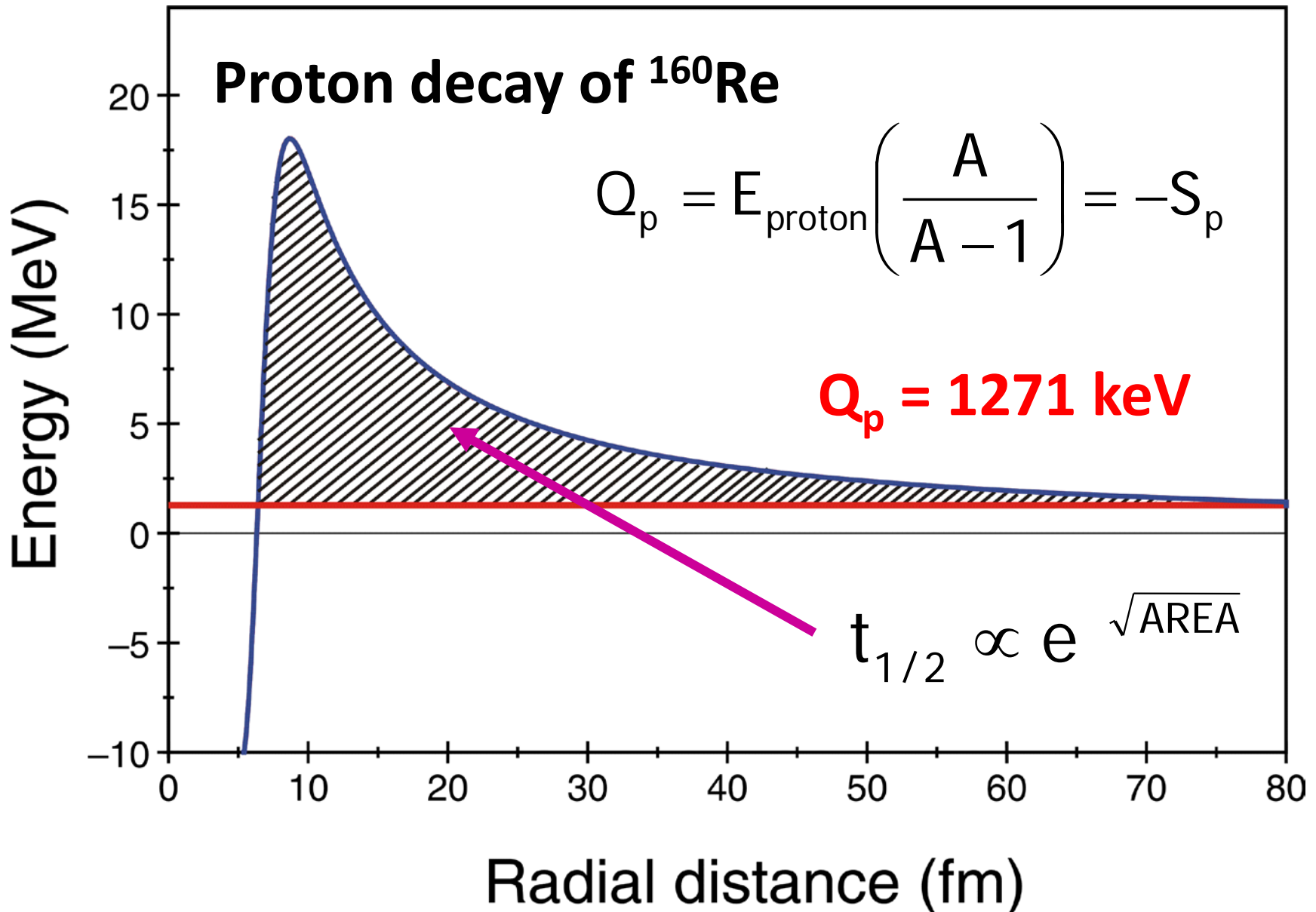
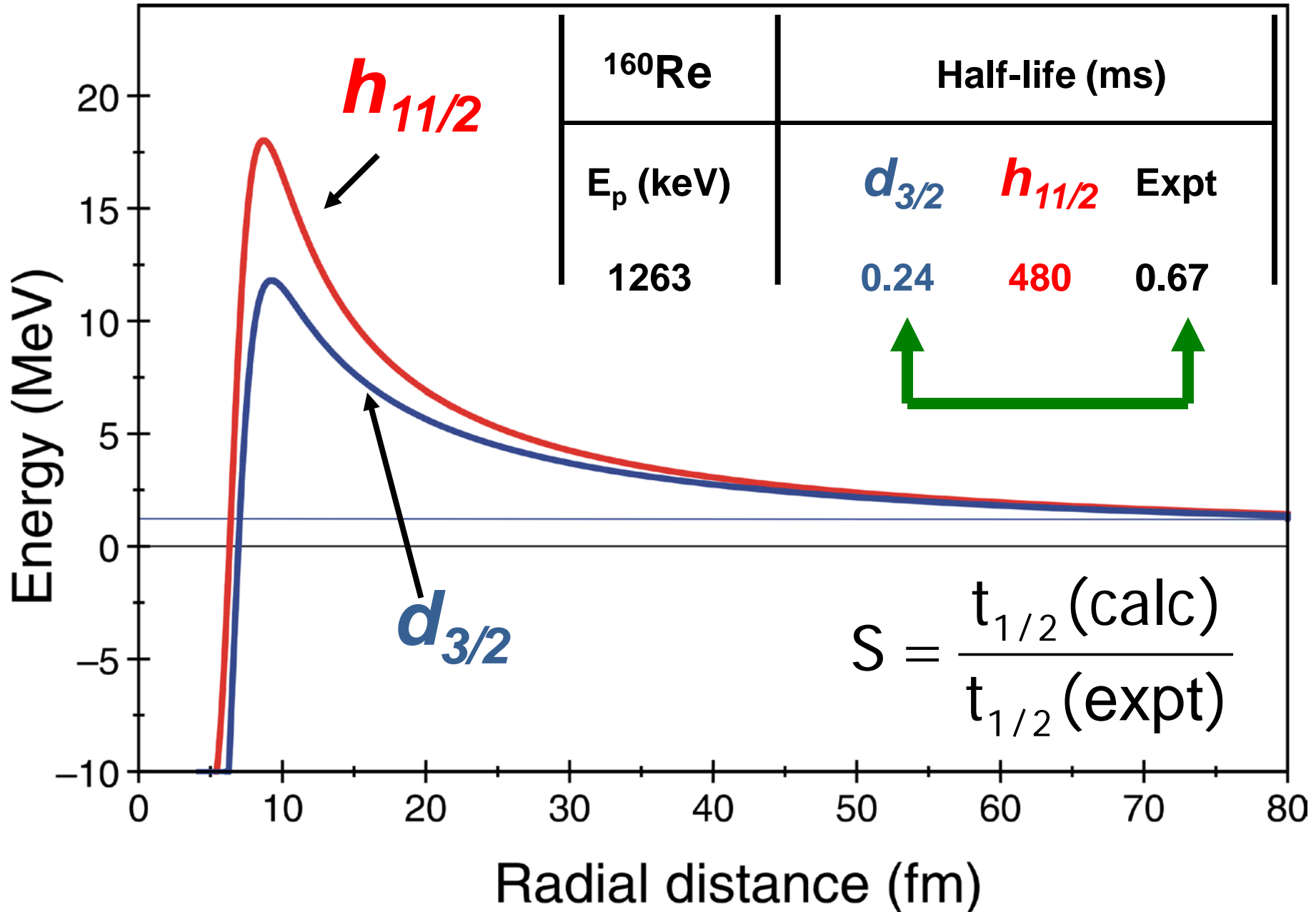


Proton emission from deformed rare earth nuclei

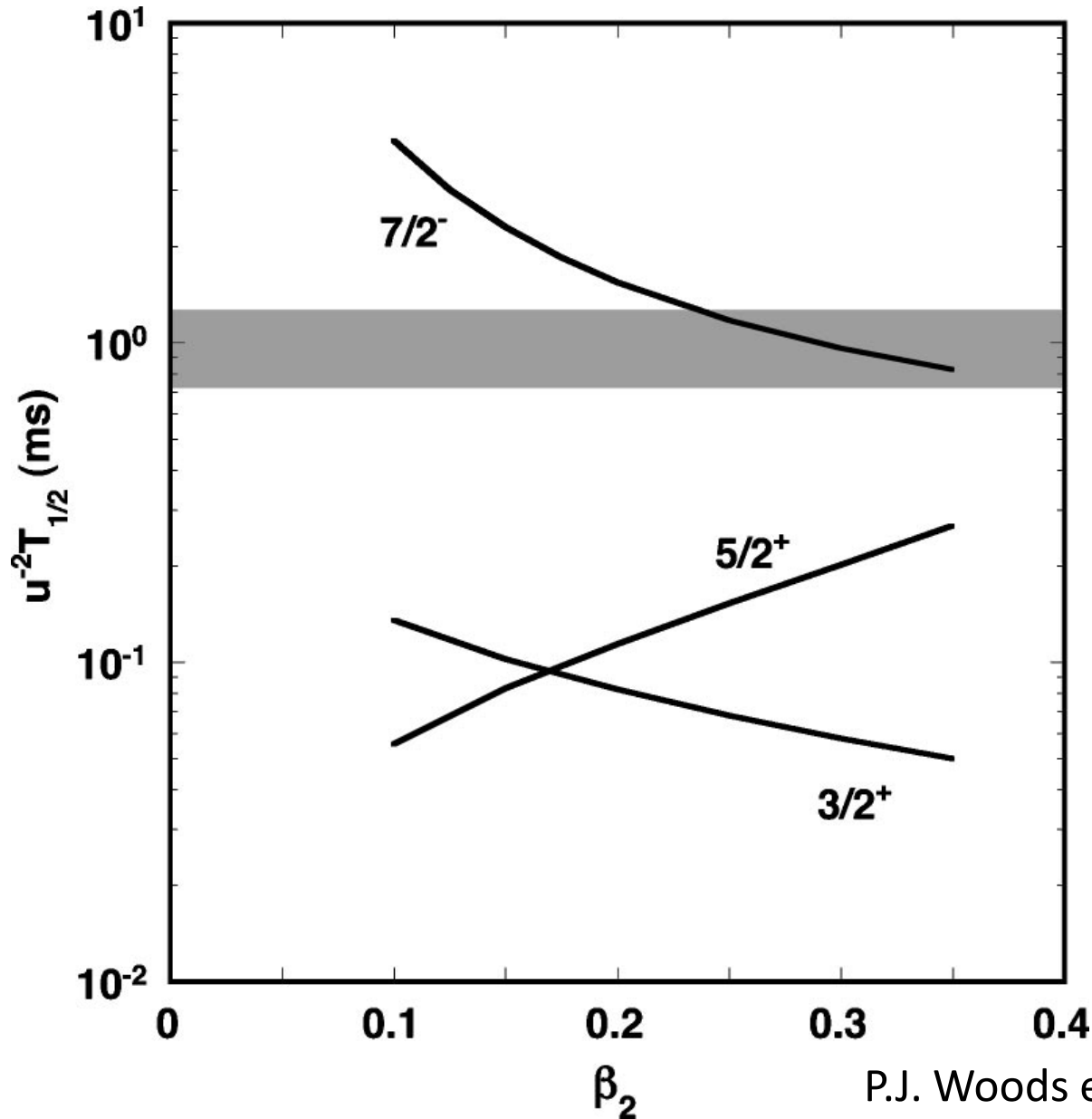
Simple model for spherical proton emitters



Proton emission as a spectroscopic tool

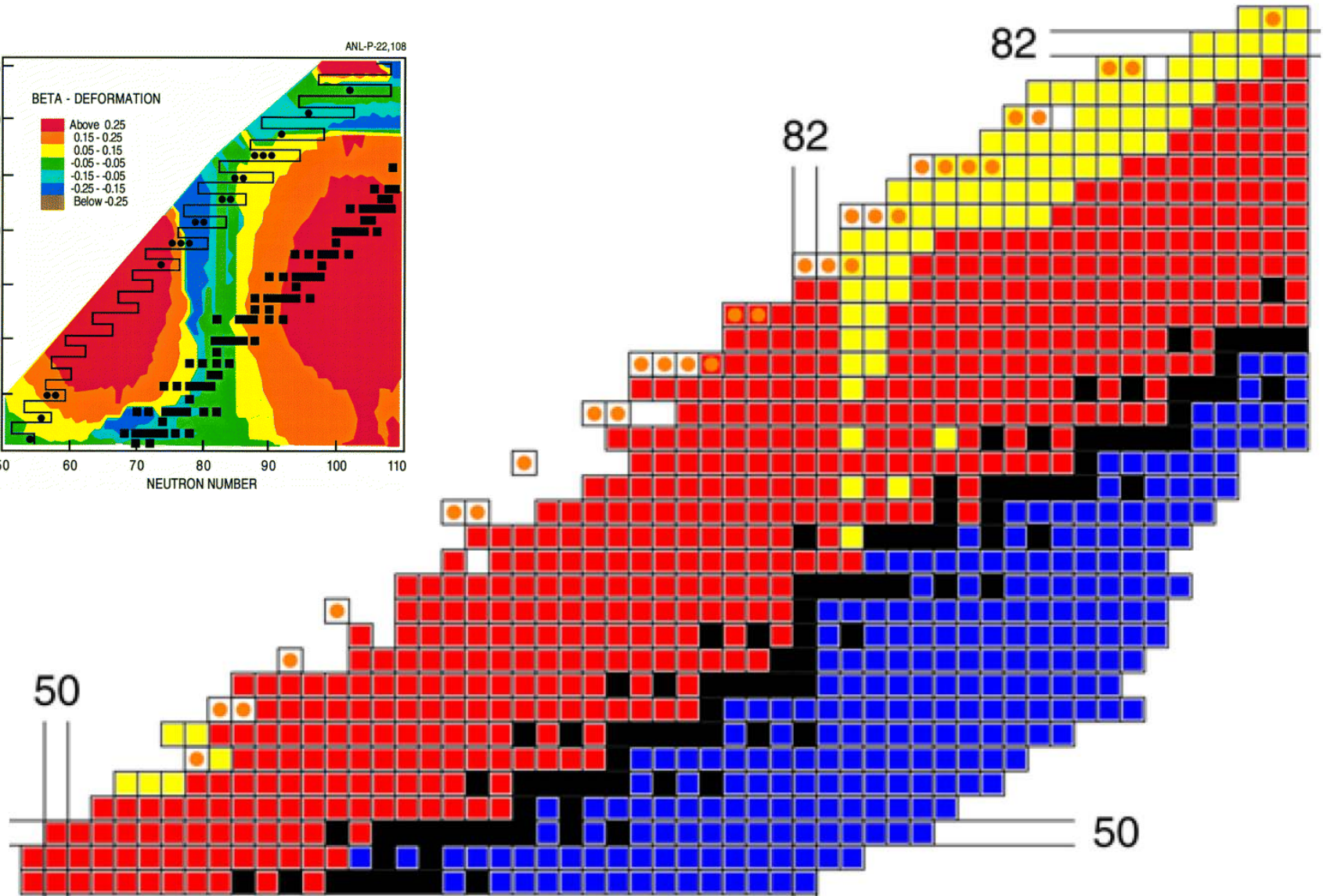
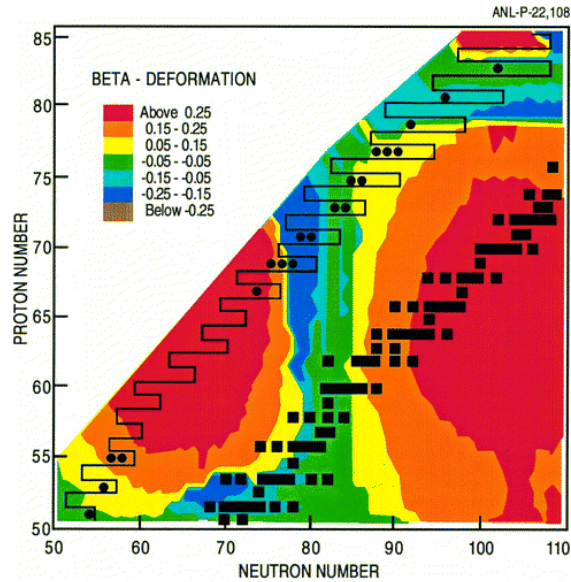


Deformed proton emitters



^{135}Tb

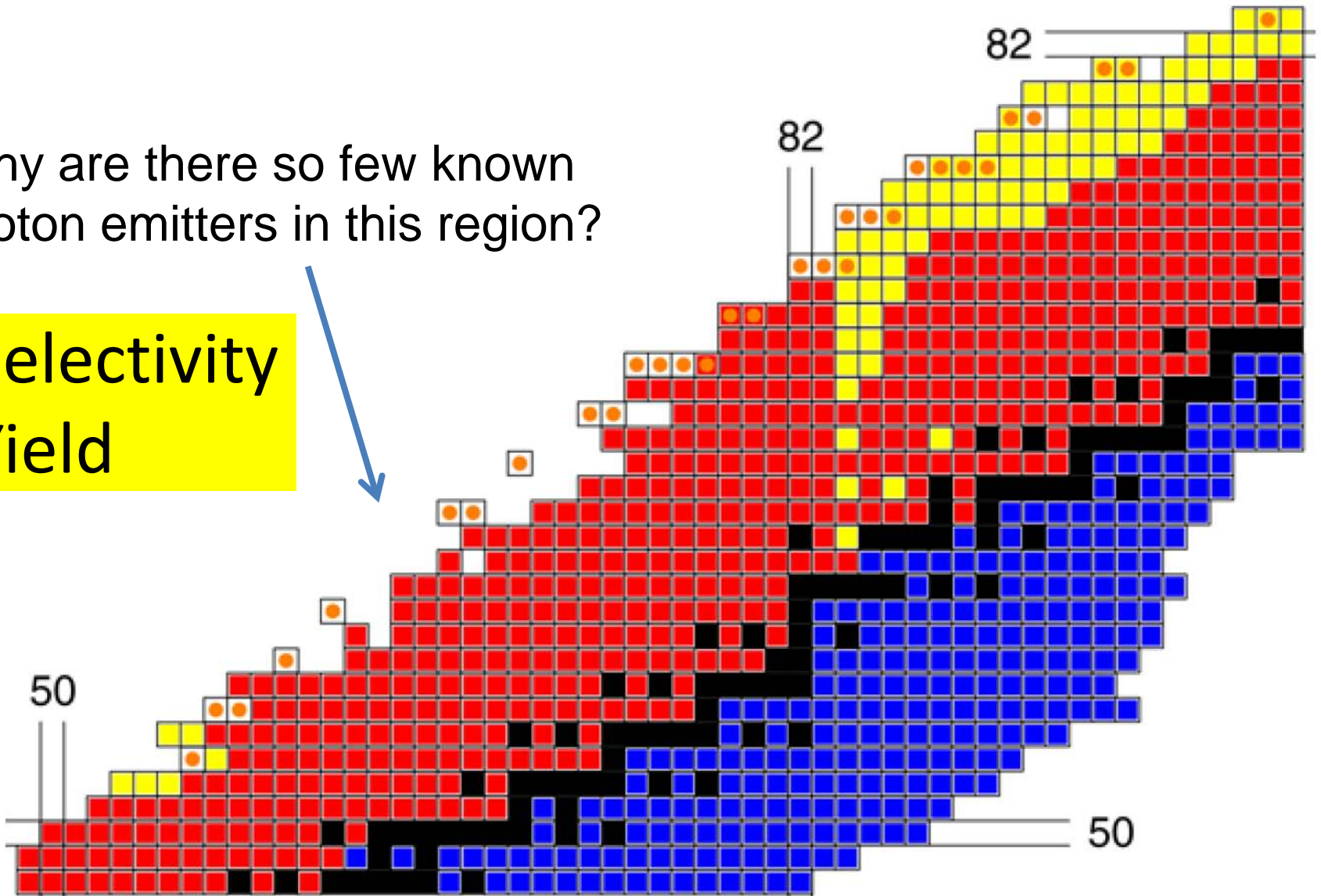
Known Proton Emitters ●



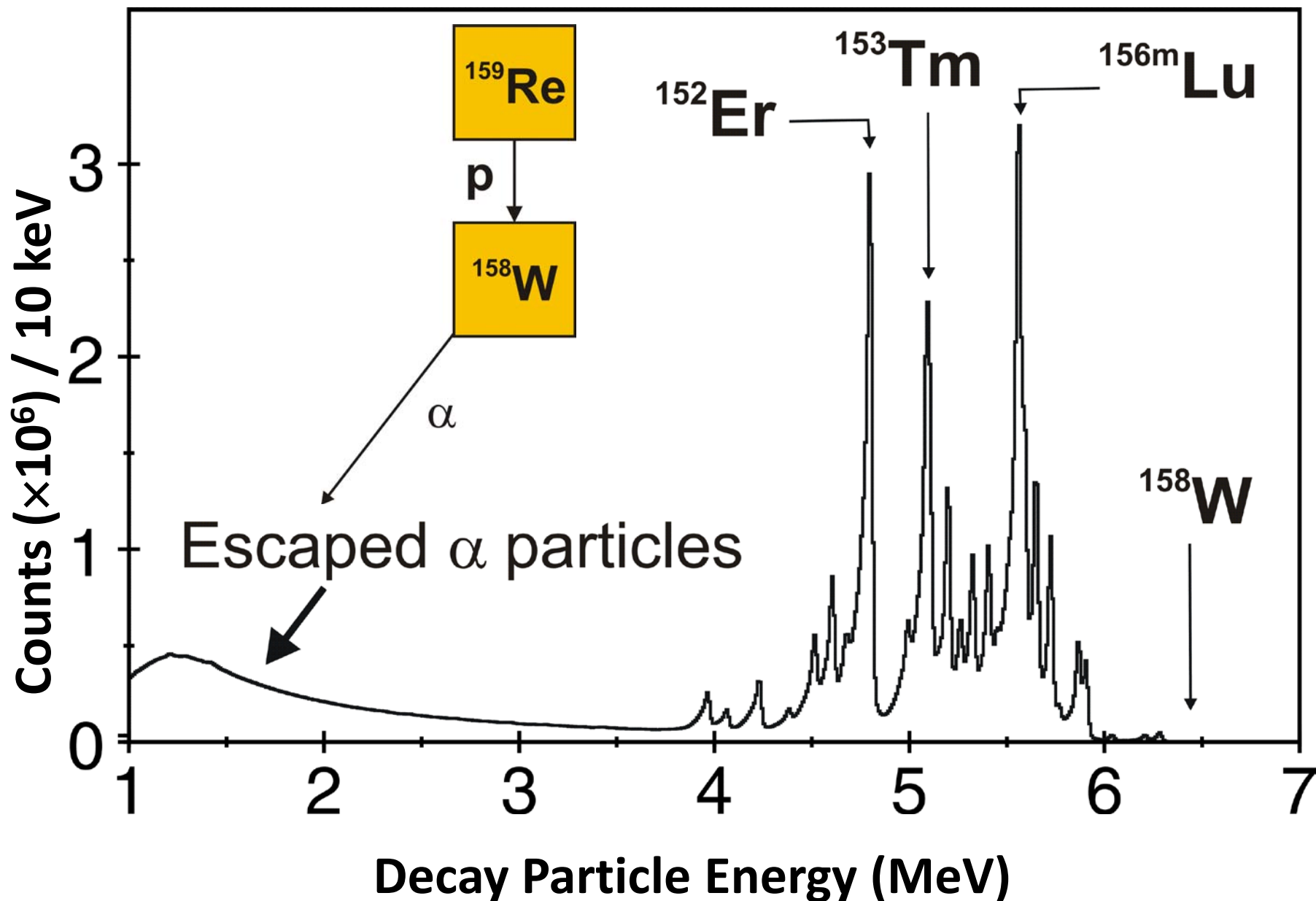
Known Proton Emitters ●

Why are there so few known proton emitters in this region?

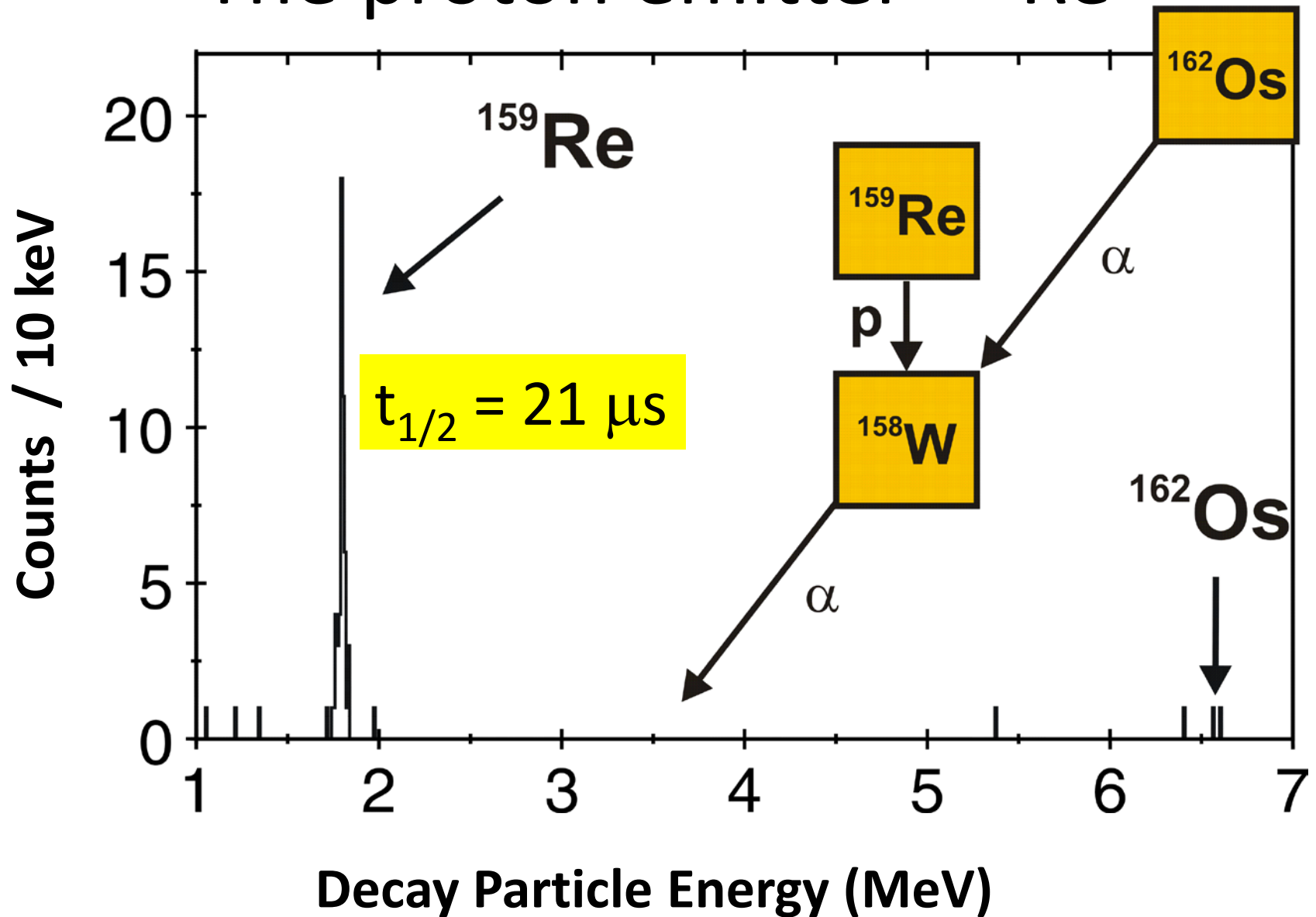
Selectivity
Yield



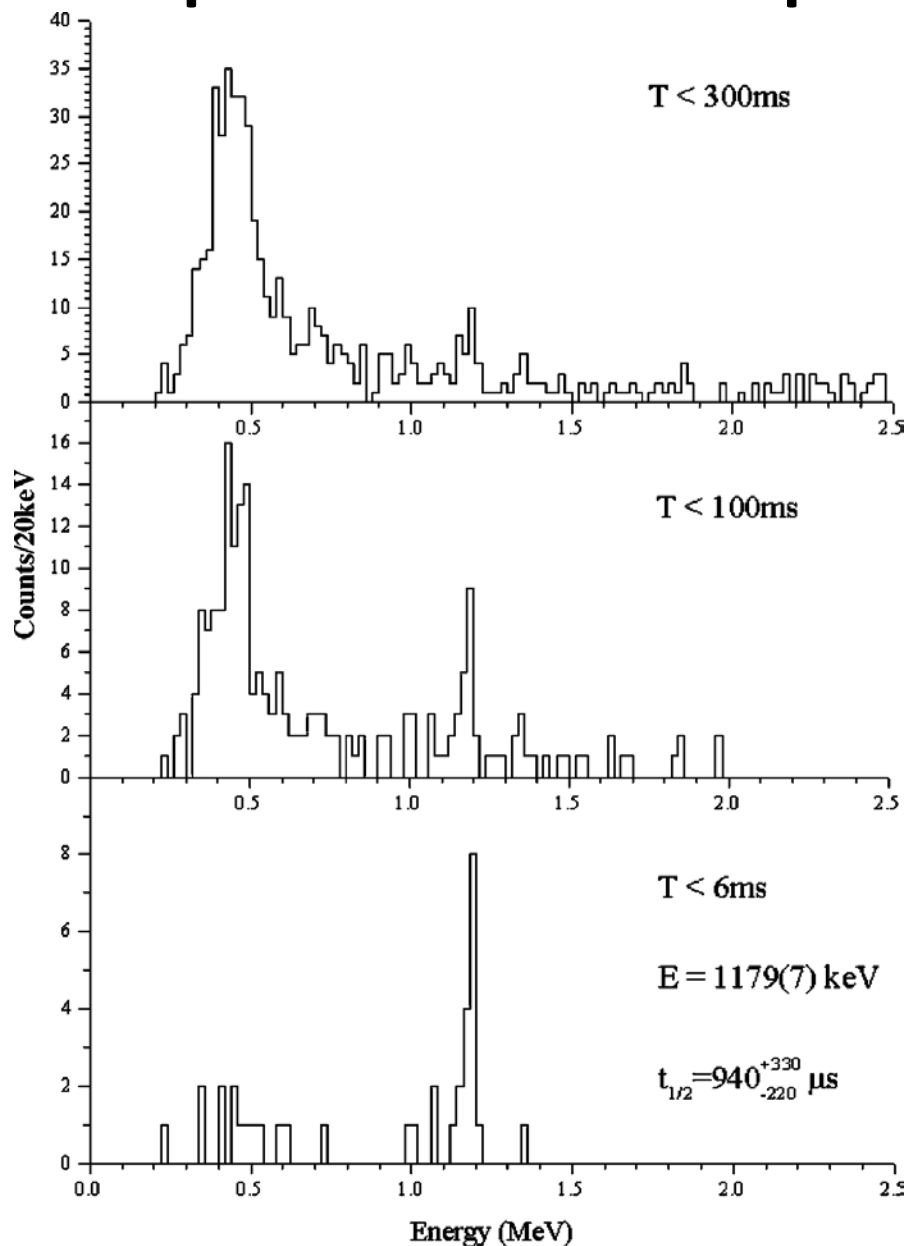
Implantation – proton – alpha correlation



The proton emitter ^{159}Re



Implantation – proton correlations

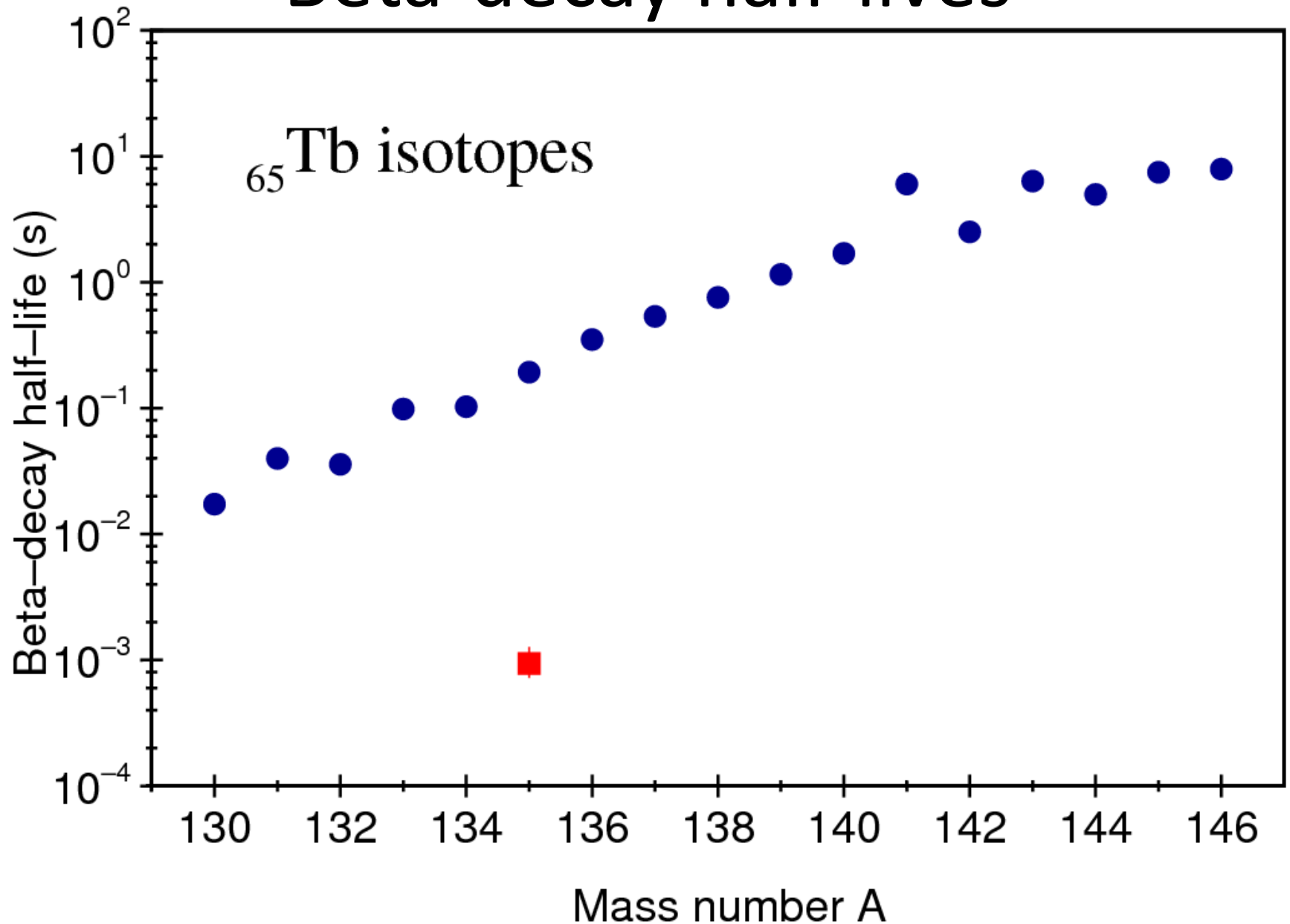


Argonne FMA

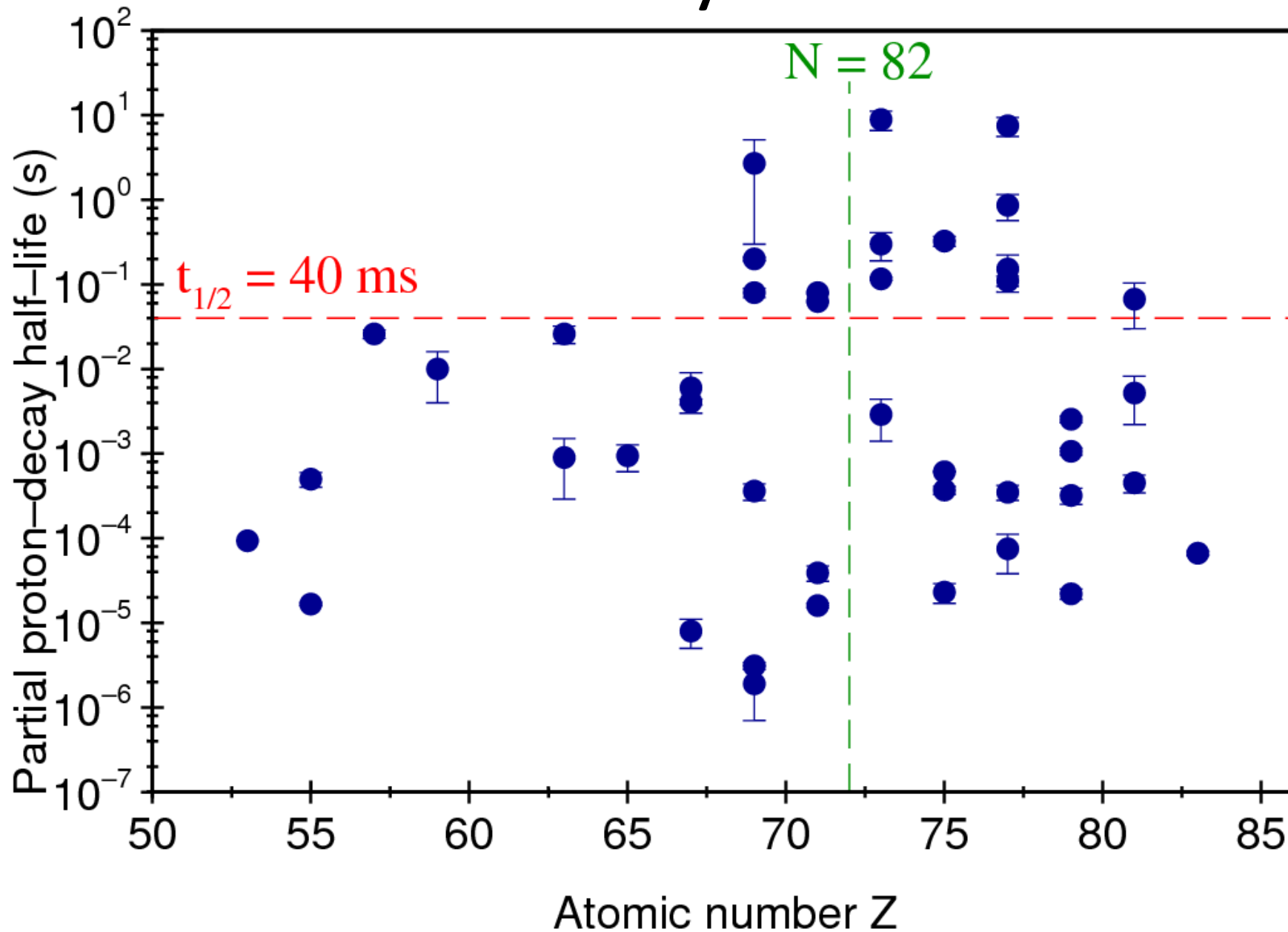
A = 135 only

60 μm thick DSSD

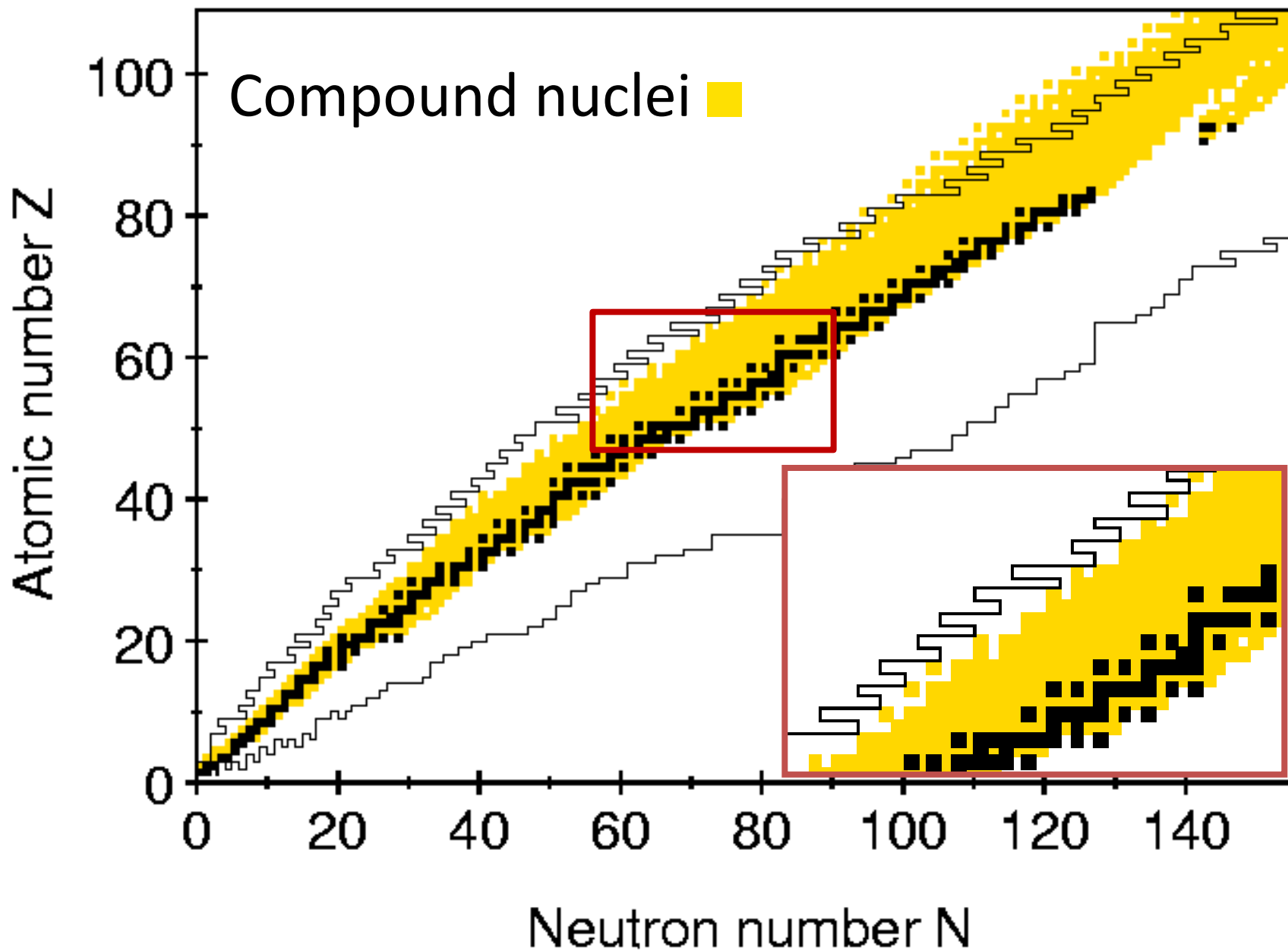
Beta-decay half-lives



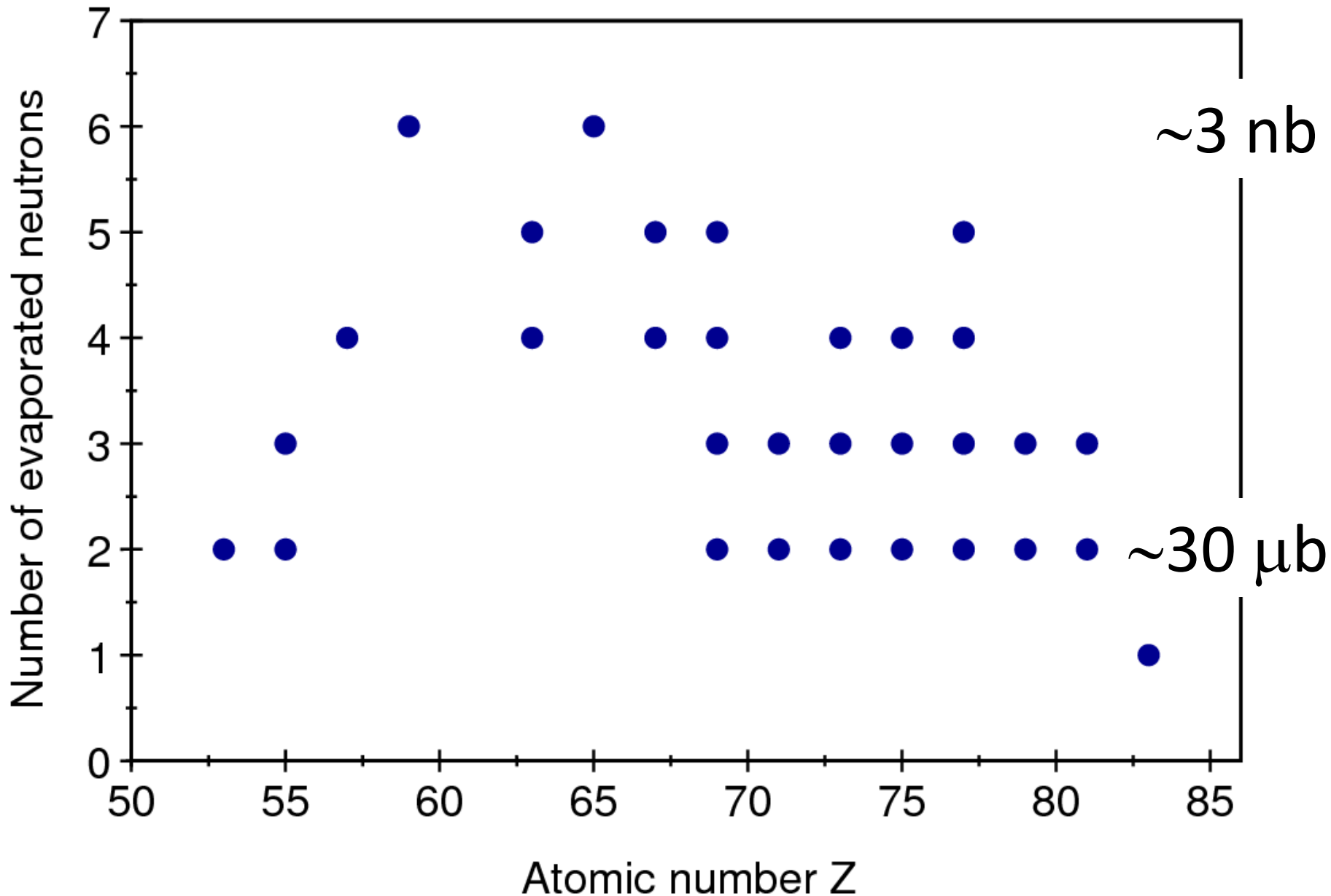
Proton-decay half-lives



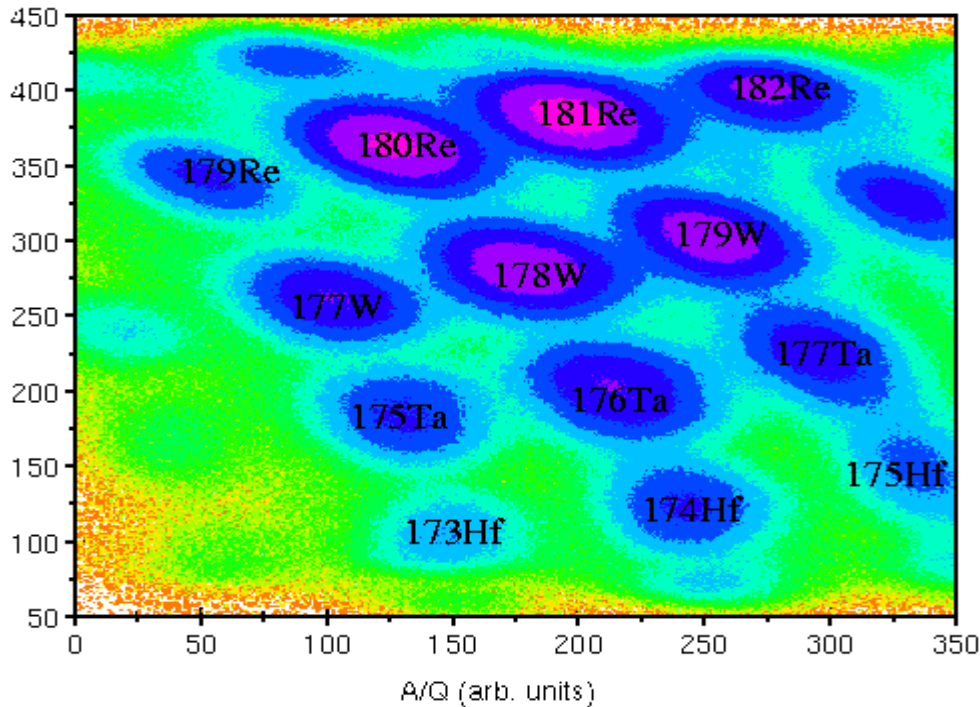
Fusion-evaporation reactions



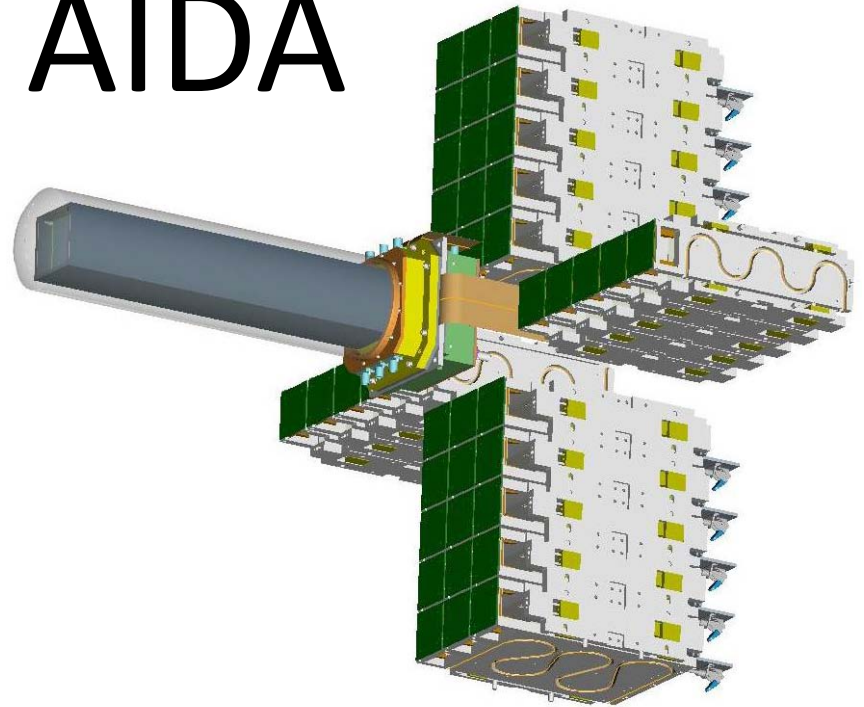
Fusion-evaporation $p\alpha n$ reactions



(Super-)FRS \Rightarrow A & Z separation



AIDA

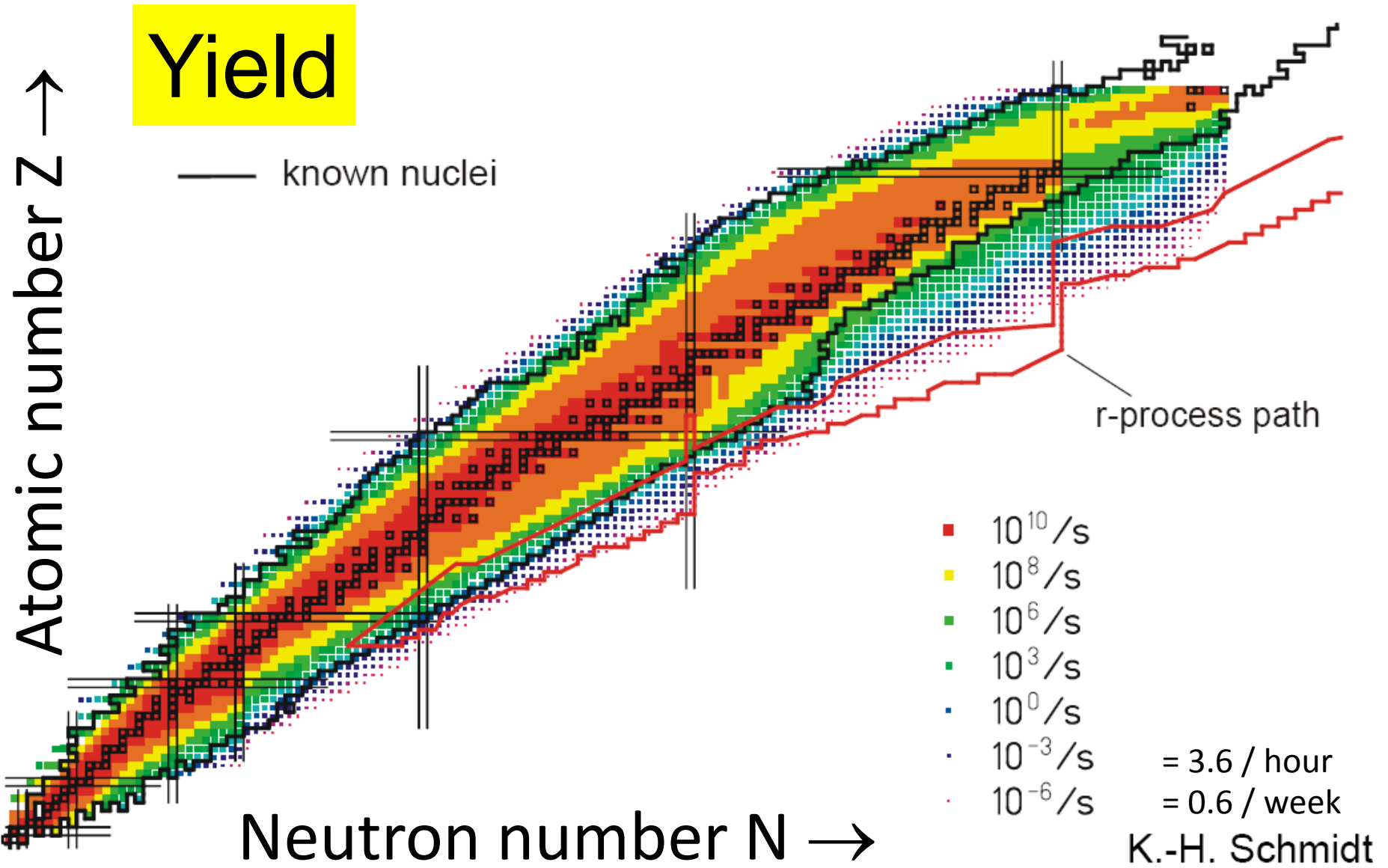


Isomer γ decays or known p
for unique A & Z identification

Selectivity

Predicted Super FRS Yields @ $10^{12}/s$

Yield

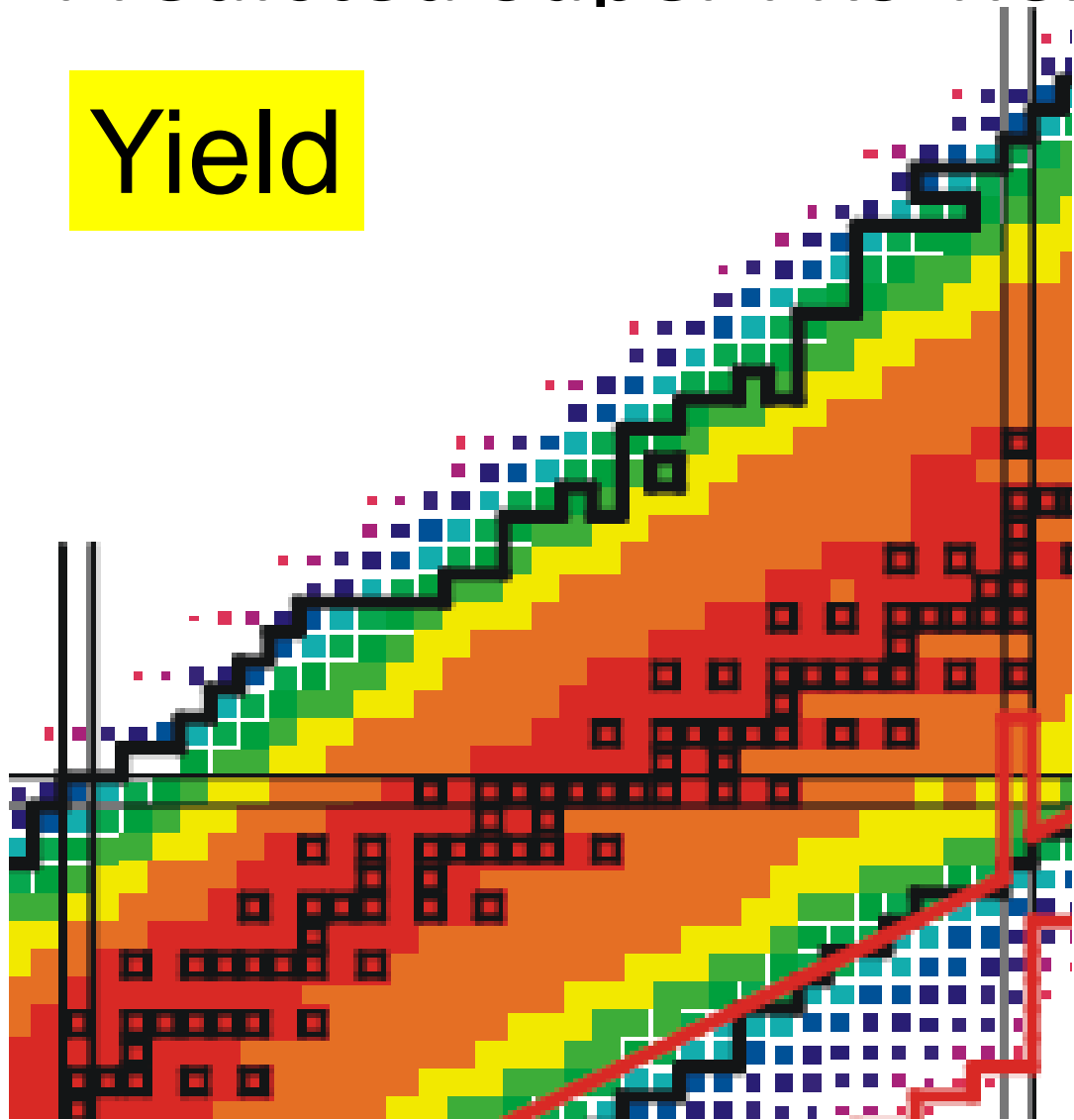


K.-H. Schmidt

Predicted Super FRS Yields @ $10^{12}/s$

Yield

Atomic number Z →



- $10^{10} /s$
- $10^8 /s$
- $10^6 /s$
- $10^3 /s$
- $10^0 /s$
- $10^{-3} /s = 3.6 / \text{hour}$
- $10^{-6} /s = 0.6 / \text{week}$

Neutron number N →

Some physics opportunities

- **New proton emitters**
- **Weak proton-decay branches**
- **Proton-decay fine structure**
- **Precision measurements**
- **Beta-delayed gamma spectroscopy**

Outstanding questions

- **Background from β and βp decays**
(1 mm thick DSSDs cf. 60 μm)
- **Identify best physics cases**
- **Choose best primary beam**

Your input is welcome...