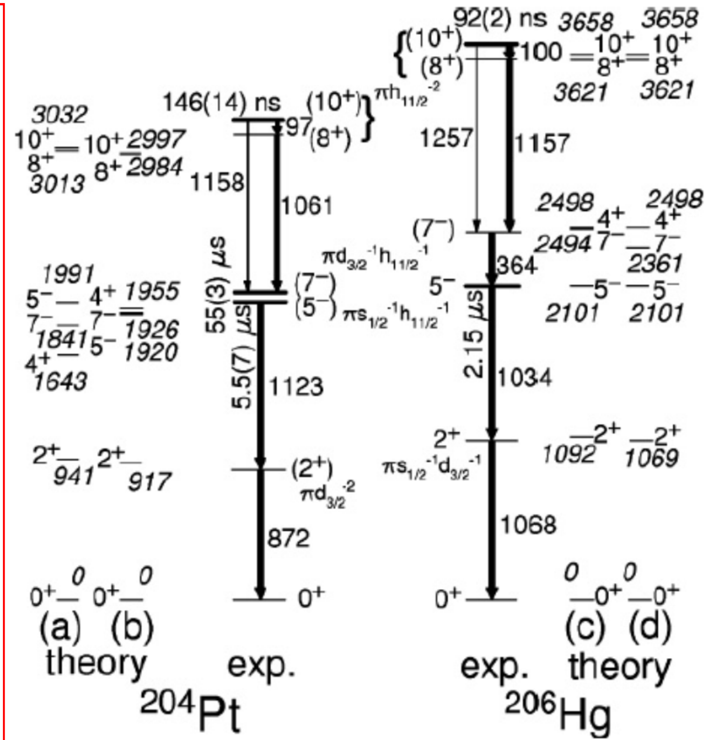
Within red line: nuclei populated measured using FRS + RISING with 1 GeV/u ^{208}Pb beam.

PHYSICAL REVIEW C **80**, 064608 (2009)

Population of low-seniority isomeric states of ^{206}Hg by two-proton knockout reactions at relativistic energies

E. C. Simpson, J. A. Tostevin, Zs. Podolyák, P. H. Regan, and S. J. Steer
Department of Physics, Faculty of Engineering and Physical Sciences, University of Surrey, Guildford, Surrey GU2 7XH, United Kingdom
(Received 5 October 2009; published 8 December 2009)

	State I^{π}	Isomeric ratio (%)
Experiment	5^-	$21.9^{+1.2}_{-2.9}$
	$(10^+)^a$	$3.1^{+1.0}_{-1.2}$
	$(10^+)^b$	$2.2^{+0.7}_{-0.8}$
Theory	5^- (direct only)	4.8
	5^- (includes 7^-, 8^+, and 10^+)	18.8
	10^+	4.7
	5^-	32.5 [14]



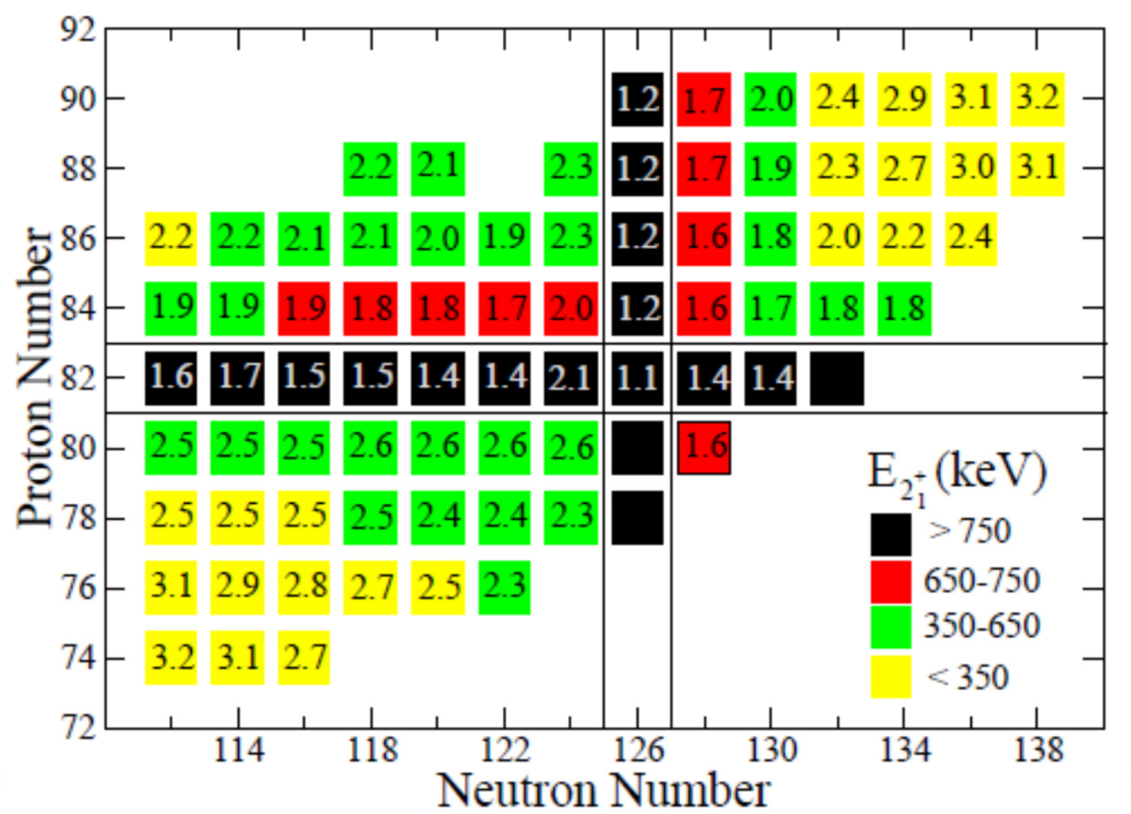
Isomeric ratios also used to improve/test knockout reaction theory…
isomeric states tend to be rather ‘pure’ shell model configurations.

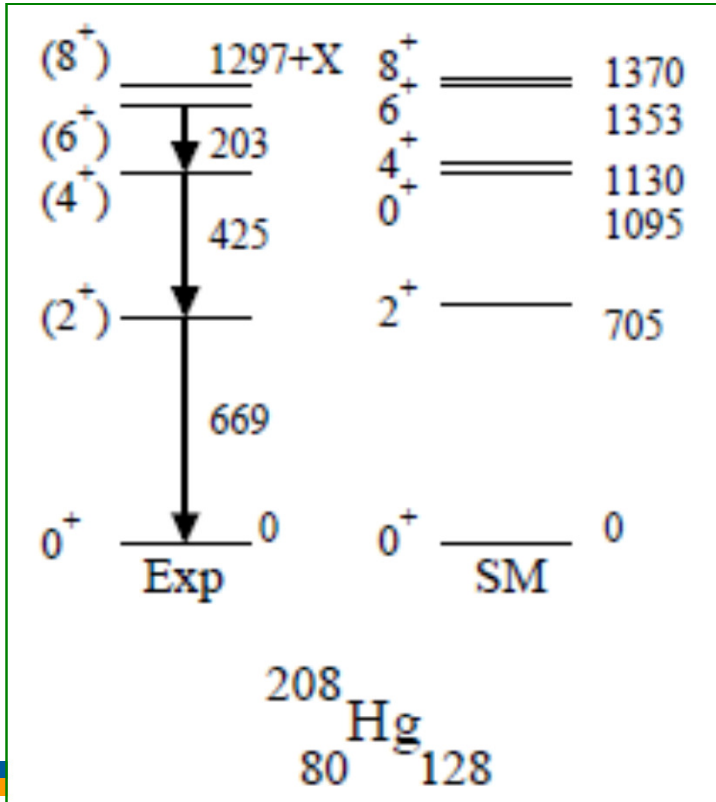
RAPID COMMUNICATIONS

PHYSICAL REVIEW C **80**, 061302(R) (2009)

Nuclear structure "southeast" of ^{208}Pb: Isomeric states in ^{208}Hg and ^{209}Tl

N. Al-Dahan,[1,2] Zs. Podolyák,[1,*] P. H. Regan,[1] M. Górska,[3] H. Grawe,[3] K. H. Maier,[4] J. Gerl,[3] S. B. Pietri,[3] H. J. Wollersheim,[3] N. Alkhomashi,[1] A. Y. Deo,[1] A. M. Denis Bacelar,[5] G. Farrelly,[1] S. J. Steer,[1] A. M. Bruce,[5] P. Boutachkov,[3] C. Domingo-Pardo,[3] A. Algora,[6,7] J. Benlliure,[8] A. Bracco,[9] E. Calore,[10] E. Casarejos,[8] I. J. Cullen,[1] P. Detistov,[11] Zs. Dombrádi,[7] M. Doncel,[12] F. Farinon,[3] W. Gelletly,[1] H. Geissel,[3] N. Goel,[3] J. Grebosz,[4] R. Hoischen,[3,13] I. Kojouharov,[3] N. Kurz,[3] S. Lalkovski,[5] S. Leoni,[14] F. Molina,[6] D. Montanari,[9] A. I. Morales,[8] A. Musumarra,[3,15] D. R. Napoli,[10] R. Nicolini,[9] C. Nociforo,[3] A. Prochazka,[3] W. Prokopowicz,[3] B. Rubio,[6] D. Rudolph,[3,13] H. Schaffner,[3] P. Strmen,[16] I. Szarka,[16] T. Swan,[1] J. S. Thomas,[1] J. J. Valiente-Dobón,[10] S. Verma,[8] P. M. Walker,[1] and H. Weick[3]





ELSEVIER

Physics Letters B

Volume 725, Issues 4–5, 1 October 2013, Pages 292–296

New μs isomers in the neutron-rich ^{210}Hg nucleus

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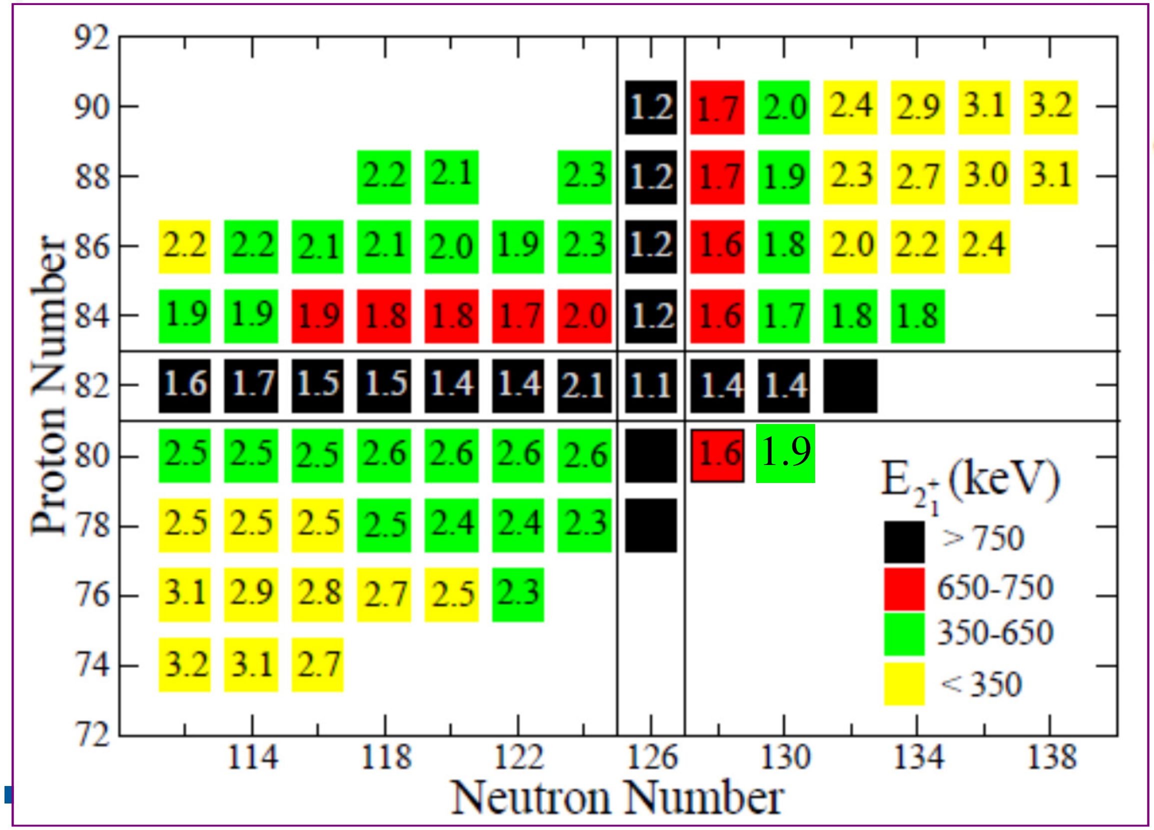
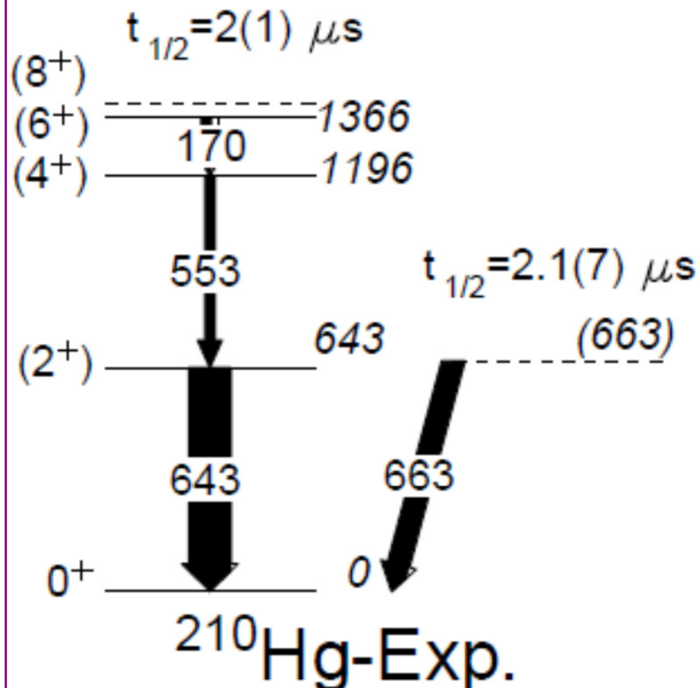
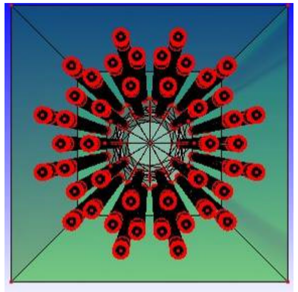
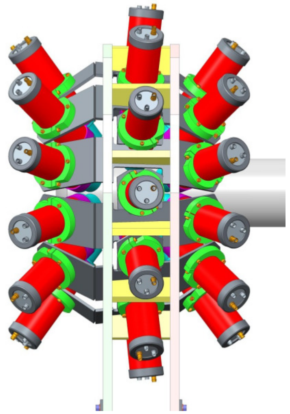




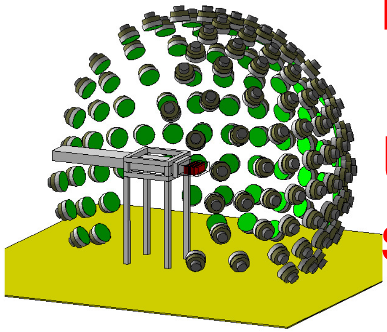
To gain a deeper understanding:



Use BELEN to measure beta-delayed neutron emission

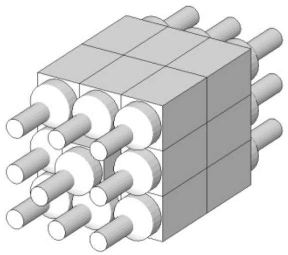


Use FATIMA to measure level lifetimes in the nanosecond regime



Use MONSTER to carry out neutron spectroscopy

Use DTAS to measure beta decay strengths



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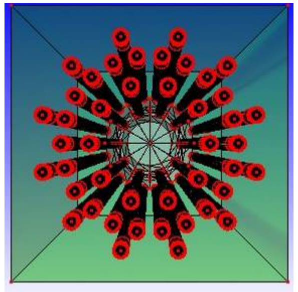
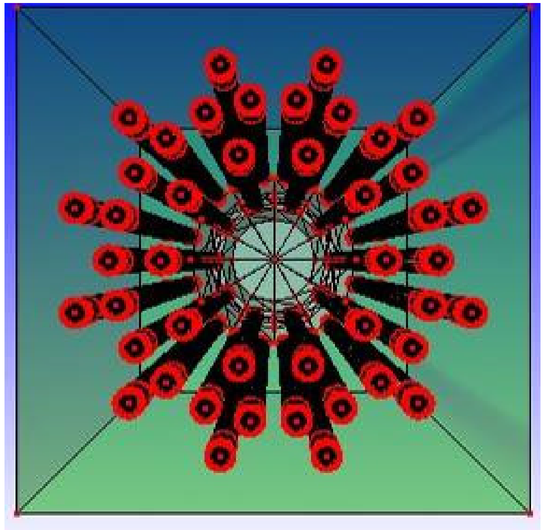


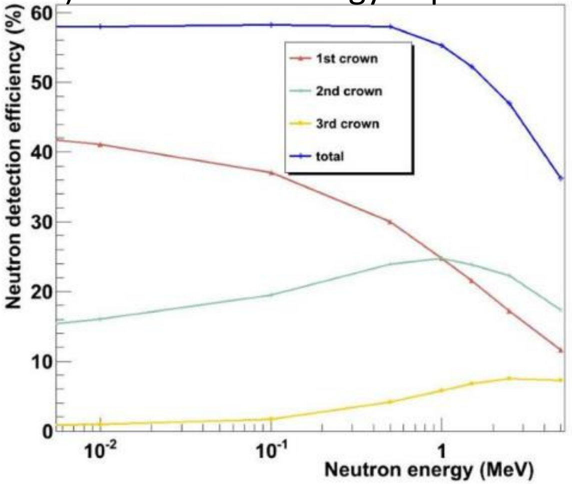
Use BELEN to measure beta-delayed neutron emission

Beta dELayEd Neutron detector

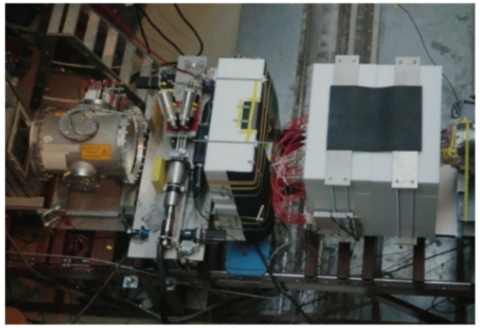
^{3}He counters arranged in 3 crowns around the beam hole.



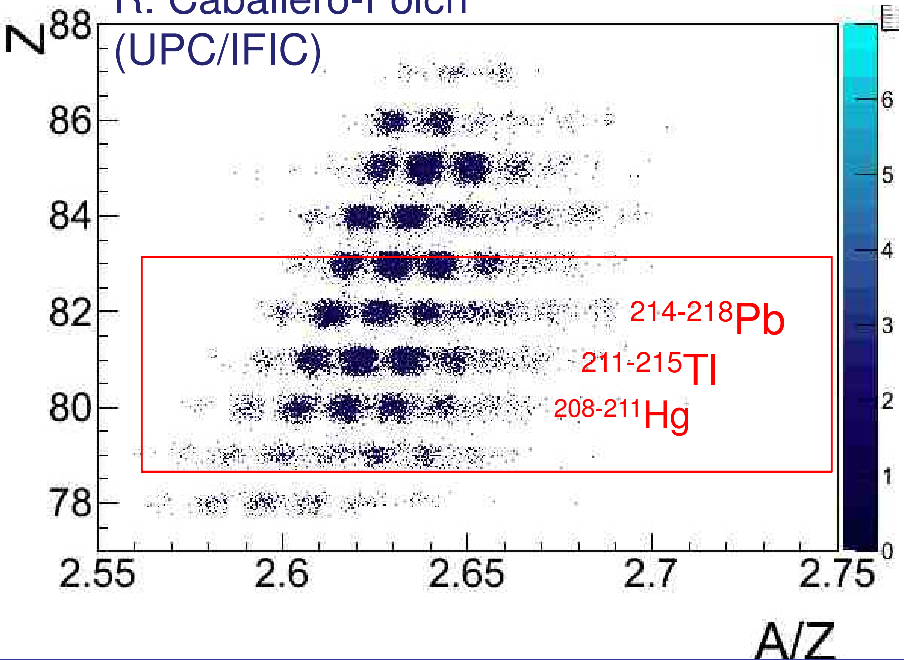
The detector has very high and flat efficiency (~60%) to minimise energy dependence



- 2 Experiments at the **Fragmentation-Facility:** GSI-FRS
  - 2011
  - BELEN + SIMBA
  - S323: Pn values around N=82
  - S410: Pn values around N=126



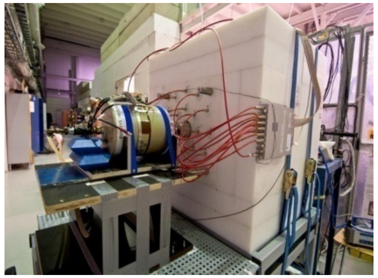
PhD Thesis:
R. Caballero-Folch
(UPC/IFIC)



The primary objective of BELEN at NUSTAR

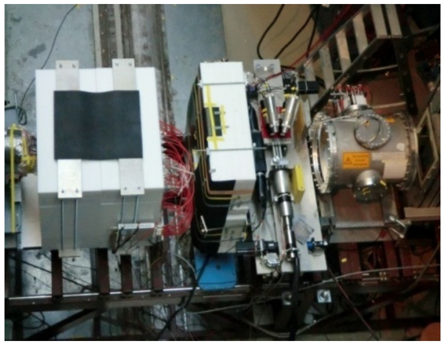
BELEN20	BELEN30	BELEN48	BRIKEN-174	BELEN48
JYFL	GSI	JYFL	RIKEN	
2009-2010	2011	2014	2015-2016	2017 + 2018-2019

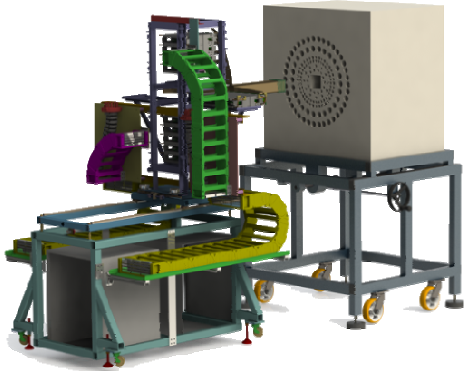
Preparatory Phase towards FAIR NUSTAR → **PHASE 0 + PHASE 1**



βn's Fission Fragments

βn's beyond N=126, Pb-region
βn's around N=82, Pd-region

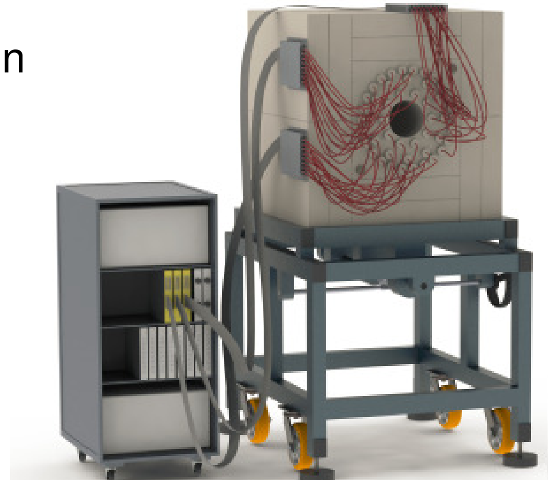




βn's around N=50, ^{78}Ni-region
βn's around N=82, ^{132}Sn-region

FAIR-Unique Case

Objective: first r-process WPs along N=126: from ^{202}Os down to ^{192}Dy, and from there down to the stability valley.



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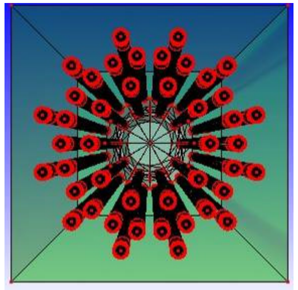
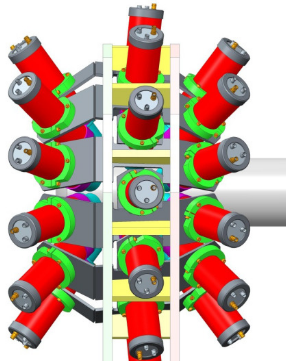
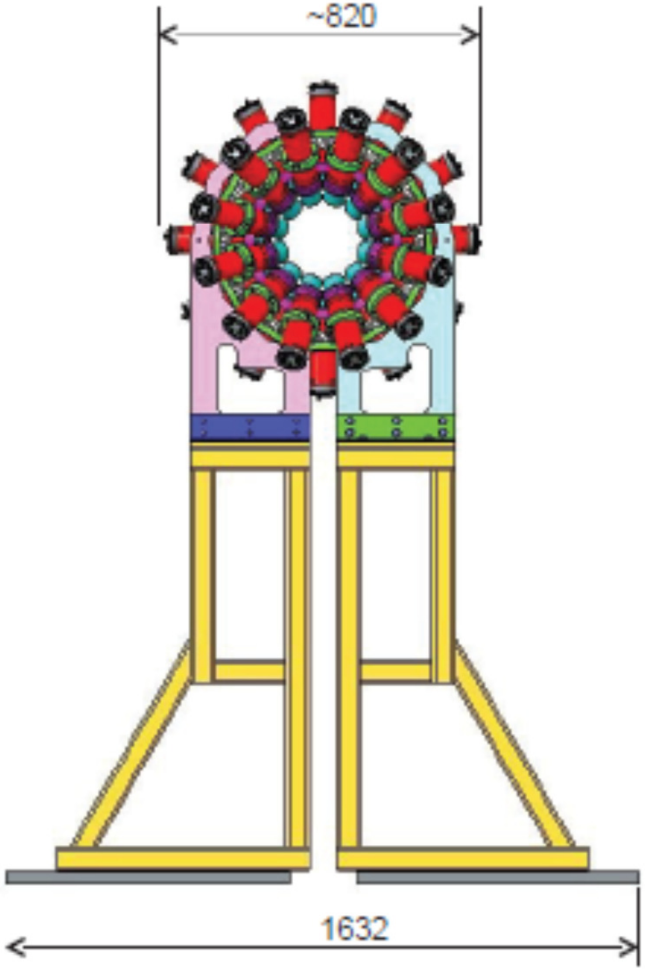


Use BELEN to measure beta-delayed neutron emission

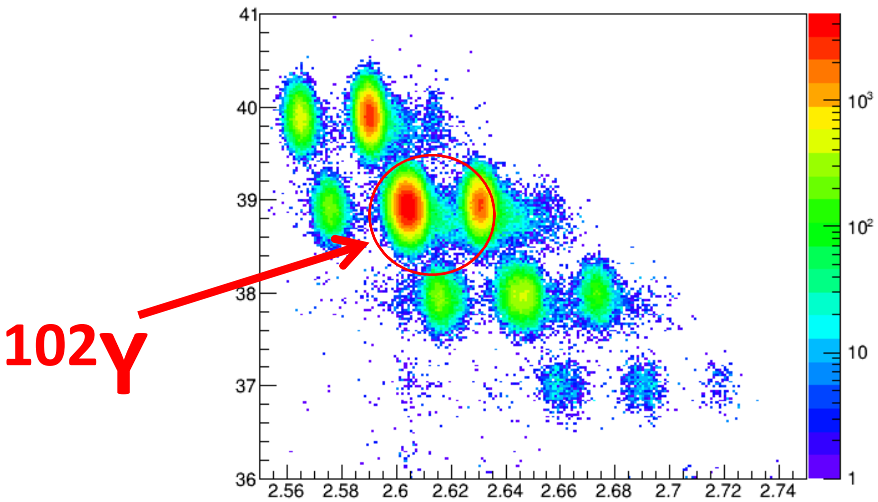
Use FATIMA to measure level lifetimes in the nanosecond regime



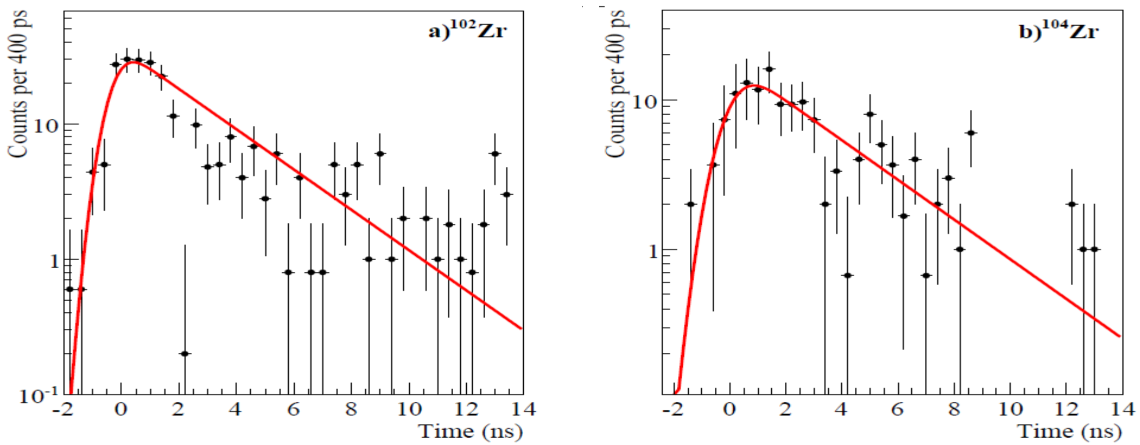
Fast-timing array



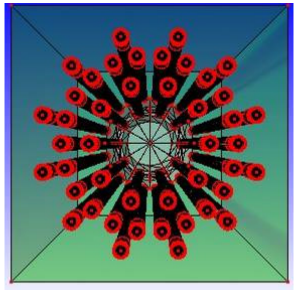
PID plot for ^{102}Y setting, 5 x 10^5 ^{102}Y implants in 2.5 hours



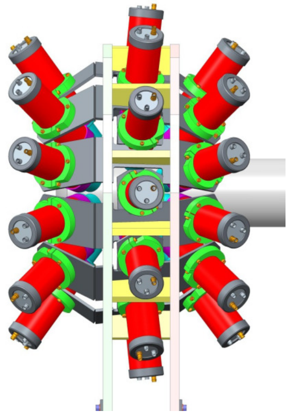
Measured $t_{1/2}$ = 2.0 (2) and 2.0 (3) ns, in agreement with literature values



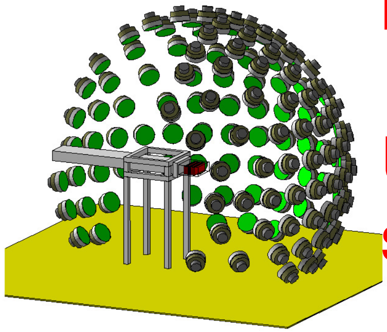
To gain a deeper understanding:



Use BELEN to measure beta-delayed neutron emission



Use FATIMA to measure level lifetimes in the nanosecond regime

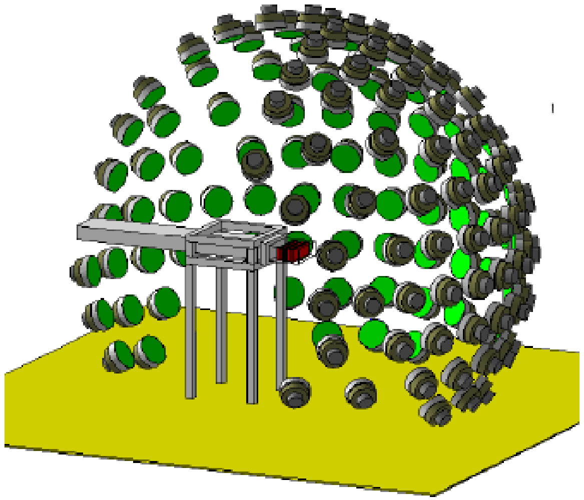


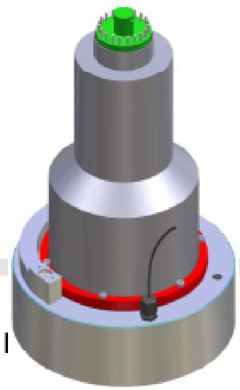
Use MONSTER to carry out neutron spectroscopy

The Modular Neutron SpectrometER (MONSTER)

The largest possible geometric effiency: 150 – 200 detectors (Consider the combined use with the Ge detectors)
A reasonable intrinsic efficiency (i.e. detector thickness)
Reasonable energy resolution < 10% up to 5 MeV:
Good neutron timing ~1ns
Good β timing: <1ns
Resonable flight path 2-3 m TOF
Energy threshold ~ 100 keV E_n (10 keV_{ee})

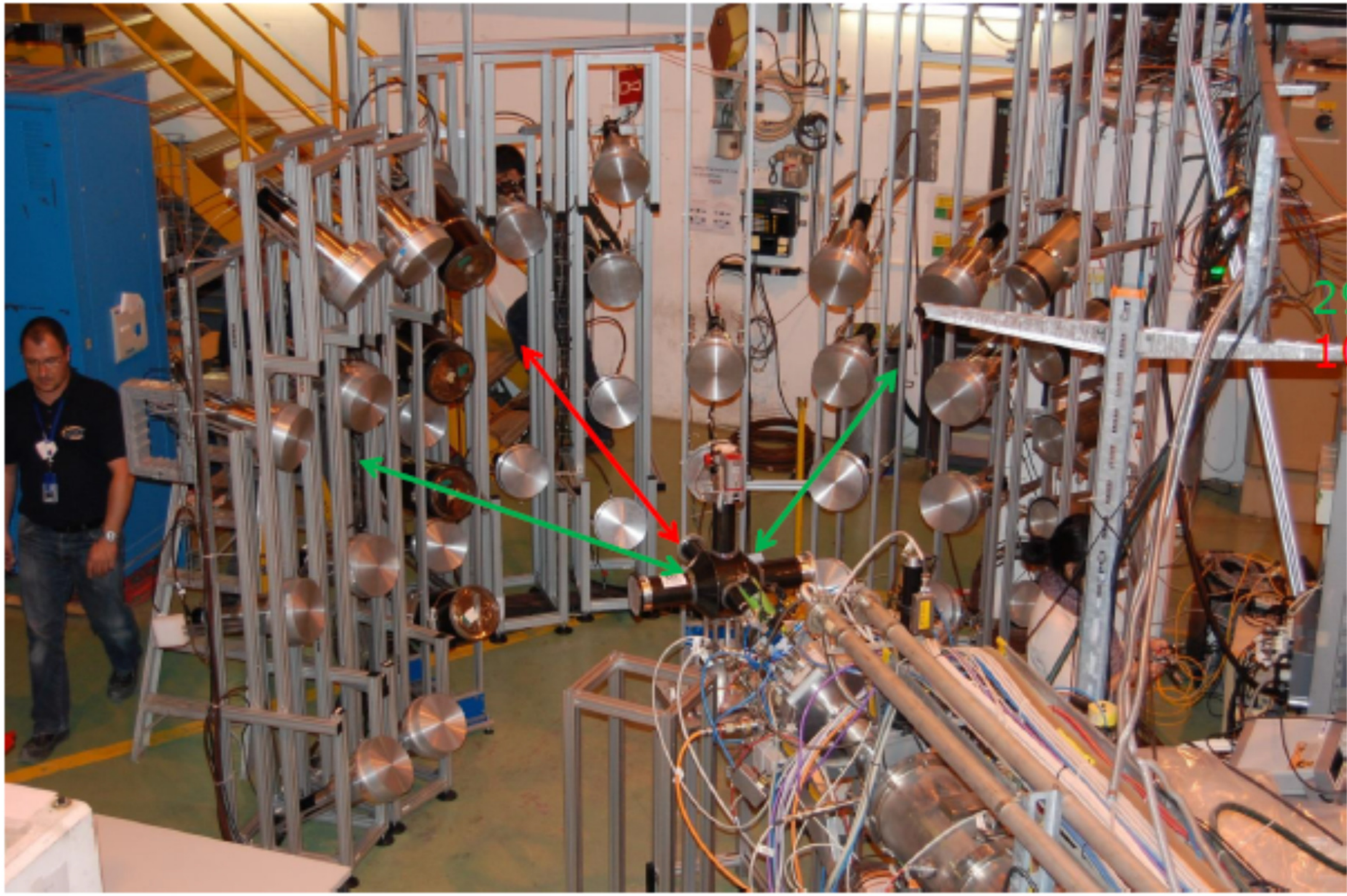
200 detectors, 10cm radius		ΔE/E @ 1 MeV	
TOF distance (m)	Geometric efficiency	1ns	5ns
2	**12.5%**	**4.6%**	**16.4%**
2.5	8.0%	3.7%	13.2%
3	**5.6%**	**3.1%**	**11%**
3.5	4.1%	2.7%	9.4%
4	3.1%	2.3%	8.2%
4.5	2.5%	2.1%	7.3%
5	2.0%	1.9%	6.6%





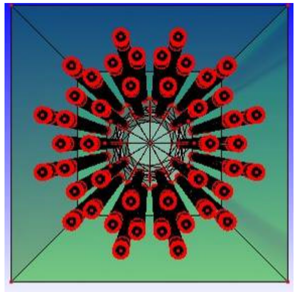
Ø=20cm
L=5cm

IS525 @ ISOLDE

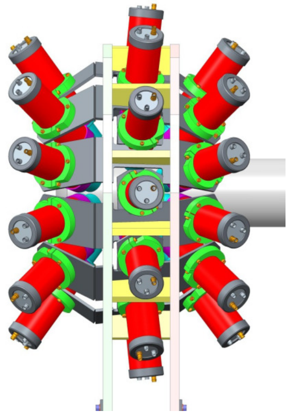


29 @ 1.5
10 @ 2.5

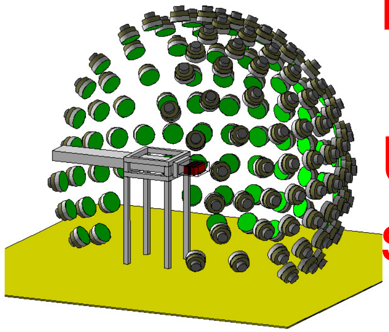
To gain a deeper understanding:



Use BELEN to measure beta-delayed neutron emission

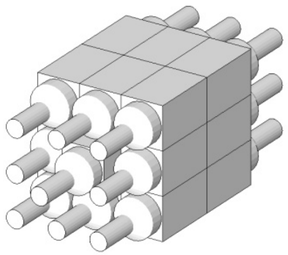


Use FATIMA to measure level lifetimes in the nanosecond regime

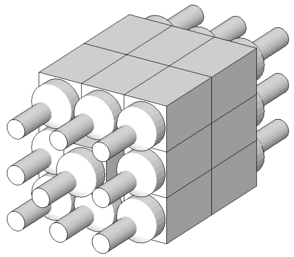


Use MONSTER to carry out neutron spectroscopy

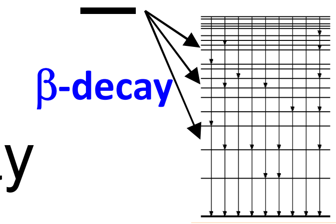
Use DTAS to measure beta decay strengths

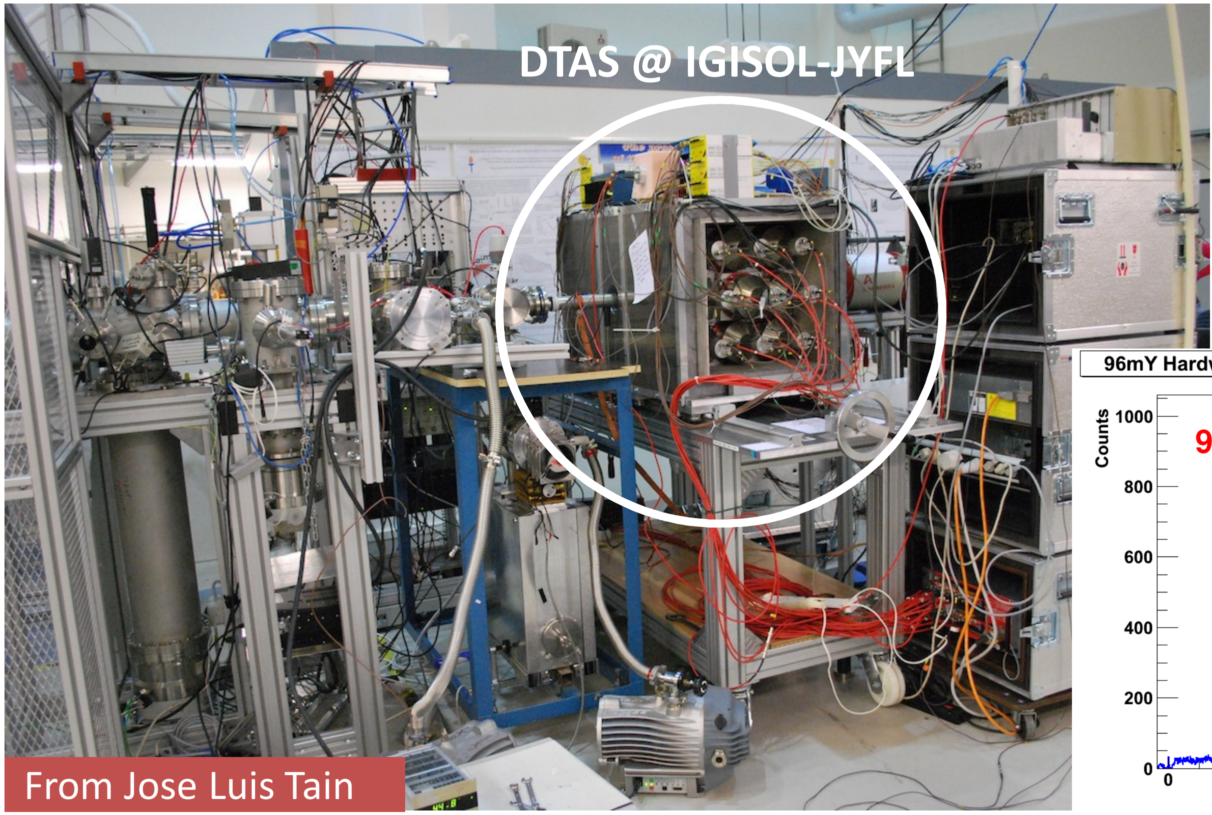


Decay Total Absorption Spectrometer (DTAS)

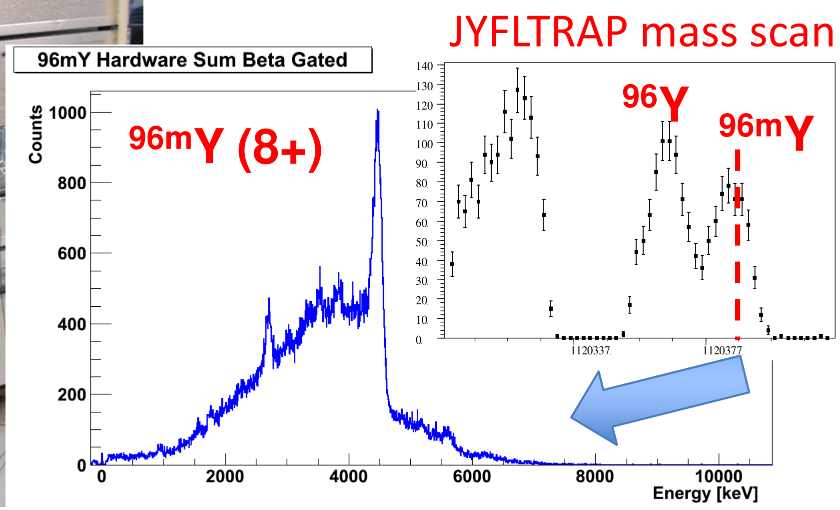


- Accurate measurement of β-strength distributions
- TDR approved (01/2013)
- Commissioning at IFIC (01/2014)
- First experiment at JYFL (02/2014)
- Experimental proposal at RIKEN on 100Sn decay

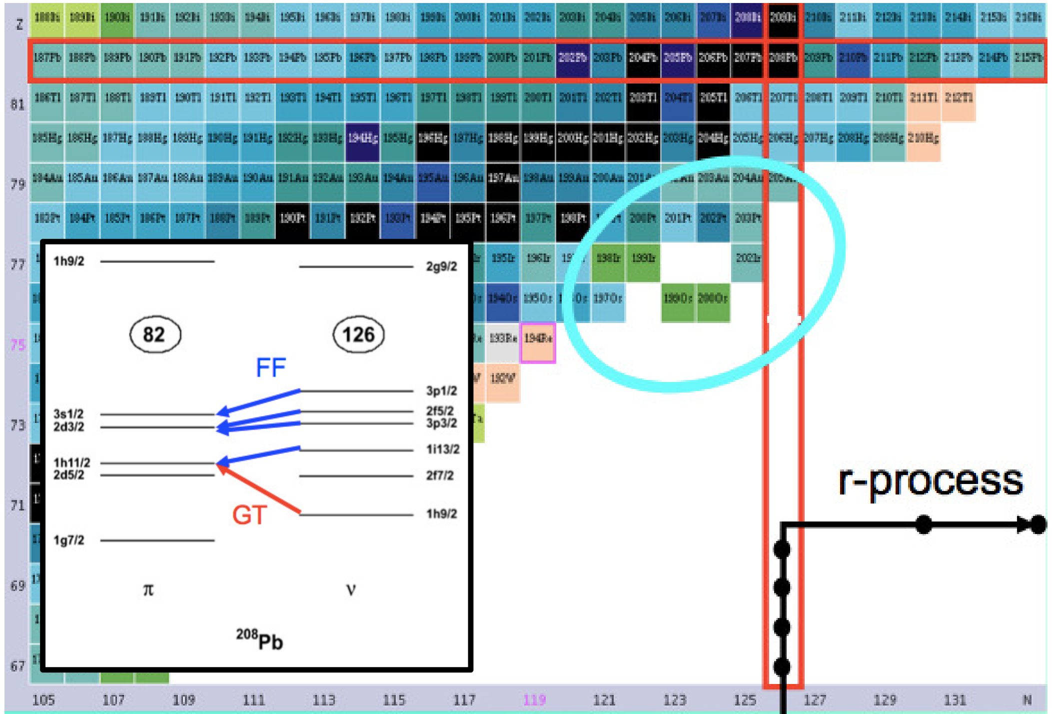


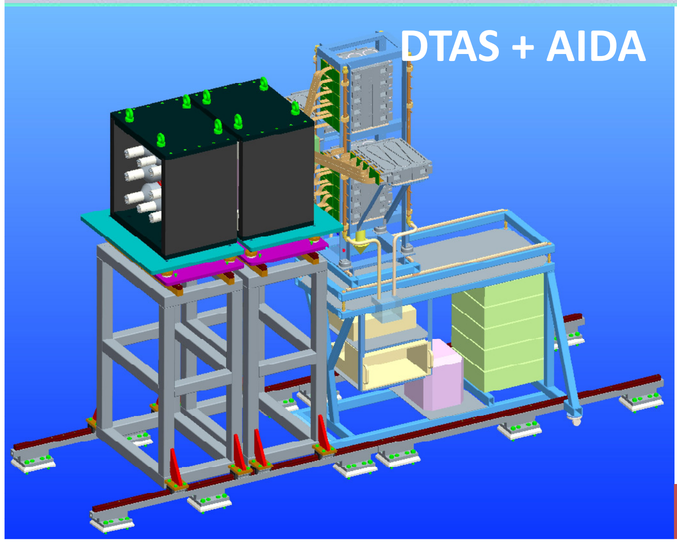


- Nuclear structure, decay heat and antineutrino spectra of fission products



DTAS Phase-0 Experiment: β-strength measurements in the tail of the 3rd r-process peak (Brighton Meeting, 2011)

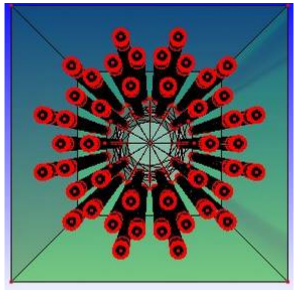




From Jose Luis Tain

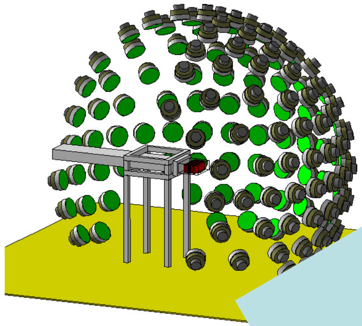
- Synthesis of heavy elements
- Role of first-forbidden transitions
- T1/2: discrepancy theory-experiment
- Os, Au, Ir, Pt isotopes: N<126, Z<82
- Region unique to FAIR-FRS
- Complementary to BELEN β-delayed neutron experiments: N>126
- RISING high resolution γ-ray measurements (Morales, Benlliure): enough statistics achievable

To gain a deeper understanding:



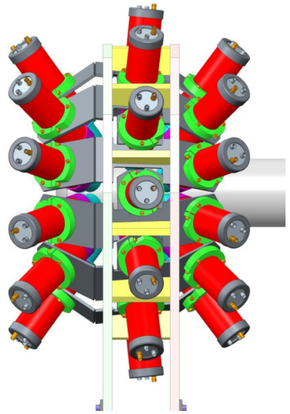
Use BELEN to measure beta-delayed neutron emission

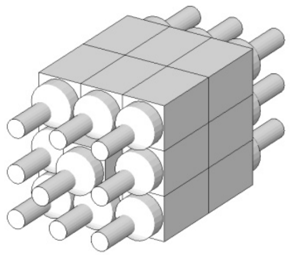
Use FATIMA to m... lifetimes in the nanose...



Use ... to carry out neutron ...py

...e DTAS to measure beta decay strengths

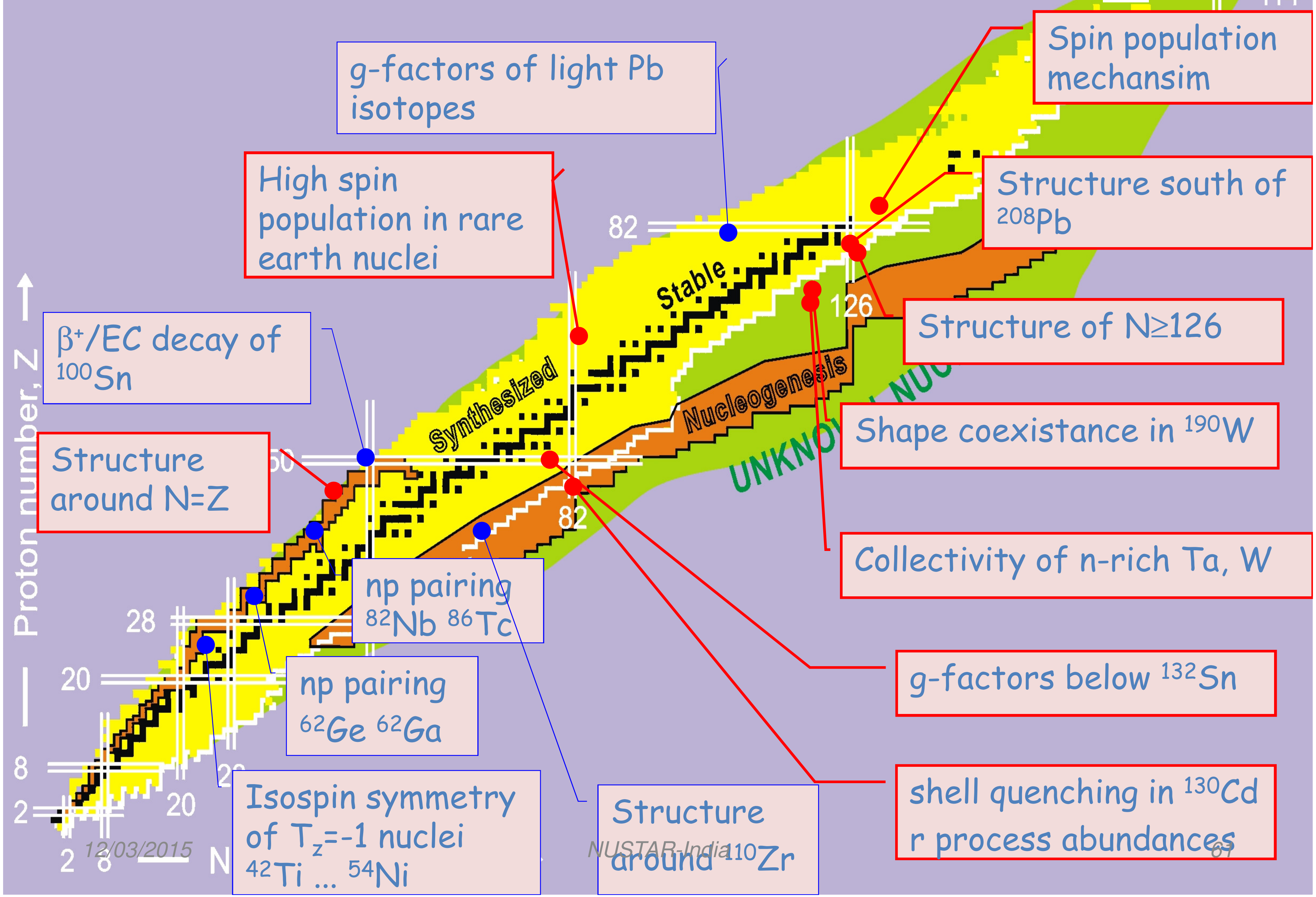




3 out of 4 TDR's approved

Commissioned and ready for phase 0

RISING: Stopped beam - physics focus



The lead region is only one of many….

Home Page

Presentations
Programme (PDF)

Registration

Registered Participants

Accommodation Information

First Announcement (PDF)

Contact
Alison Bruce
Paddy Regan

University of Brighton

UNIVERSITY OF SURREY

Science & Technology Facilities Council

W3C XHTML 1.0 W3C CSS

Decay Physics Workshop
12th - 13th January 2011
University of Brighton

Talks from the Workshop

This version of the programme contains links to the presentations from the meeting, in PDF format.
There are also links to the original PowerPoint files where they exist.
These files are either in PowerPoint 97-2003 format (PPT) or Open XML format from PowerPoint 2007 or newer (PPTX).

The original programme can be downloaded here (PDF).

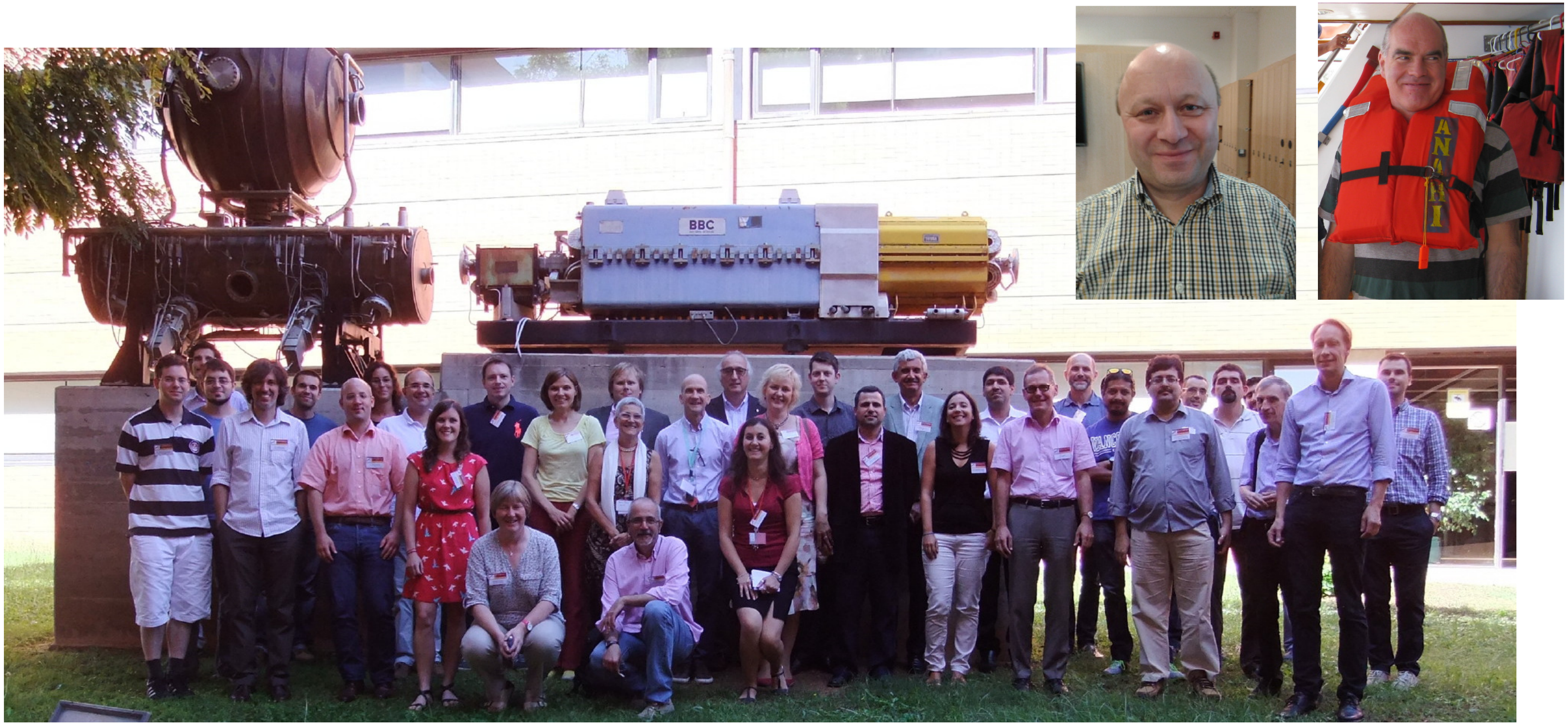
	Wednesday 12th January		
10:00	Alison	Bruce	Introduction, welcome and housekeeping
10:10	Jim	Al-Khalili	A model of one-proton emission from deformed nuclei (PPT)
10:25	Bertram	Blank	Decay of 73Sr to study unbound 73Rb in the framework of the rp process
10:40	Robert	Page	Proton emission from deformed rare earth nuclei (PPT)
10:55	Paul	Sapple	Proton emission from deformed rare earth nuclei: A possible AIDA physics campaign (PPT)
11:10	Andrey	Blazhev	Isomeric states in 98Cd and 98Ag (PPTX)
11:35	Dirk	Rudolph	Isomers and isospin symmetry aspects in the f7/2 shell
11:50	David	O'Donnell	High-spin states feeding seniority isomers in heaviest N=82 isotones (PPTX)
12:05	Adam	Garnsworthy	Present and Future Decay Spectroscopy at TRIUMF-ISAC
12:25	**Lunch**		
13:30	Zhong	Liu	Search for proton radioactivity in the trans-lead and sub-tin regions (PPT)
13:45	Rayner	Rodriguez-Guzman	Signatures of nuclear shape transitions with a microscopic perspective
14:00	Phil	Walker	Isomers and shape transitions in the n-rich A~190 region (PPT)
14:15	Andrea	Gottardo	New isomers in neutron-rich lead region (PPT)
			Discovery of highly excited long-lived isomers in neutron-rich hafnium and tantalum isotopes through direct mass measurements (PPT)

http://npg.dl.ac.uk/PRESPEC-11/Talks.html

Summary

- We will have a stopped-beam campaign using the AIDA detector as the stopper.
- Experiments will build on our existing expertise and focus on our regions of interest
- Using a variety of FAIR detectors at the FRS will require the operation of the full NuSTAR DAQ.

On behalf of the HISPEC/DESPEC collaboration



Valencia, September 2014