Nucleon-transfer reactions using ^{206,207}Hg beams at ISS

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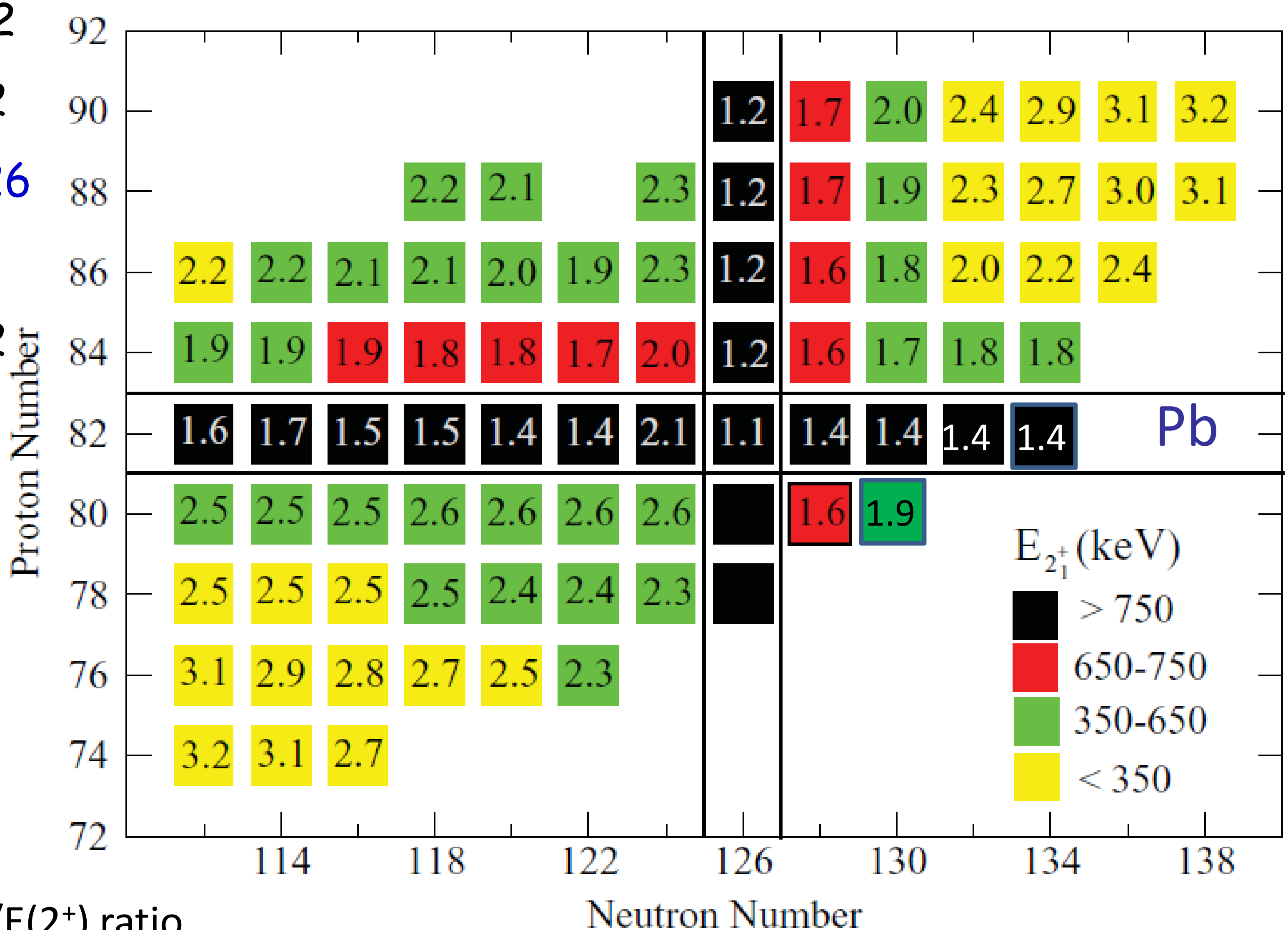
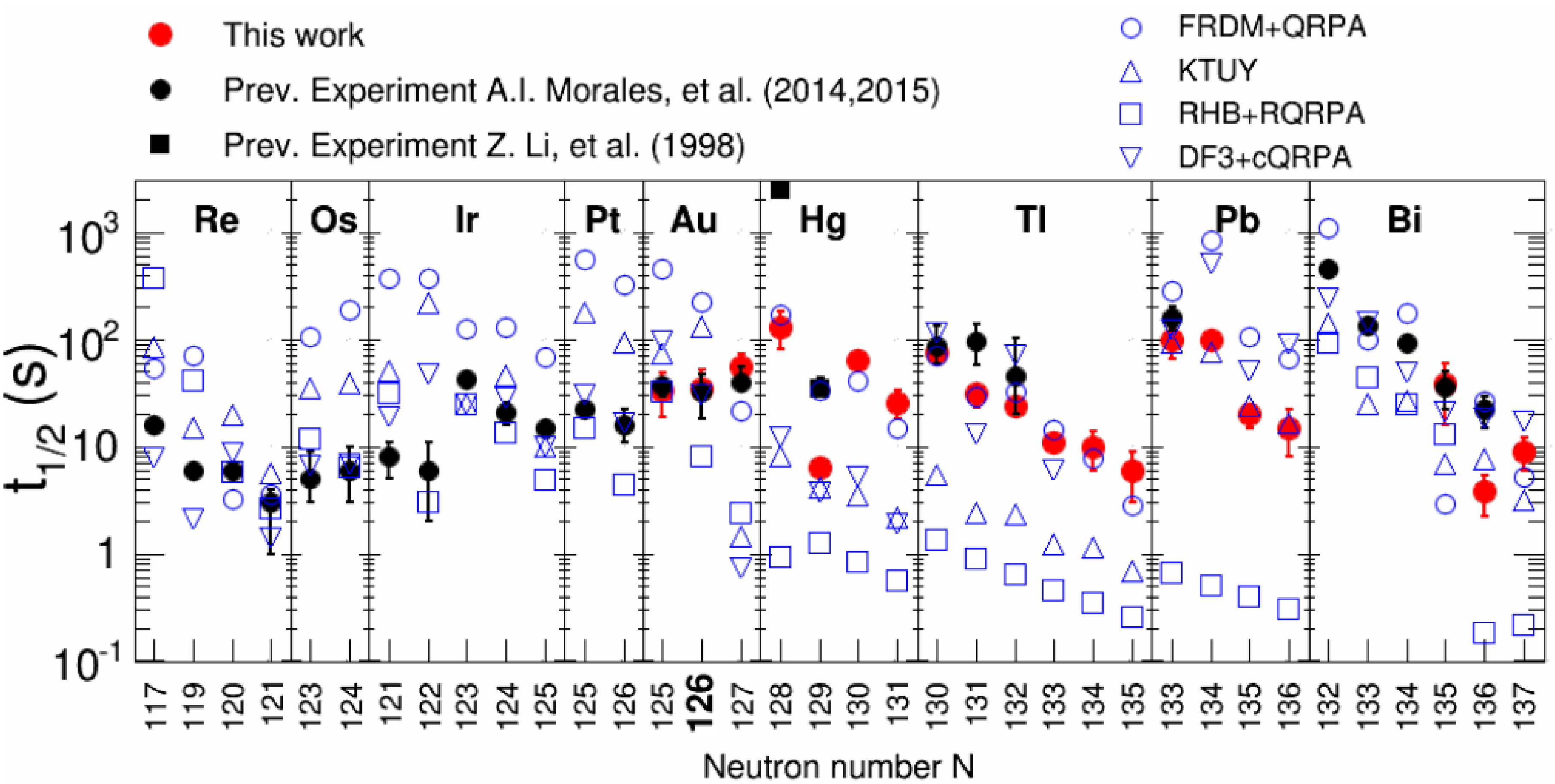
π	ν
i13/2	i11/2
h9/2	g9/2
Z=82	N=126
s1/2	p1/2
d3/2	f5/2
h11/2	



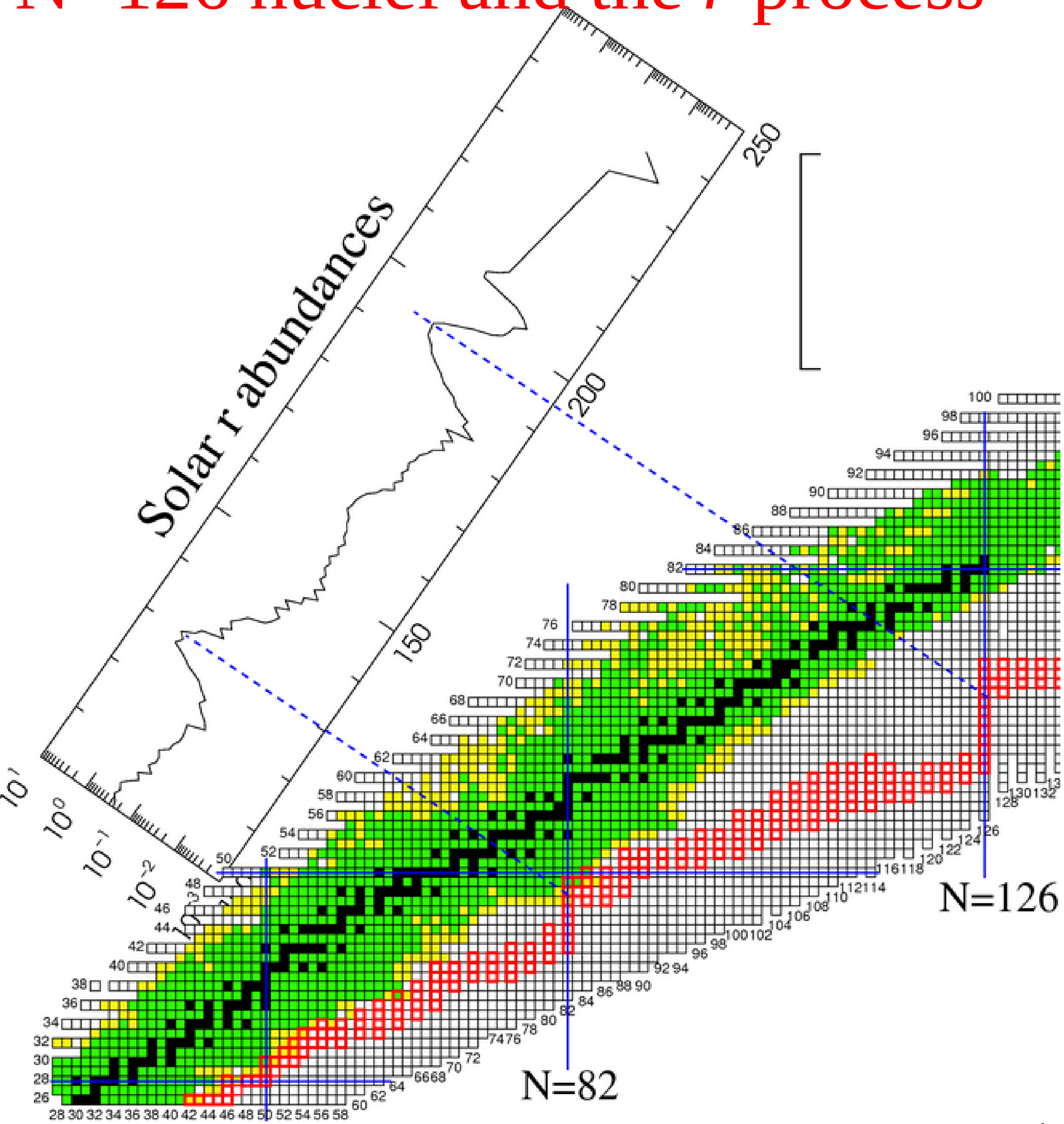
In box: E(4⁺)/E(2⁺) ratio

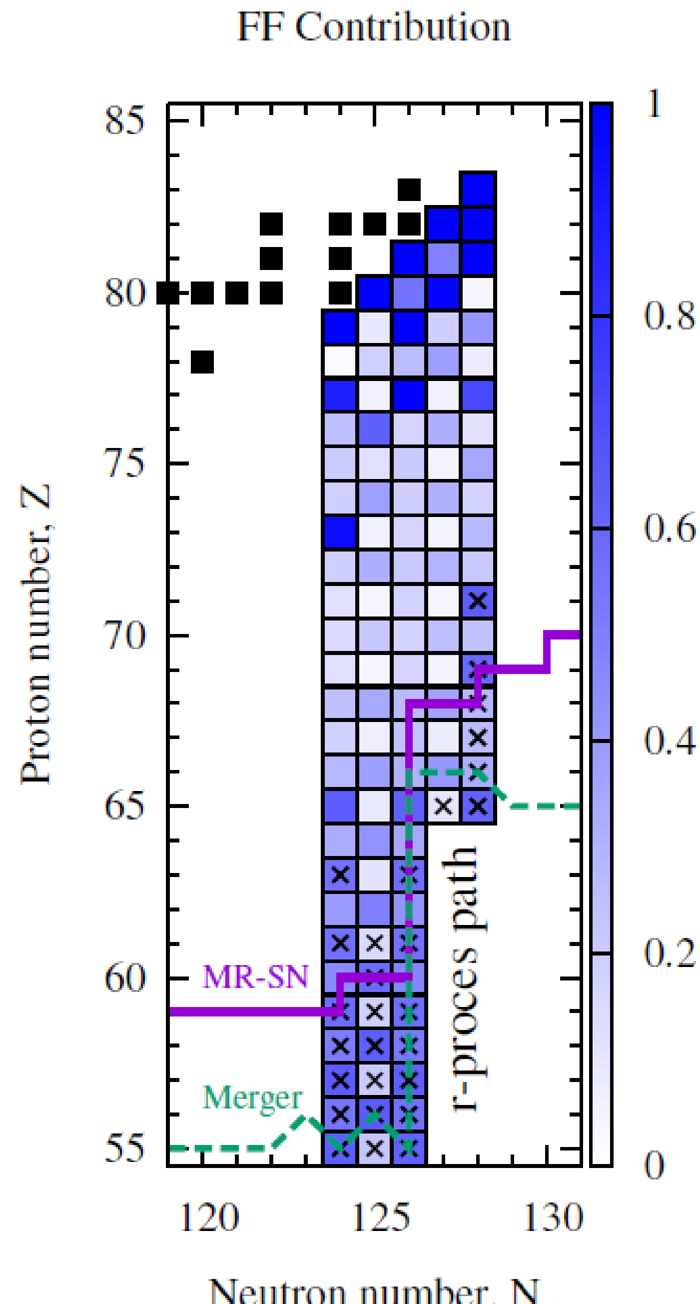
Lifetime measurements



R. Caballero-Folch et al., PRL17, 012501 (2016)

N=126 nuclei and the *r* process

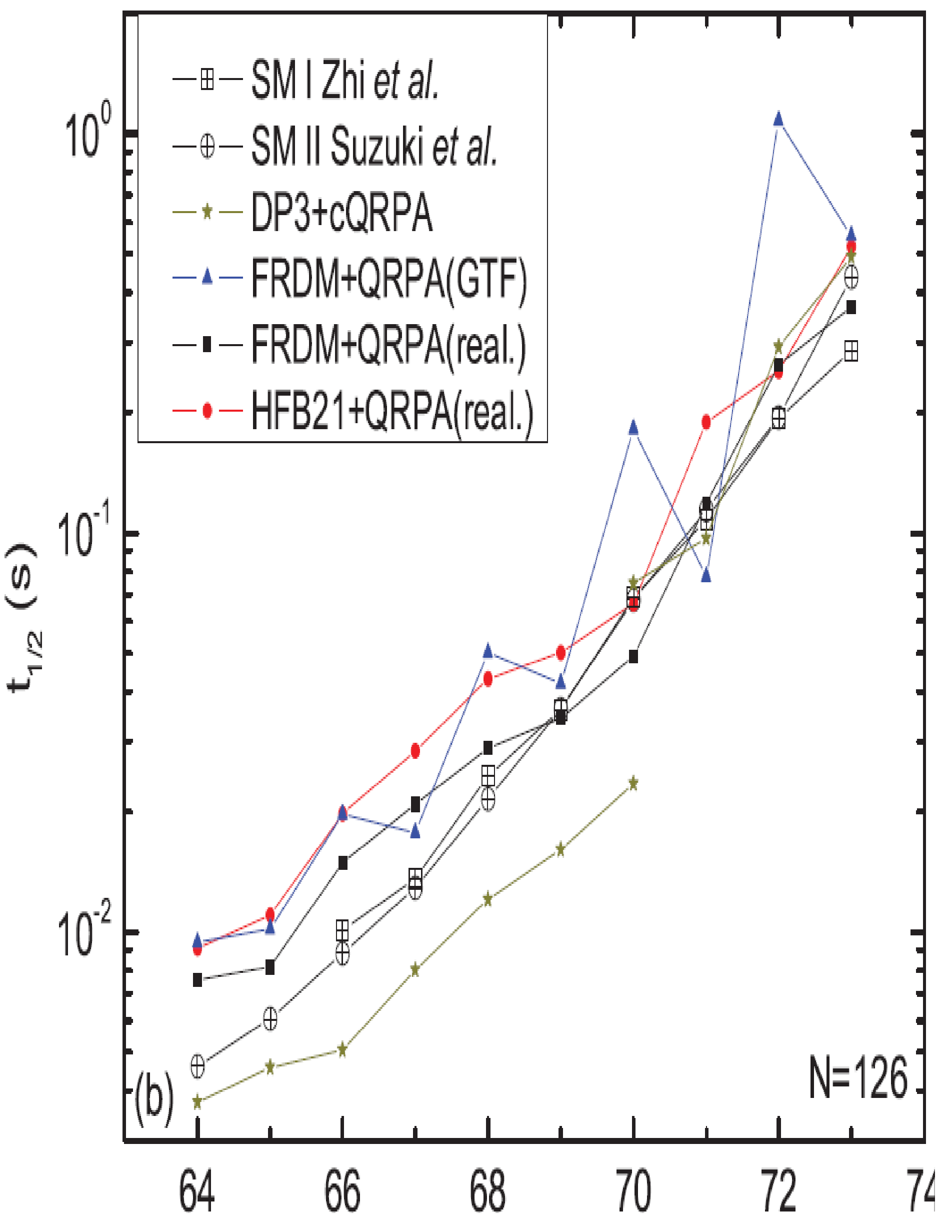


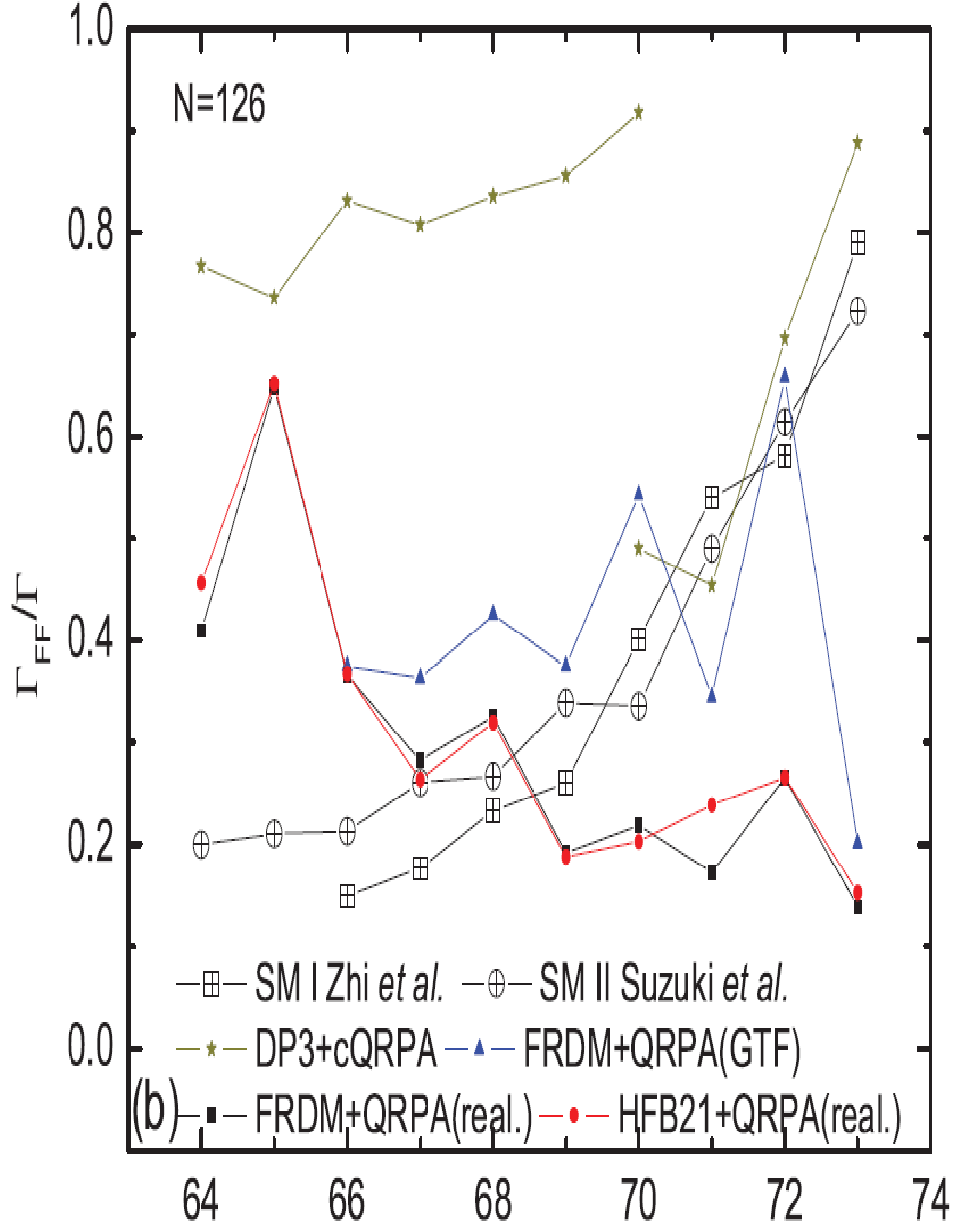


N. Nishimura et al., Phys. Lett. B 756 (2016) 273

D.-L. Fang et al., Phys. Rev. C88 (2013) 034304

First-forbidden β decay





Z D.-L. Fang, B.A. Z

Building on d(206Hg,p)207Hg

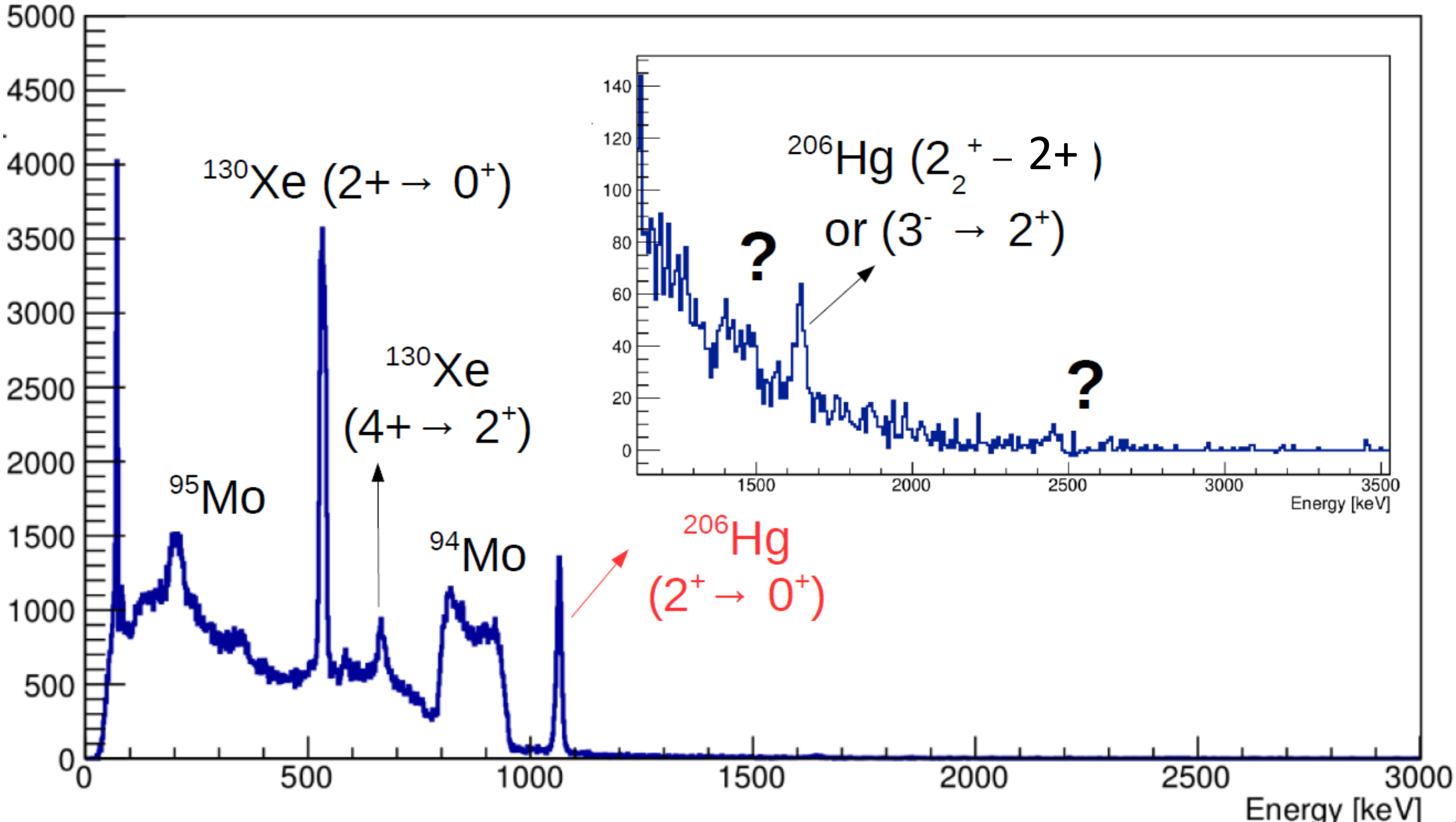
ISS experiment (Ben Kay and the ISS collaboration)
Talk by Ryan Tang

Very successful

Established single neutron particle energies beyond N=126

Further opportunities?

Coulomb excitation spectrum of ^{206}Hg (exp. in November 2107)



Lisa Morrison, Kasia Hadynska-Klek, Zsolt Podolyák et al.

Possibilities with 206Hg (and 207Hg) beams

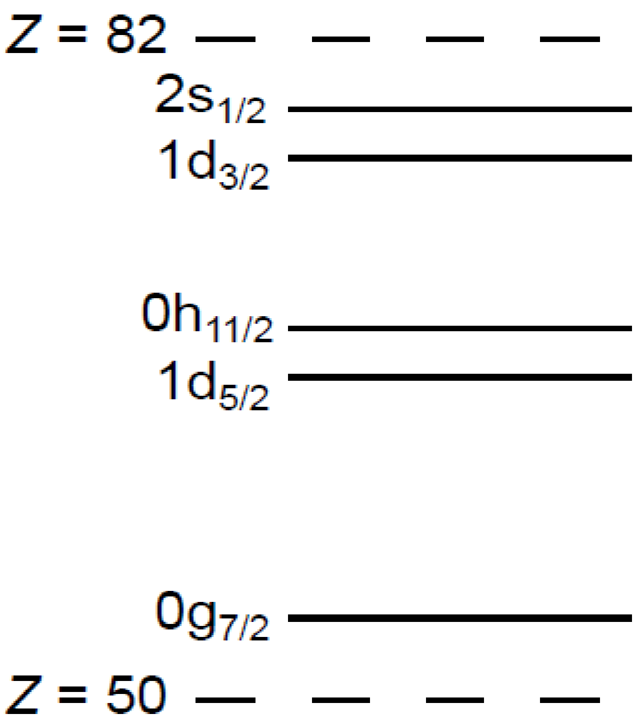
206Hg(d,3He)205Au

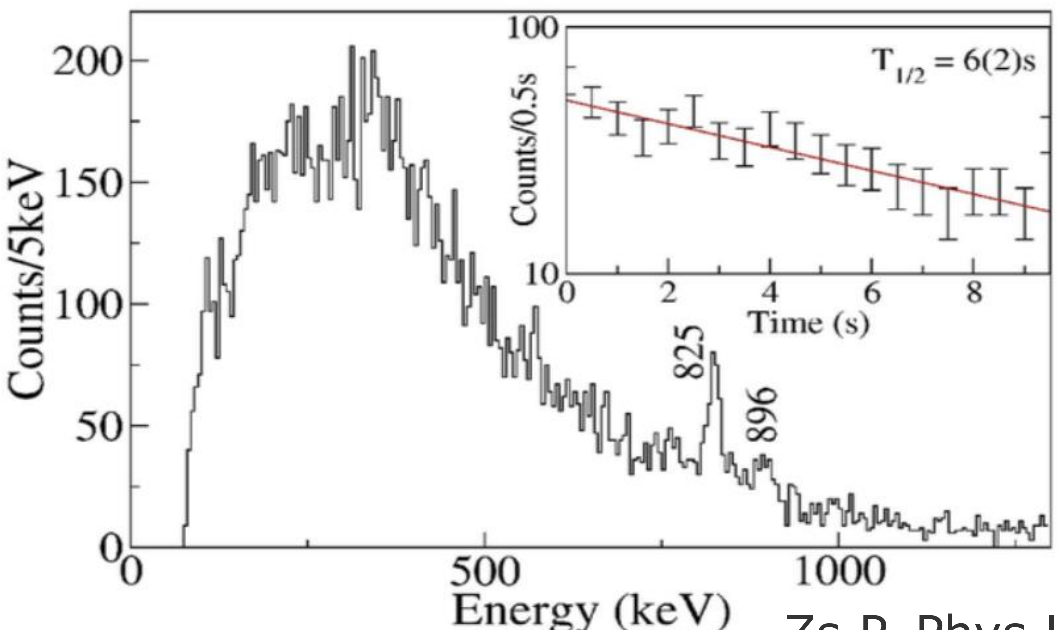
206Hg(t,p)208Hg
206Hg(t,3He)206Au

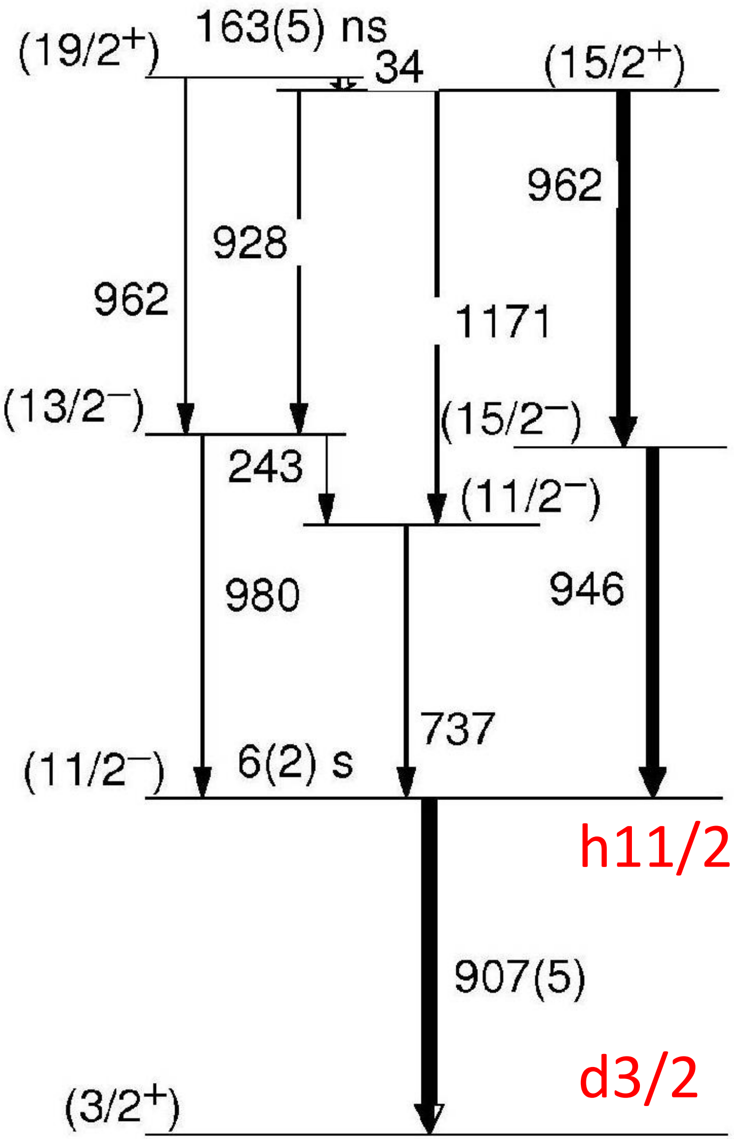
207Hg(t,p)209Hg
207Hg(t,3He)207Au

All in inverse kinematics
ISS or MINIBALL?
Measure beta decay of products?

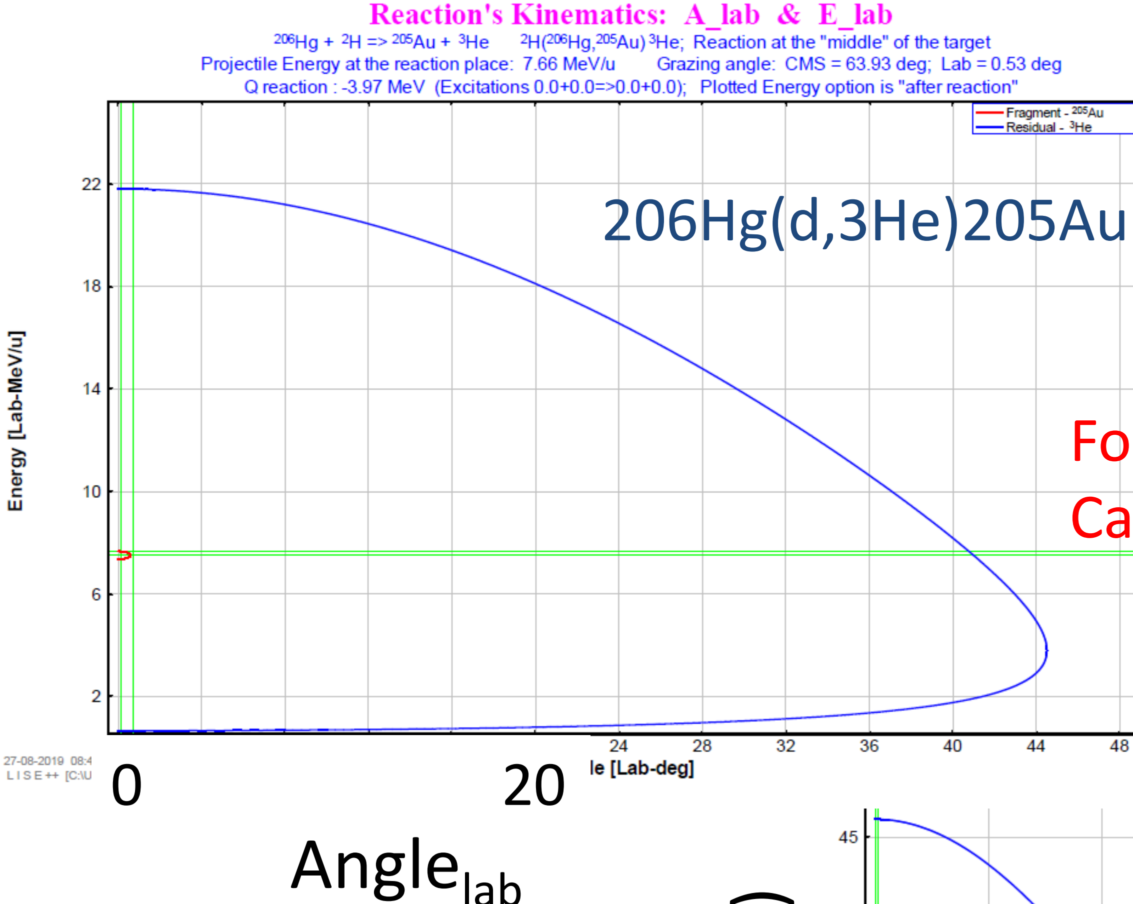
206Hg(d,3He)205Au







Zs.P. Phys.Lett. B 672, 116 (2009)

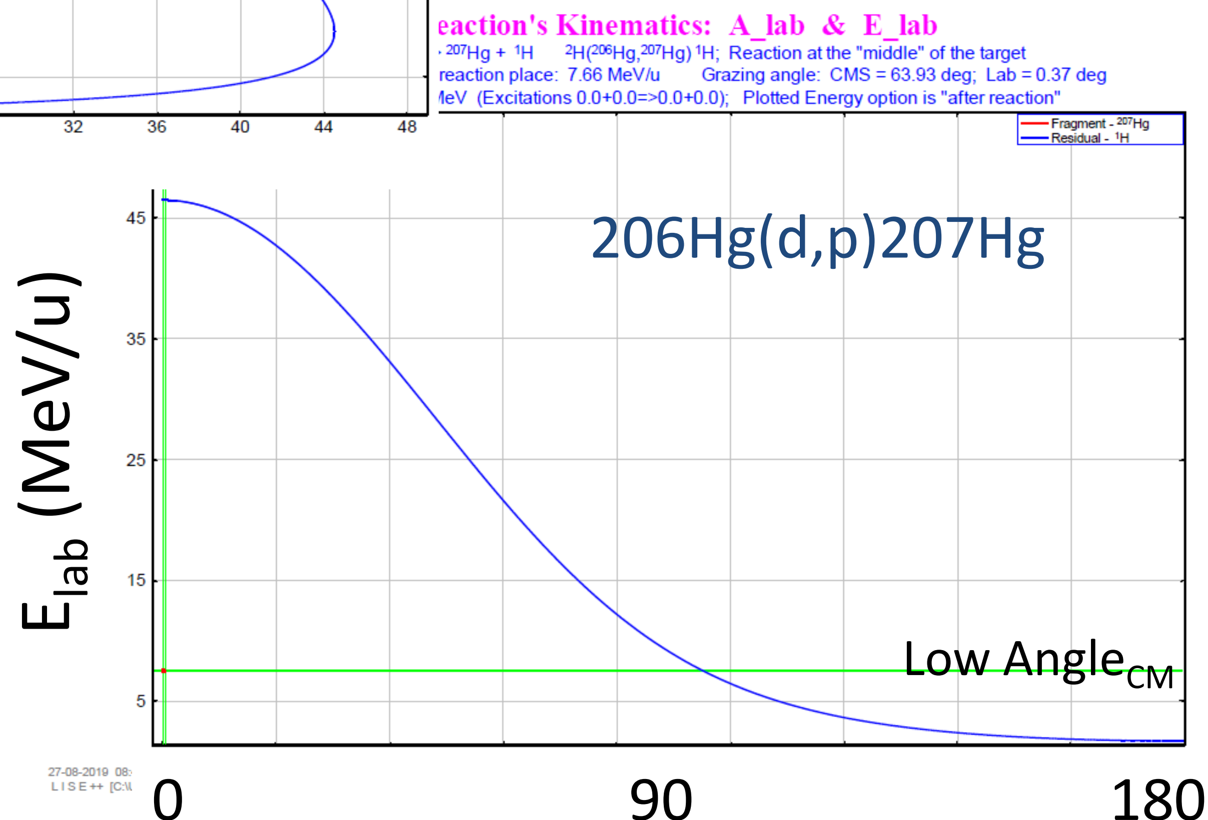


3He forward

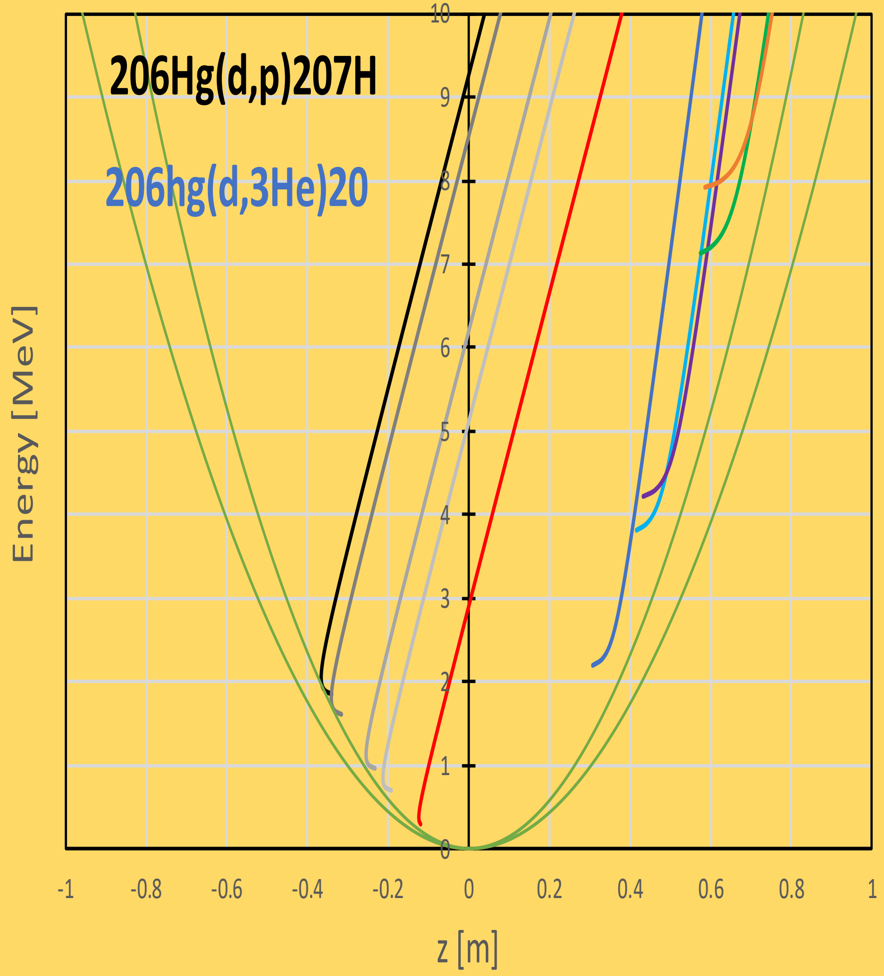
1H backward

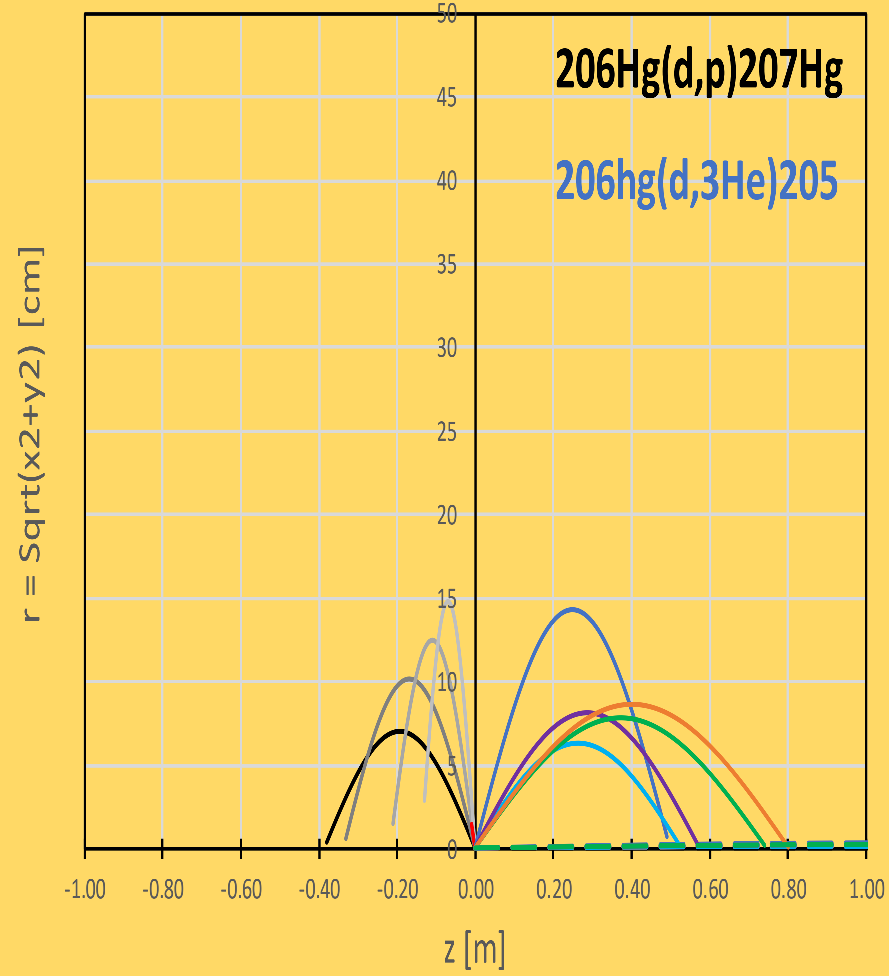
Forward it needs ID from TOF.

Can we use two Si arrays at ISS?



Compare | 206Hg(d,p)207Hg -- 206hg(d,3He)205Au (heliosmatic)





3He forward
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Forward it needs ID from TOF.
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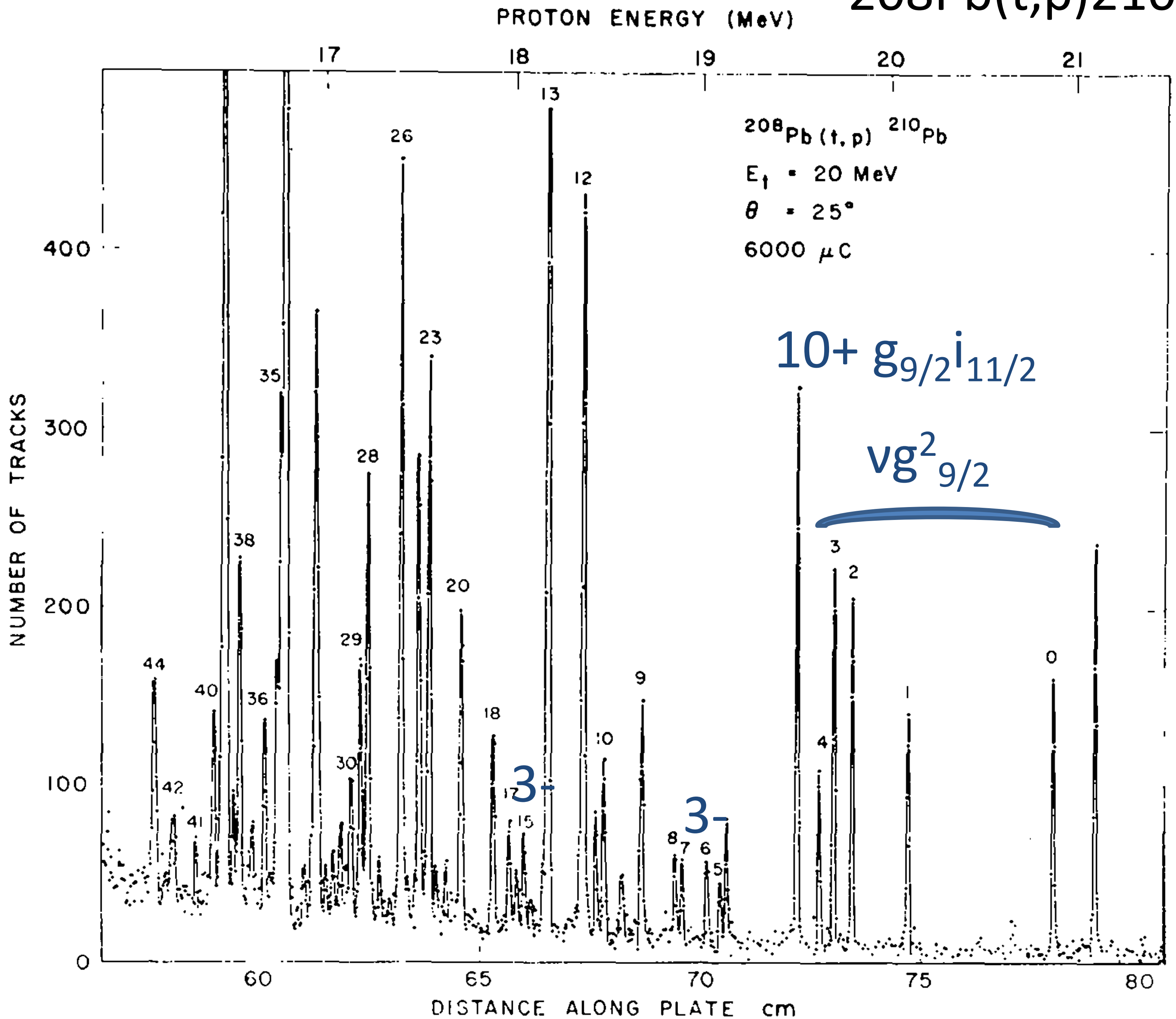
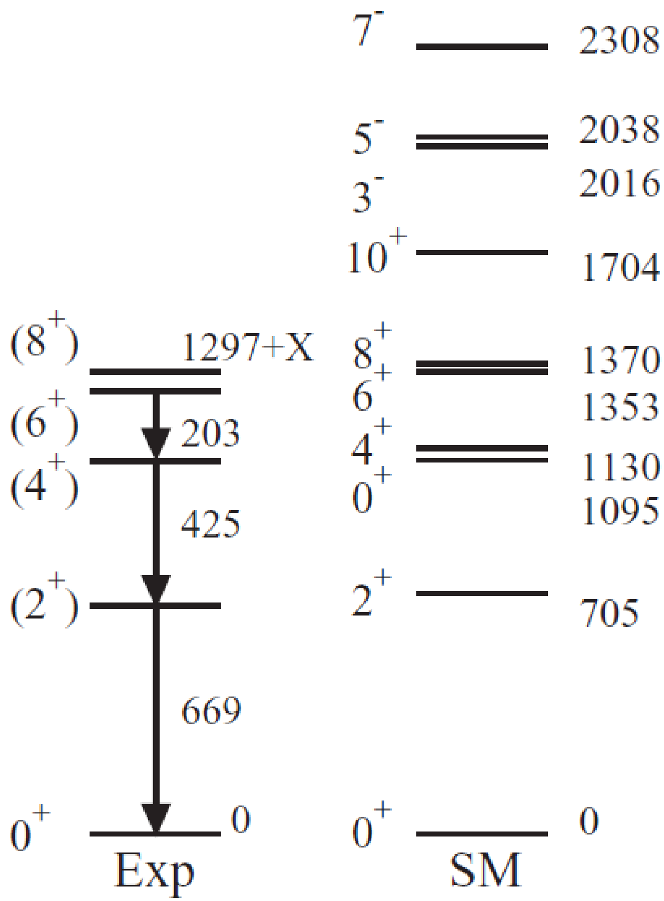
What can be populated in (t,p)?

208Pb(t,p)210Pb



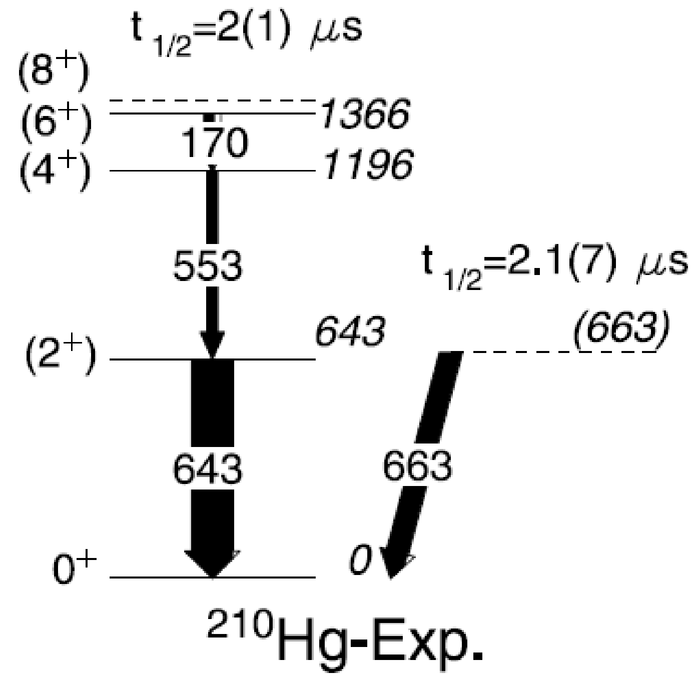
A.R. Flynn et al., Nuclear Physics A195 (1972) 97

What can we get from 206Hg(t,p)208Hg?



$^{208}_{80}Hg_{128}$

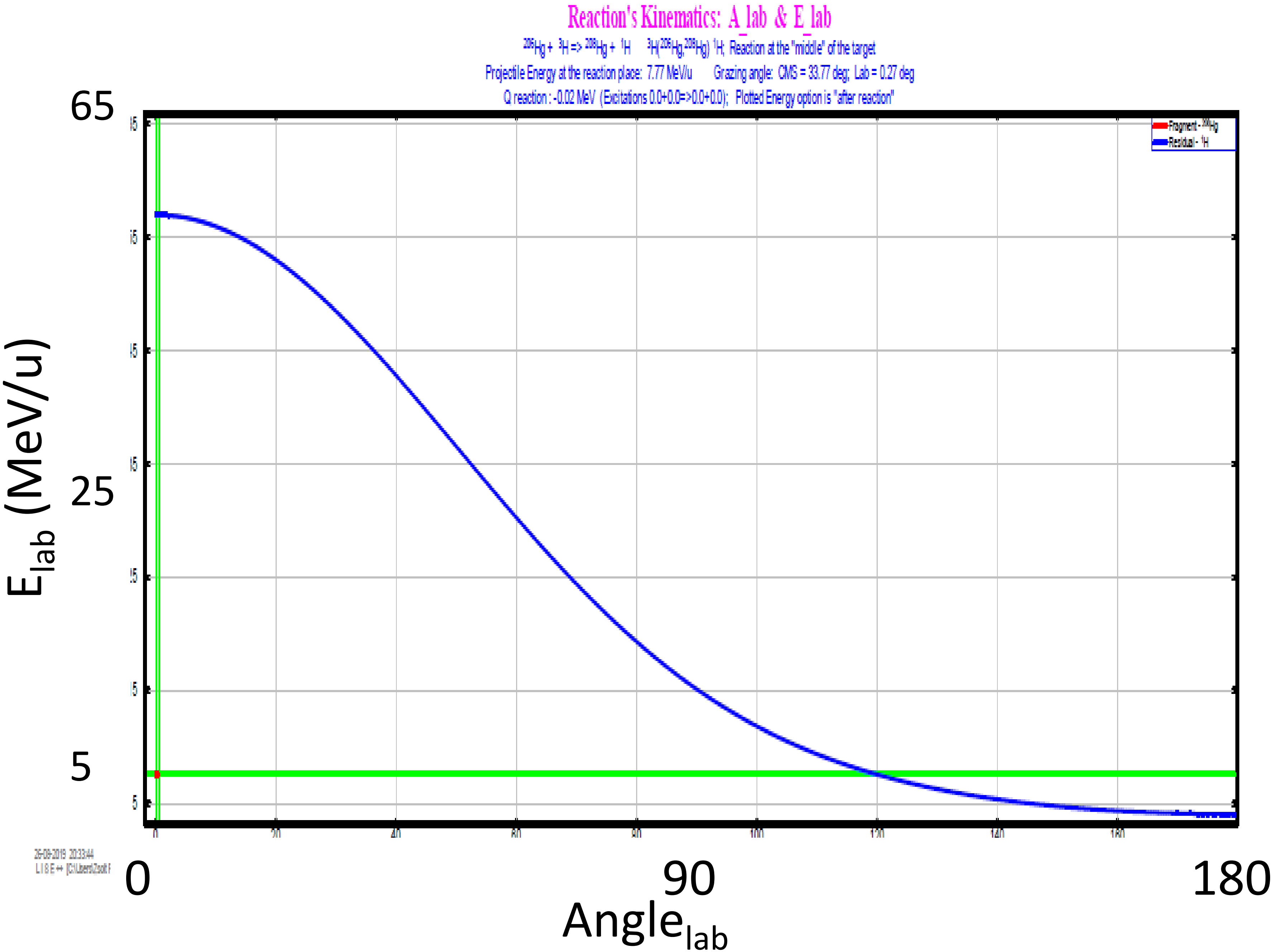
$\nu g^2_{9/2}$ states known only!



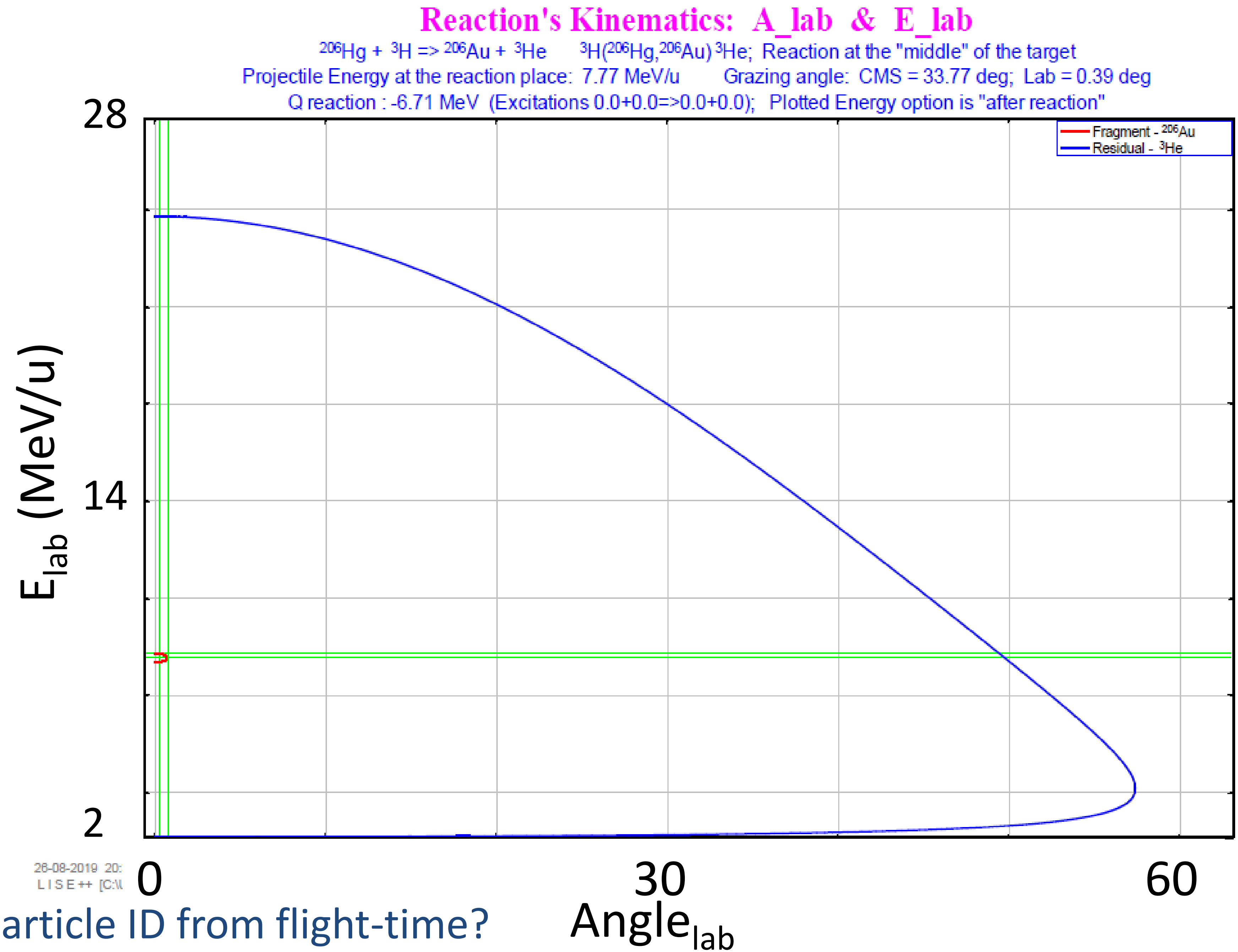
N. Al-Dahan et al., Phys. Rev. C80, 061302(R) (2009)

A. Gottardo et al.,
B. Phys. Lett. B 725, 292 (2013)

206Hg(t,p)208Hg



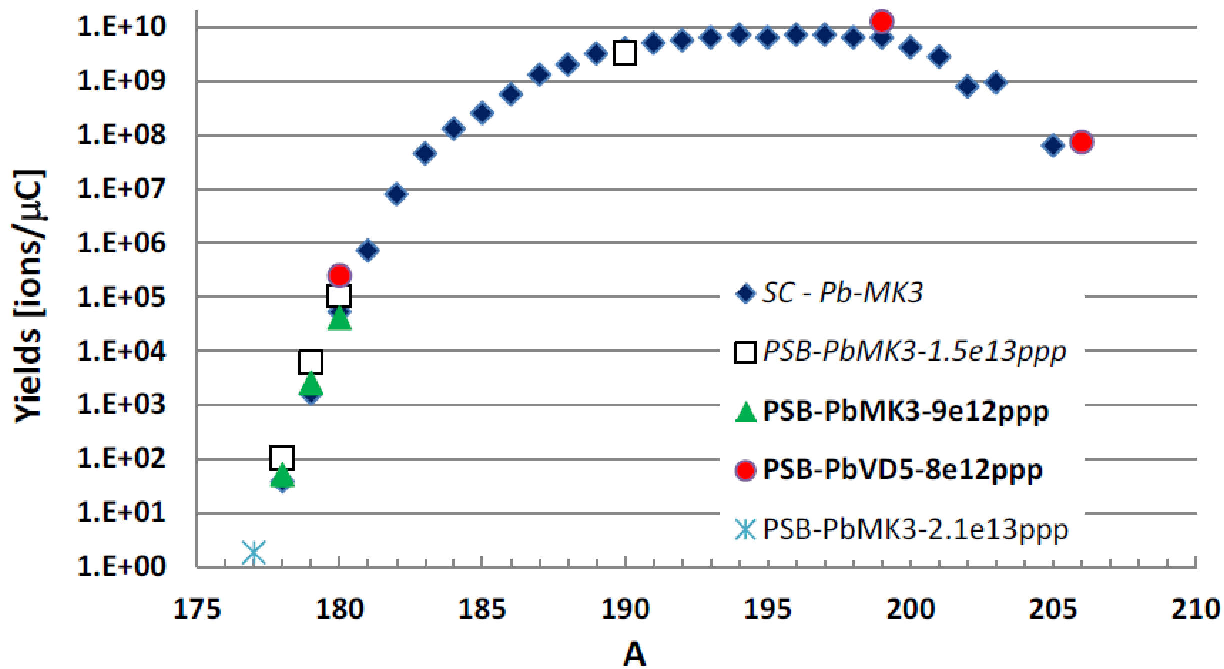
206Hg(t,3He)206Au



Particle ID from flight-time?

^{206,207}Hg beams at ISOLDE

Hg yields from molten Pb targets at ISOLDE



T. Stora, EURISOL town meeting, Oct. 2012

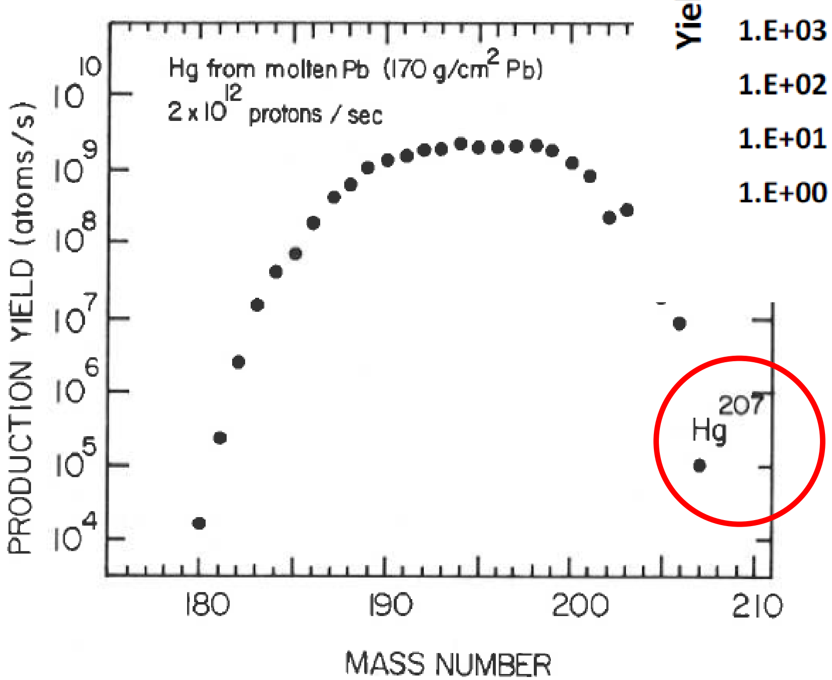


Fig. 1 Production yield in the ISOLDE facility of the mercury isotopes, including ^{206}Hg and ^{207}Hg.

^{207}Hg at IDS:

4×10^4 pps in 2014

2×10^5 pps in 2016

B. Jonson, O.B. Nielsen, J. Zylicz, CERN-81-09 (1981)
(Proc. Int. Conf. Nuclei far from stability, Helsingor, Denmark. Vol.2 p.640 (1981))

Summary

Transfer reactions with ^{206,207}Hg beams

Study of neutron-rich nuclei

206Hg(d,3He)205Au single proton states

Using triton targets

206Hg beams available

207Hg after upgrade?