Coordination plan for IDATEN pre-proposals

IDATEN Steering Board (ISB)

IDATEN Steering Board (IDS)

■ Members

Alison Bruce (University of Brighton)
Adam Garnsworthy (TRIUMF)
Magda Gorska (GSI)
Byungsik Hong (CENuM, Korea University)
Eiji Ideguchi (RCNP, Osaka University)

■ Spokespersons

Byul Moon (CENS, IBS)
Paddy Regan (University of Surrey)
Hiroshi Watanabe (Beihang University)

■ In-house contact person

Shunji Nishimura (RIKEN)

■ Ex-officio

Hiroyoshi Sakurai (RIKEN)

Guideline

Case 1: No overlap and the proposed experiment is feasible

- ISB recommends to submit a real proposal to NP-PAC.

Case 2: Feasibility is questioned

- ISB suggests to change the experimental conditions or to consider conducting the experiment at other facilities.

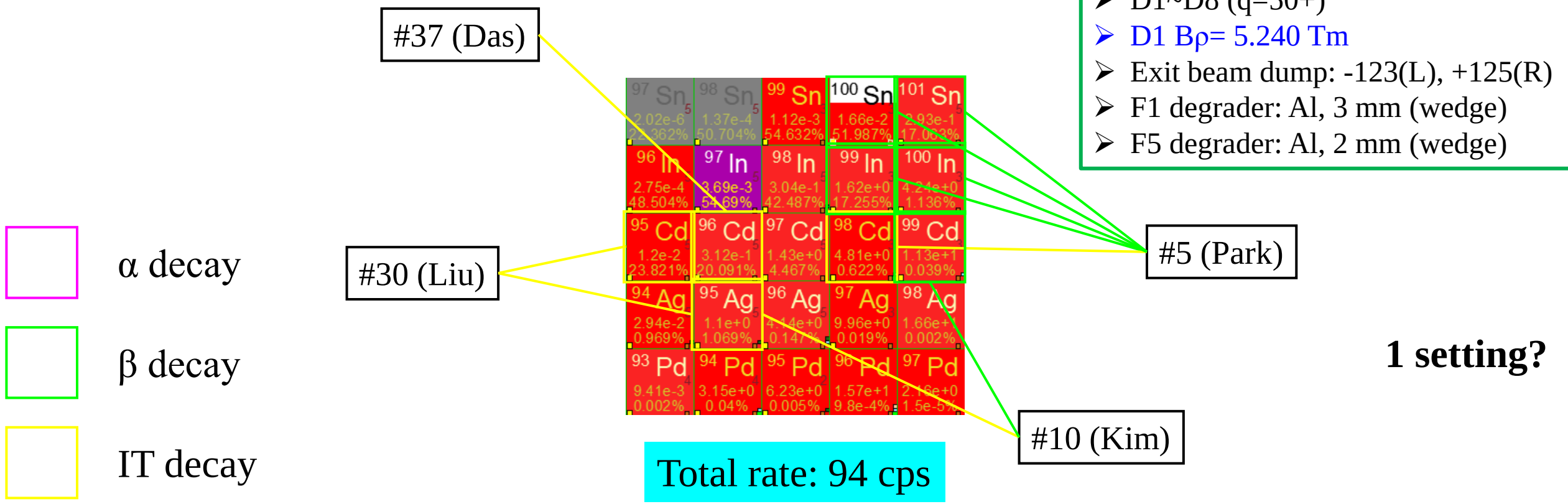
Case 3: Overlap of nuclides/regions with others

- ISB suggests how to merge the pre-proposals and asks the proponents involved to discuss/solve the issue.

Proponent	#	Title of experiment	Specified nuclide(s)
J. Park	5	New measurements of M1 and E2 transition strengths below ^{100}Sn	^{100,101}Sn, ^{99,100}In, ^{98}Cd
Y. Kim	10	Evolution of seniority breaking in Silver isotopes near doubly magic nuclides	^{95}Ag, ^{99}Cd, ^{101}Ag (^{101}Cd?)
X. Liu	30	Spin-gap isomer study in the N=Z-1 nucleus ^{95}Cd	^{95}Cd
B. Das	37	The competition between the T=0 and the T=1 coupled states in ^{96}Cd: lifetime measurement in the heaviest N=Z nucleus with known excited states	^{96}Cd

Case 3

- Primary beam: ^{124}Xe, 140 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=50+)
- D1 Bρ= 5.240 Tm
- Exit beam dump: -123(L), +125(R)
- F1 degrader: Al, 3 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)



1 setting?

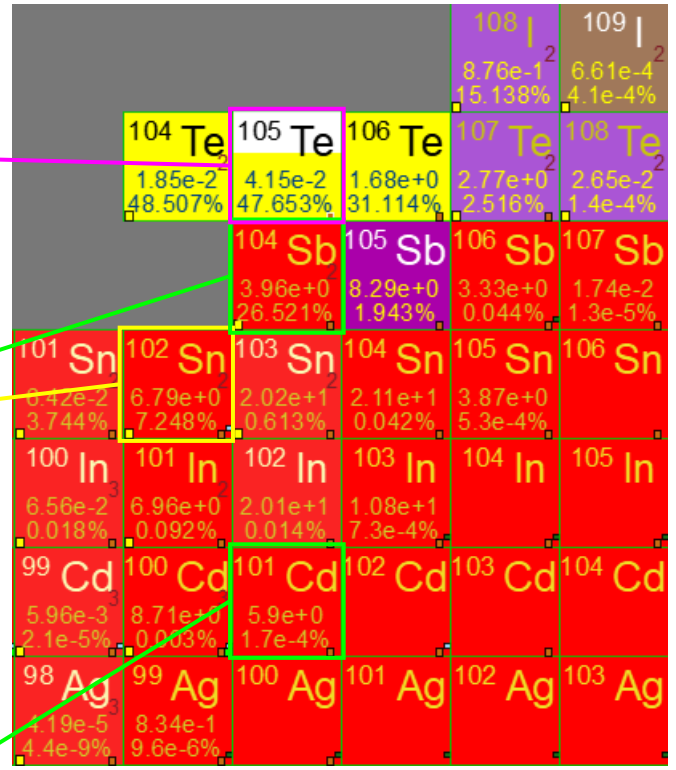
Proponent	#	Title of experiment	Specified nuclide(s)
J. Park	6	Investigation of shell structure and shape evolution in ^{102,104}Sn with IDATEN	^{102}Sn, ^{104}Sb
Y. Kim	10	Evolution of seniority breaking in Silver isotopes near doubly magic nuclides	^{95}Ag, ^{99}Cd, ^{101}Ag (^{101}Cd?)
D. Mengoni	19	Core-breaking effects in ^{100}Sn: lifetime measurements in ^{101}Sn	^{105}Te
S. Guo	25	Lifetime measurement of the 5/2$^+$ state in ^{101}Sn populared by alpha decay of ^{105}Te	^{105}Te
A. Blazhev	33	Study of spin-flip core-excitations towards ^{100}Sn by lifetimes of "L-forbidden" M1 transitions	^{105,107}Te

Case 3

#19 (Mengoni)
#25 (Guo)
#33 (Blazhev)

#6 (Park)

#10 (Kim)



Total rate: 126 cps

- Primary beam: ^{124}Xe, 140 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=52+)
- D1 Bρ= 5.300 Tm
- Exit beam dump: -123(L), +125(R)
- F1 degrader: Al, 3 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

1 setting?

α decay

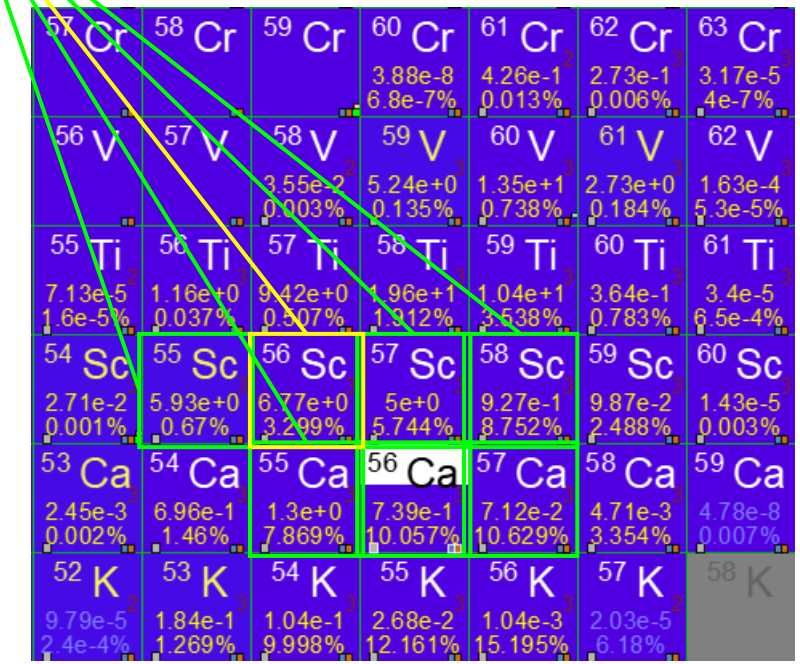
β decay

IT decay

Proponent	#	Title of experiment	Specified nuclide(s)
H. Watanabe	16	Decay spectroscopy of neutron-rich A = 55, 56, 57 isobars relevant to Urca cooling process in the neutron star crust	^{55,56,57}Ca, ^{55,56,57,58}Sc

Case 1

#16 (Watanabe)



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=20+)
- D1 Bρ= 7.995 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

α decay

β decay

IT decay

Total rate: 85 cps

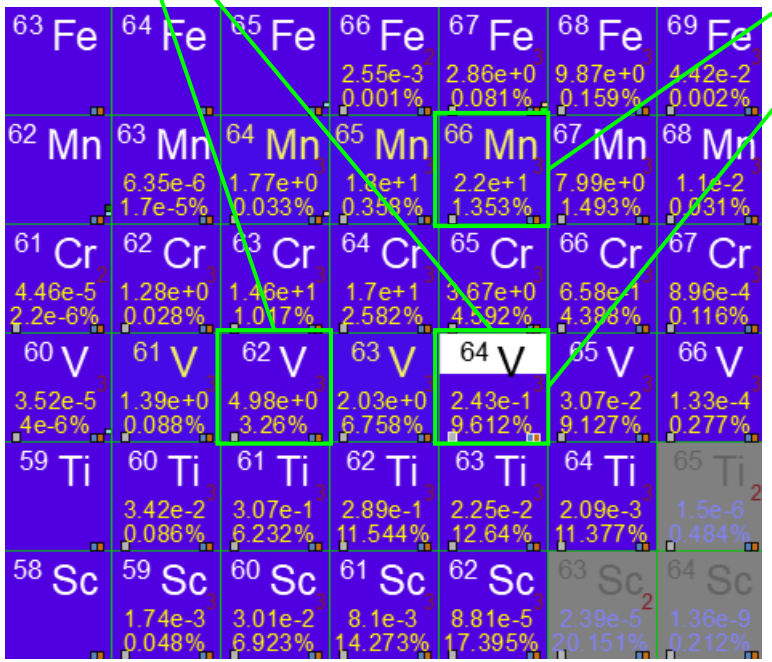
1 setting?

Proponent	#	Title of experiment	Specified nuclide(s)
K. Wimmer	2	Shape coexistence at N=40	^{64}V, ^{66}Mn
B. Olaizola	12	Locating the center of the N=40 Island of Inversion	^{62,64}V

Case 3

#12 (Olaizola w/ **Ge beam**)

#2 (Wimmer w/ **U beam**)



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=23+)
- D1 Bρ= 8.025 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

α decay

β decay

IT decay

Total rate: 109 cps

1 setting?

Proponent	#	Title of experiment	Specified nuclide(s)
S. Franchoo	13	Emergence of collectivity in ^{75,77}Cu	^{75,77}Ni
S. Ahn	21	The lifetime of low-lying states in the N = 49 isotones, ^{81}Ge and ^{83}Se	^{81,83}Ga, ^{81}Zn
E. Sahin	22	Search for prolate deformed and particle-core coupled states in neutron-rich ^{75,77}Cu. Deeper understanding of the low-lying states in odd-odd ^{74,76,78}Cu near ^{78}Ni.	^{74,75,76,77,78}Ni
G. Mukherjee	43	Search of isomeric states in odd-A, neutron-rich nuclei with N = 48, 49	^{77}Cu, ^{79}Ga, ^{79}Zn, ^{81}Ge, ^{83}Se

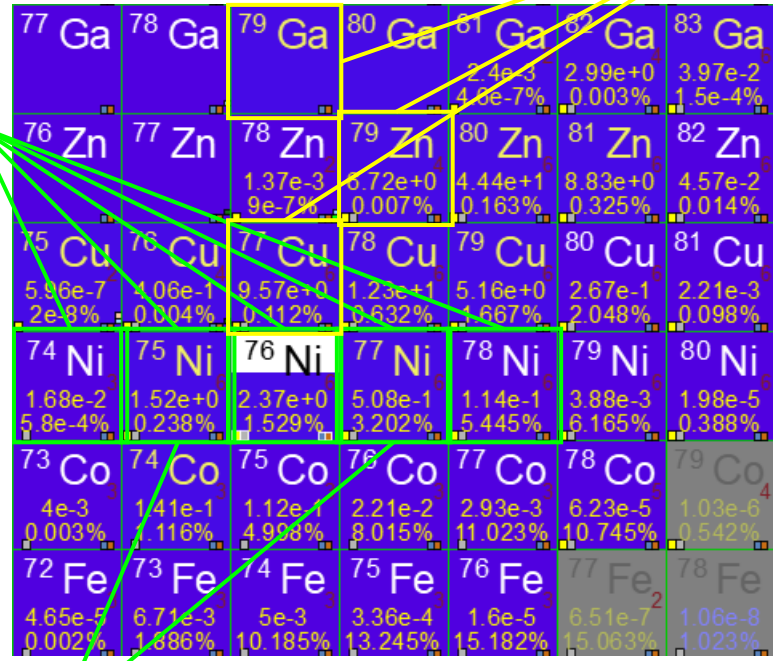
Case 3

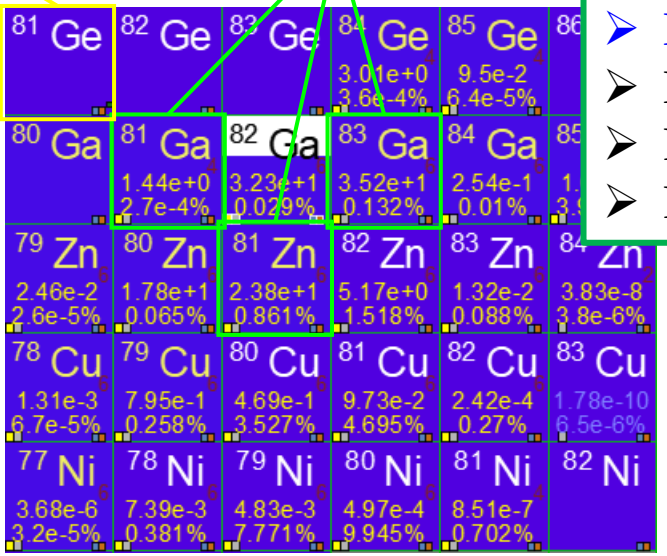
#43 (Mukherjee)

#21 (Ahn)

#22 (Sahin)

#13 (Franchoo)





- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=31+)
- D1 Bρ= 8.140 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

2 settings?

Total rate: 96 cps

Total rate: 120 cps

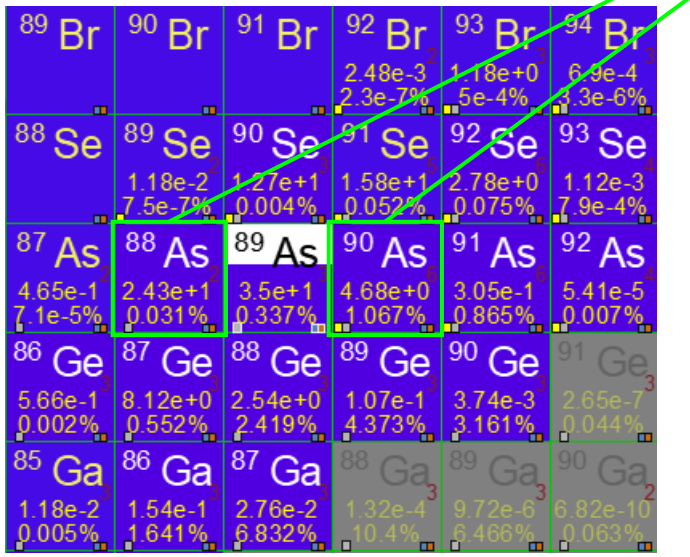
Proponent	#	Title of experiment	Specified nuclide(s)
Q. Zeng	35	Lifetime measurements of the low-lying states in ^{88,90,92,94}Se isotopes	^{88,90}As, ^{92,94}Se

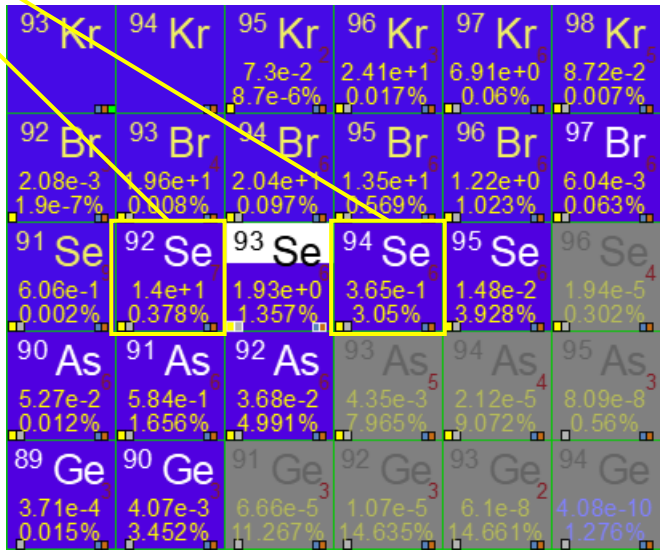
Case 1

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=33+)
- D1 Bρ= 8.150 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

#35 (Zeng)

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=34+)
- D1 Bρ= 8.135 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)





Total rate: 109 cps

Total rate: 104 cps

2 settings?

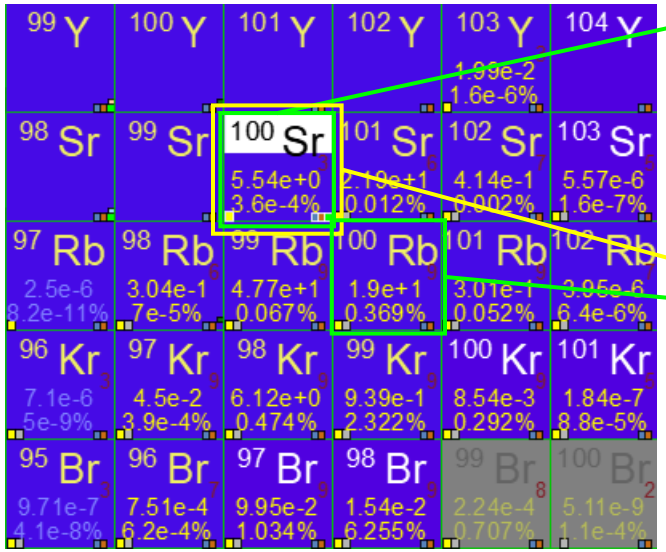
Proponent	#	Title of experiment	Specified nuclide(s)
S. Bae	18	Lifetime measurement for excited states in ^{100,102}Sr: Systematic study for shape coexistence over N=60 region	^{100}Rb, ^{100,102}Rb
T. Bhattacharjee	31	Exploring Intertwined Quantum Phase Transition in Zr isotopes with Lifetime measurement	^{100,102}Sr

Case 3

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=38+)
- D1 Bρ= 8.060 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

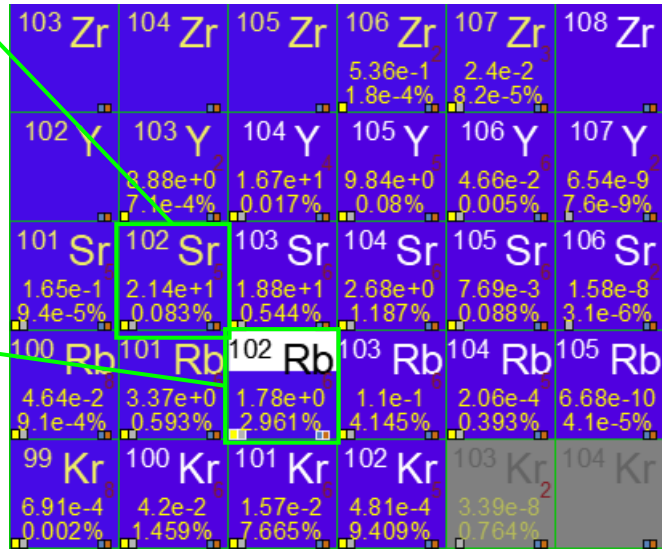
#31 (Bhattacharjee)

#18 (Bae)



Total rate: 102 cps

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=37+)
- D1 Bρ= 8.070 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

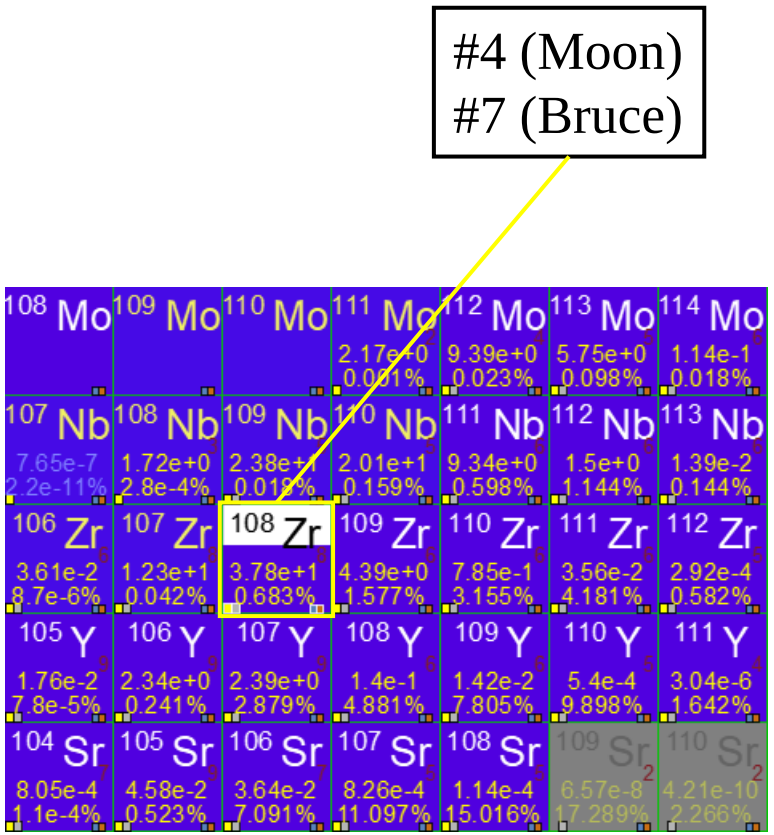


Total rate: 85 cps

2 settings?

Proponent	#	Title of experiment	Specified nuclide(s)
B. Moon	4	Nuclear shape of ^{108}Zr	^{108}Zr
A. Bruce	7	Lifetime of excited states in ^{108}Zr	^{108}Zr

Case 3



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=40+)
- D1 Bρ= 8.005 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

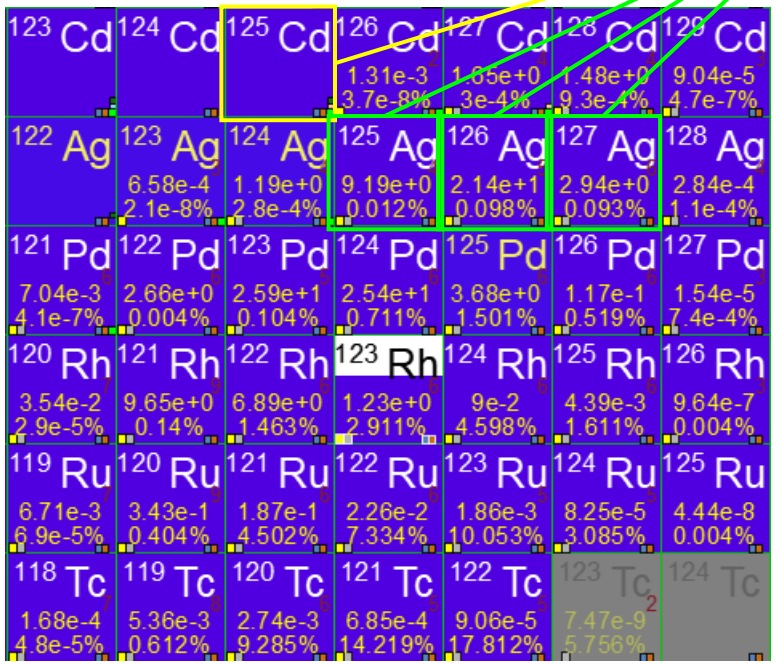
1 setting?

Total rate: 135 cps

Proponent	#	Title of experiment	Specified nuclide(s)
H. Watanabe	8	Nuclear structure study below ^{132}Sn by lifetime measurement of excited states	^{128,130}Cd, ^{128}Ag, ^{126,128}Pd
A. Jungclaus	9	Measurement of excited-state lifetimes in ^{130}Cd	^{130}Cd
Z. Chen	20	Exploring the neutron shell evolution around ^{132}Sn with fast-timing lifetime measurement	^{121,123,125,127,129,131}In, ^{119,121,123,125,127,129}Ag, ^{117,119,121,123,125,127}Rh
L.M. Fraile	42	Investigation of the structure of odd-A Cd isotopes	^{125,126,127,128,129,130}Cd, ^{125,126,127}Ag

Case 3

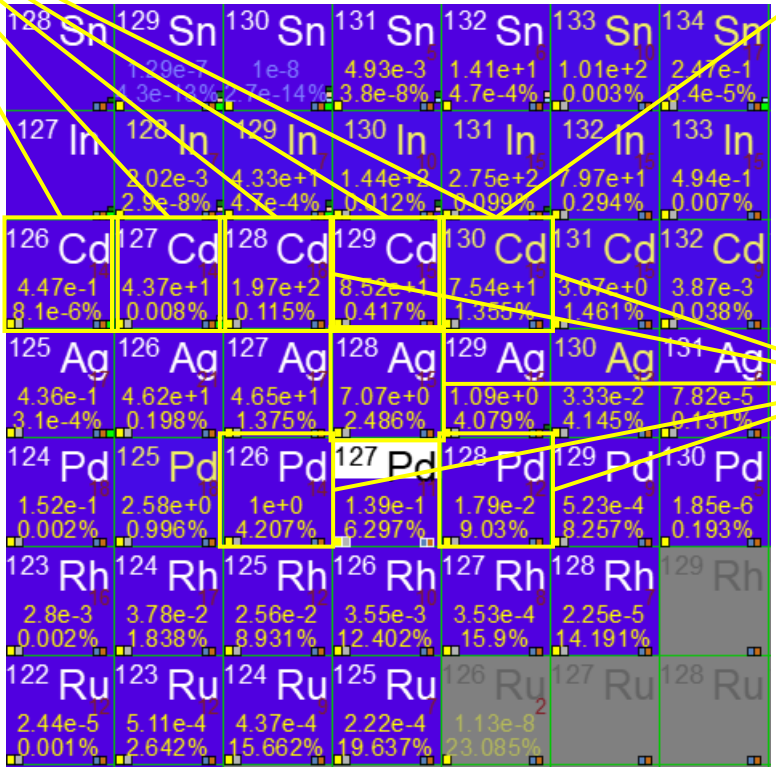
#42 (Fraile)



#20 (Chen)

#9 (Jungclaus)

#8 (Watanabe)



2 settings?

Total rate: 94 cps
⇒ Active stopper

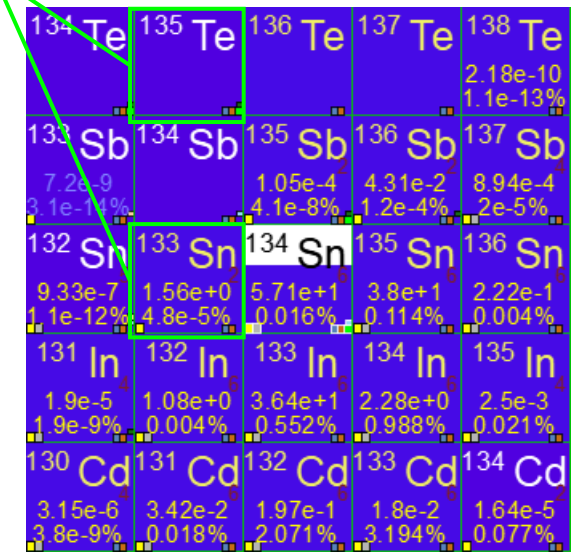
Total rate: 1171 cps ⇒ Passive stopper

Proponent	#	Title of experiment	Specified nuclide(s)
B. Moon	3	Seniority nature in nuclei beyond ^{132}Sn	^{136,137}Sn, ^{137,138,139}Sb
Q. Zeng	29	Lifetime measurements of the 5/2^{+} states in ^{133}Sb and ^{135}I	^{133}Sn, ^{135}Te
R. Lozeva	34	Evolution of collectivity beyond ^{132}Sn	$^{134-139}$Sn, $^{136-142}$Te, $^{141-143}$I, $^{134-136}$In

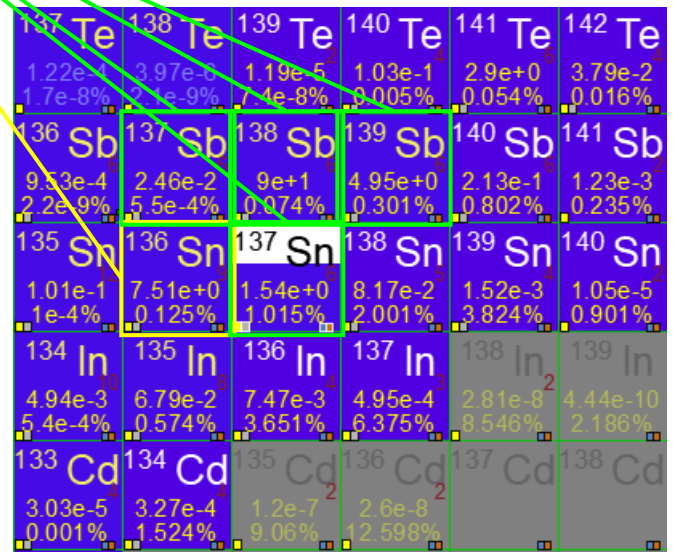
Case 3

#29 (Zeng)

#3 (Moon)



#34 (Lozeva)



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=50+)
- D1 Bρ= 7.905 Tm
- Exit beam dump: -125(L), +125(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

2 settings?

Total rate: 138 cps

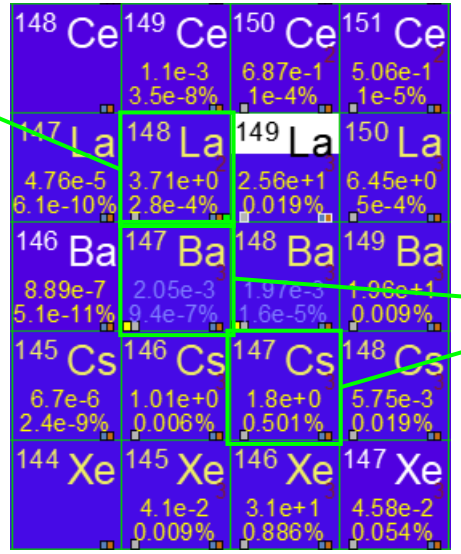
Total rate: 109 cps

Proponent	#	Title of experiment	Specified nuclide(s)
B. Ding	26	Lifetime measurements of the first 3- states in ^{144,146,148}Ce	^{144,146,148}La
H. Watanabe	38	Study of electric dipole moments in reflection-asymmetric Ba isotopes	^{148,150}Cs
S. Nag	39	Evolution of octupole characteristics in mass 150 region	^{143,145,147}La,Ba

Case 3

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=57+)
- D1 Bρ= 7.485 Tm
- Exit beam dump: -125(L), +66(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

#26 (Ding)

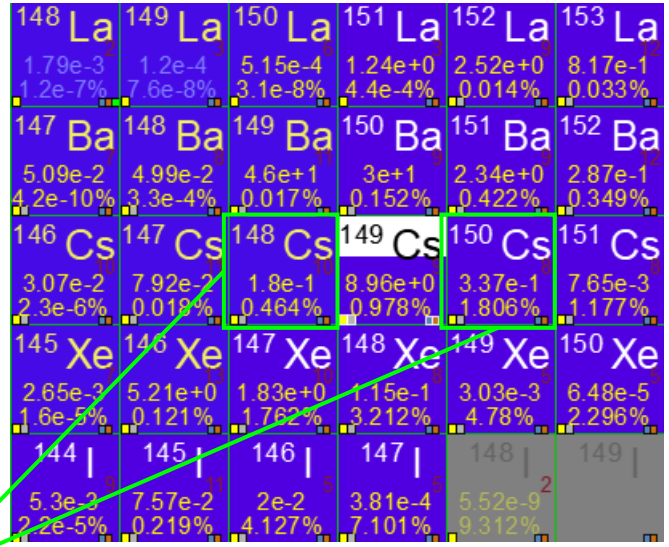


#39 (Nag)

Total rate: 118 cps

#38 (Watanabe)

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=55+)
- D1 Bρ= 7.675 Tm
- Exit beam dump: -125(L), +95(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)



Total rate: 102 cps

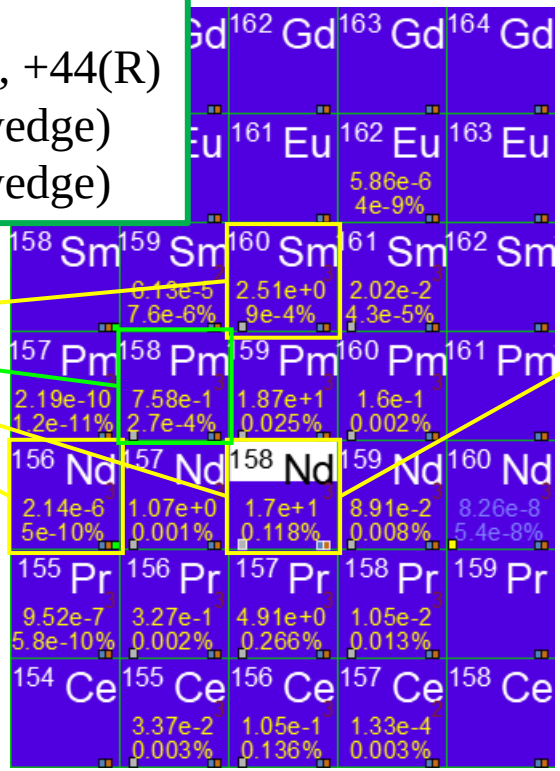
2 settings?

S. Pascu	14	Study of the deformation pattern in the highly-deformed rare-earth region	^{168,170}Dy, ^{162,164,166}Gd, ^{158,160,162}Sm, ^{154,156,158}Nd, ^{150,152,154}Ce
S. Bae	23	Study on the shape evolution of the deformed even-even Nd and Sm isotopes with N = 96, 98 using lifetime measurement for first 2^+ states	^{156,158}Nd, ^{158}Pm, ^{160}Sm
E. Ideguchi	24	Study of shape evolution in Z~60 nuclei	Z=56-64, N=92-102 around ^{160}Nd
V. Werner	44	Test of B(E2) strengths vs. low E(2^+) energies in neutron-rich Nd isotopes	^{158,160}Nd

Case 3

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=60+)
- D1 Bρ= 7.340 Tm
- Exit beam dump: -125(L), +44(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

#23 (Bae)



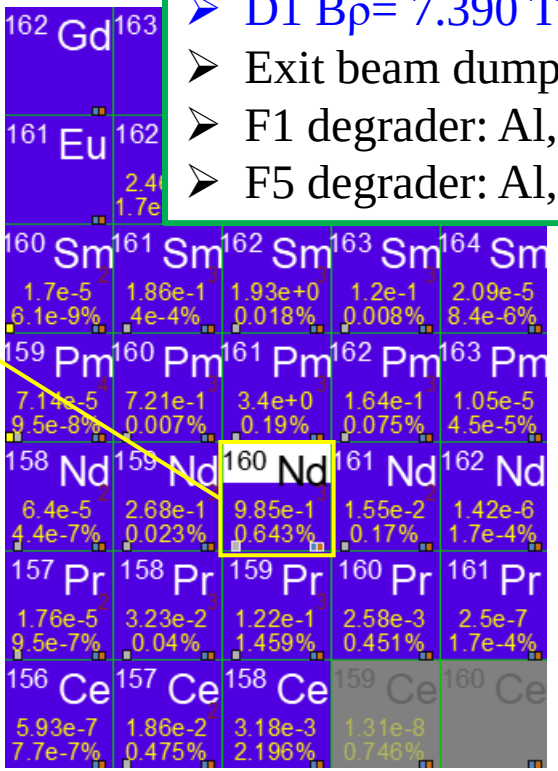
Total rate: 90 cps

#44 (Werner)

#14 (Pascu)

#24 (Ideguchi)

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 4 mm
- D1~D8 (q=60+)
- D1 Bρ= 7.390 Tm
- Exit beam dump: -125(L), +51(R)
- F1 degrader: Al, 5 mm (wedge)
- F5 degrader: Al, 2 mm (wedge)

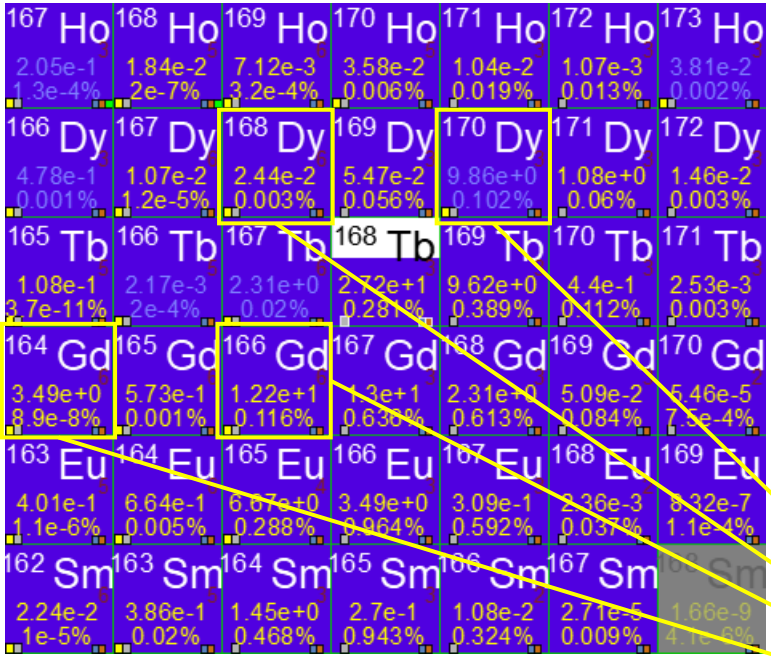


Total rate: 84 cps

2 settings?

Proponent	#	Title of experiment	Specified nuclide(s)
S. Pascu	14	Study of the deformation pattern in the highly-deformed rare-earth region	^{168,170}Dy, ^{162,164,166}Gd, ^{158,160,162}Sm, ^{154,156,158}Nd, ^{150,152,154}Ce

Case 1 (or 3)



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 5 mm
- D1 (q=64+), D2~D8 (q=65+)
- D1 Bρ= 6.825 Tm
- Exit beam dump: -125(L), +11(R)
- F1 degrader: Al, 2 mm (wedge)
- F5 degrader: Al, 1.5 mm (wedge)

Total rate: 117 cps

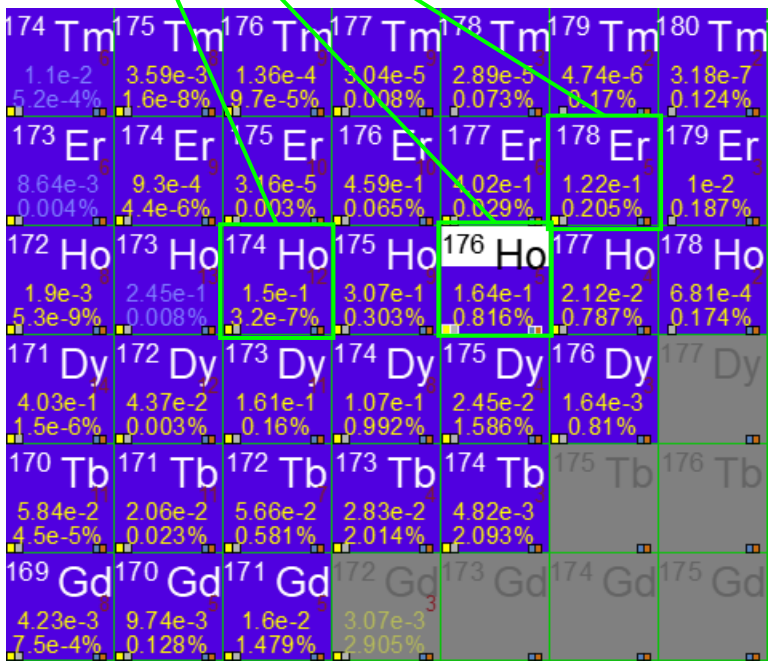
#14 (Pascu)

1 setting?

Proponent	#	Title of experiment	Specified nuclide(s)
J. Ha	15	First 2^+ state lifetime measurements for the neutron-rich Yb and Er isotopes: a quest for strong deformation around N = 110	^{174,176}Ho, ^{178}Er

Case 1

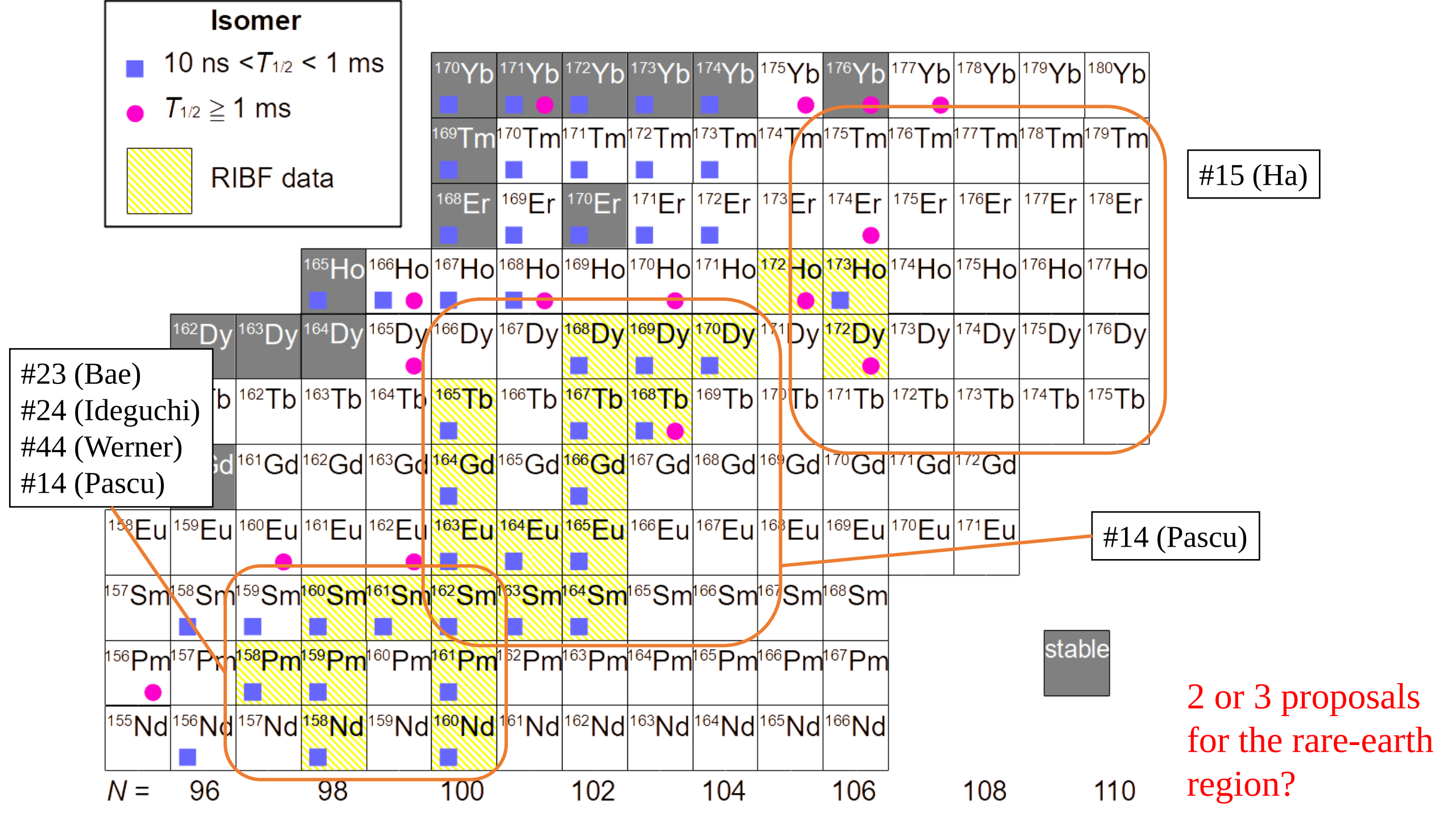
#15 (Ha)



- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 5 mm
- D1 (65+), D2~D8 (q=66+)
- D1 Bρ= 6.905 Tm
- Exit beam dump: -125(L), +24(R)
- F1 degrader: Al, 2 mm (wedge)
- F5 degrader: Al, 1.5 mm (wedge)

Total rate: 37 cps

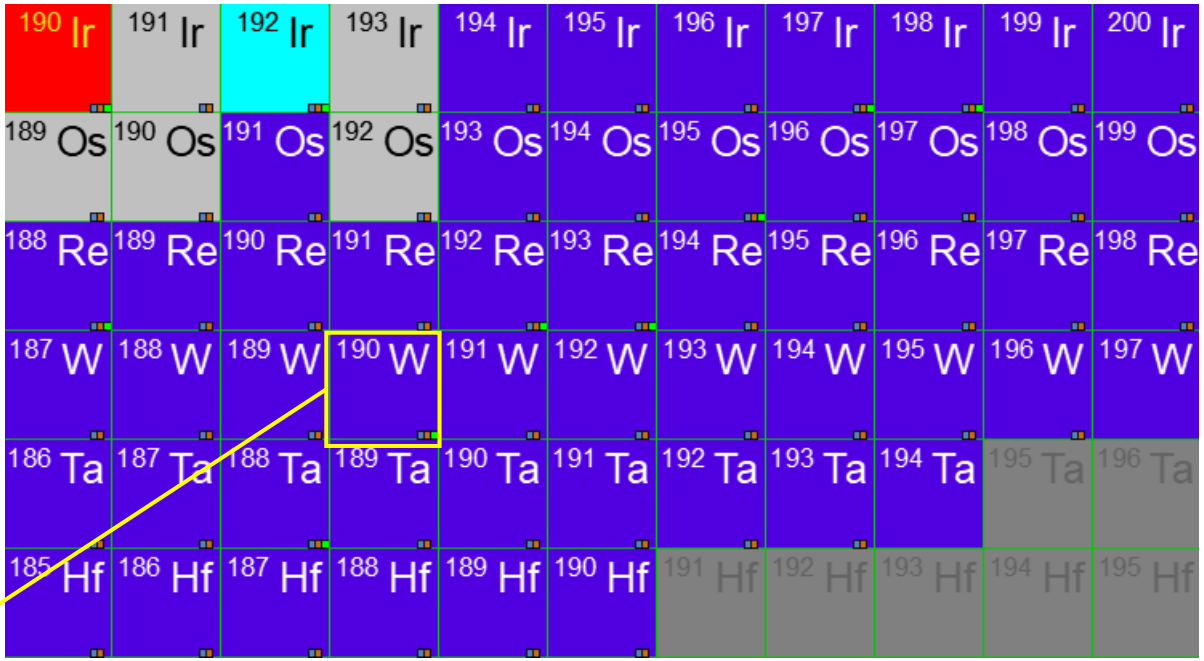
1 setting?


Isomer
10 ns < $T_{1/2}$ < 1 ms
$T_{1/2} \geqq 1$ ms
RIBF data
#15 (Ha)
#23 (Bae)
#24 (Ideguchi)
#44 (Werner)
#14 (Pascu)
#14 (Pascu)
stable
2 or 3 proposals for the rare-earth region?
N = 96 98 100 102 104 106 108 110

Proponent	#	Title of experiment	Specified nuclide(s)
S. Pascu	11	Study of the prolate-oblate shape transition in the neutron-rich heavy-mass region	^{194,196,198}Os, ^{188,190,192,194}W, ^{186,188,190}Hf
X. Liu	36	Half-life of the yrast 2^+ state in ^{190}W	^{190}W

Case 3 or Case 2

#11 (Pascu w/ **Pb beam**)



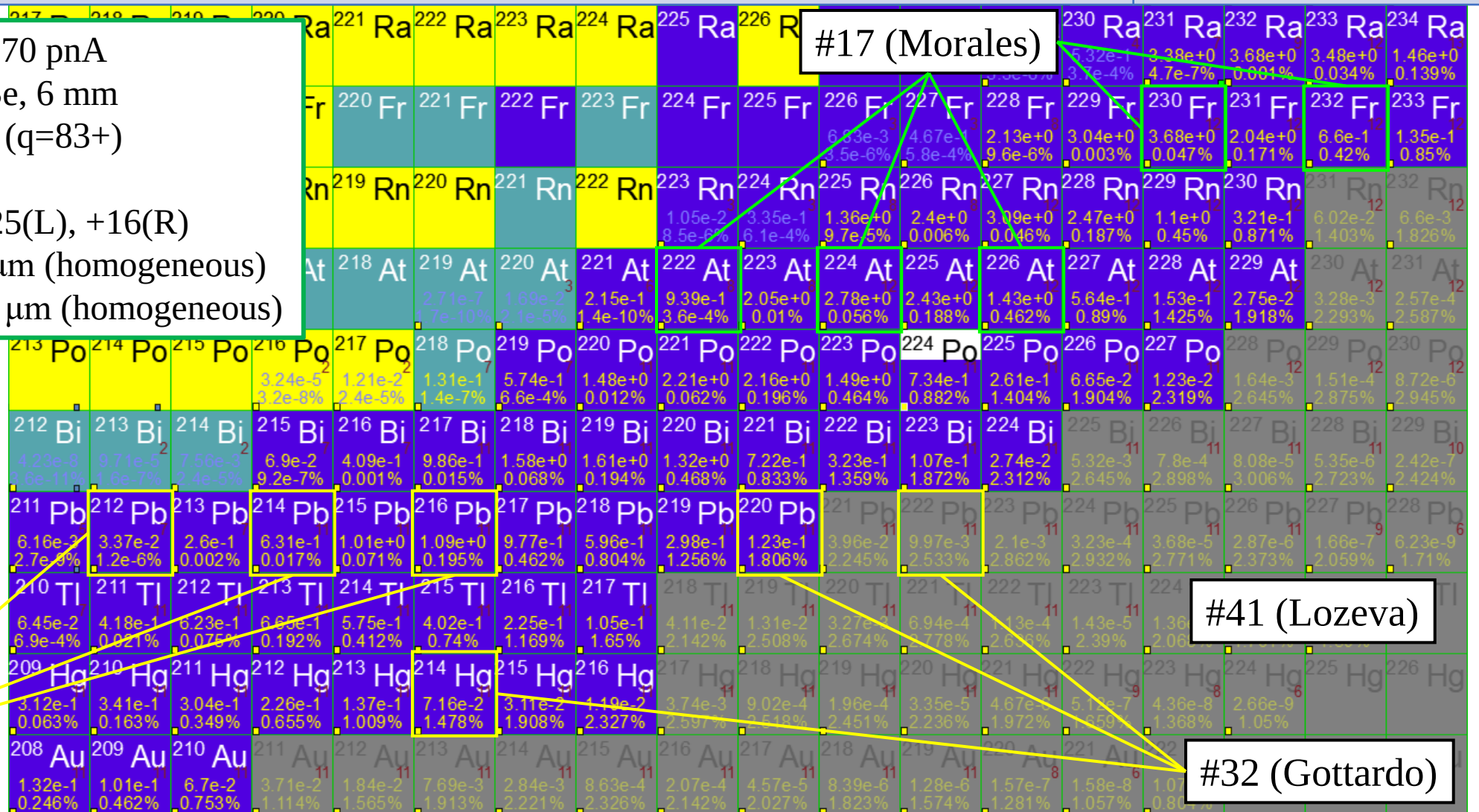
#36 (Liu w/ **U beam**)

A.I. Morales	17	Lifetime measurements in the south-east frontier of the actinide island of octupole deformation and beyond	^{222,224,226}At, ^{230,232}Fr
Z. Liu	27	Lifetime measurements of the low-lying states in $^{212, 214, 216}$Pb	^{212,214,216}Pb
A. Gottardo	32	Exploring nuclear structure beyond N=126	^{220,222}Pb, ^{214}Hg
R. Lozeva	41	Seniority breaking in n-rich isotopes beyond ^{208}Pb	$^{214\text{-}216}$Pb, $^{208\text{-}212}$Hg, $^{216\text{-}220}$Bi

- Primary beam: ^{238}U, 70 pnA
- Production target: ^{9}Be, 6 mm
- D1 (q=82+), D2~D8 (q=83+)
- D1 Bρ= 6.530 Tm
- Exit beam dump: -125(L), +16(R)
- F1 degrader: Al, 25 μm (homogeneous)
- F5 degrader: Al, 112 μm (homogeneous)

Total rate: 87 cps

Case 3



Proponent	#	Title of experiment	Specified nuclide(s)
Z. Liu	28	Lifetime measurements of the low-lying states in ^{216}Th	^{216}Th
U. Datta	40	^{12}C+^{12}C fusion rates from resonances at astrophysical energies	^{24,25,26}Al

Case 2

Requirements

■ **Consider suggestions/recommendation from ISB**

- Feasibility
- BigRIPS setting(s) ※If necessary, please invite the BigRIPS team as collaborators.
- Merged with others (for Case 3)

■ **Let ISB know your decision (e-mail to hiroshi@ribf.riken.jp by August 15)**

- Collaboration style (spokesperson, co-spokesperson, etc.)
- Title of experimental proposal
- (Rough) estimate of beamtime

■ **Prepare a good physics proposal**

Timeline

July 6-8

- Collaboration meeting

~July 20

- Recommendation/suggestion from ISB to each proponent

~August 15

- Feedback from the proponents to ISB (e-mail to HW)

~August 31

- Announcement of a list of proposals (with Spokesperson's name and e-mail address) to the IDATEN collaboration

October xx

- Proposal submission to RIBF NP-PAC