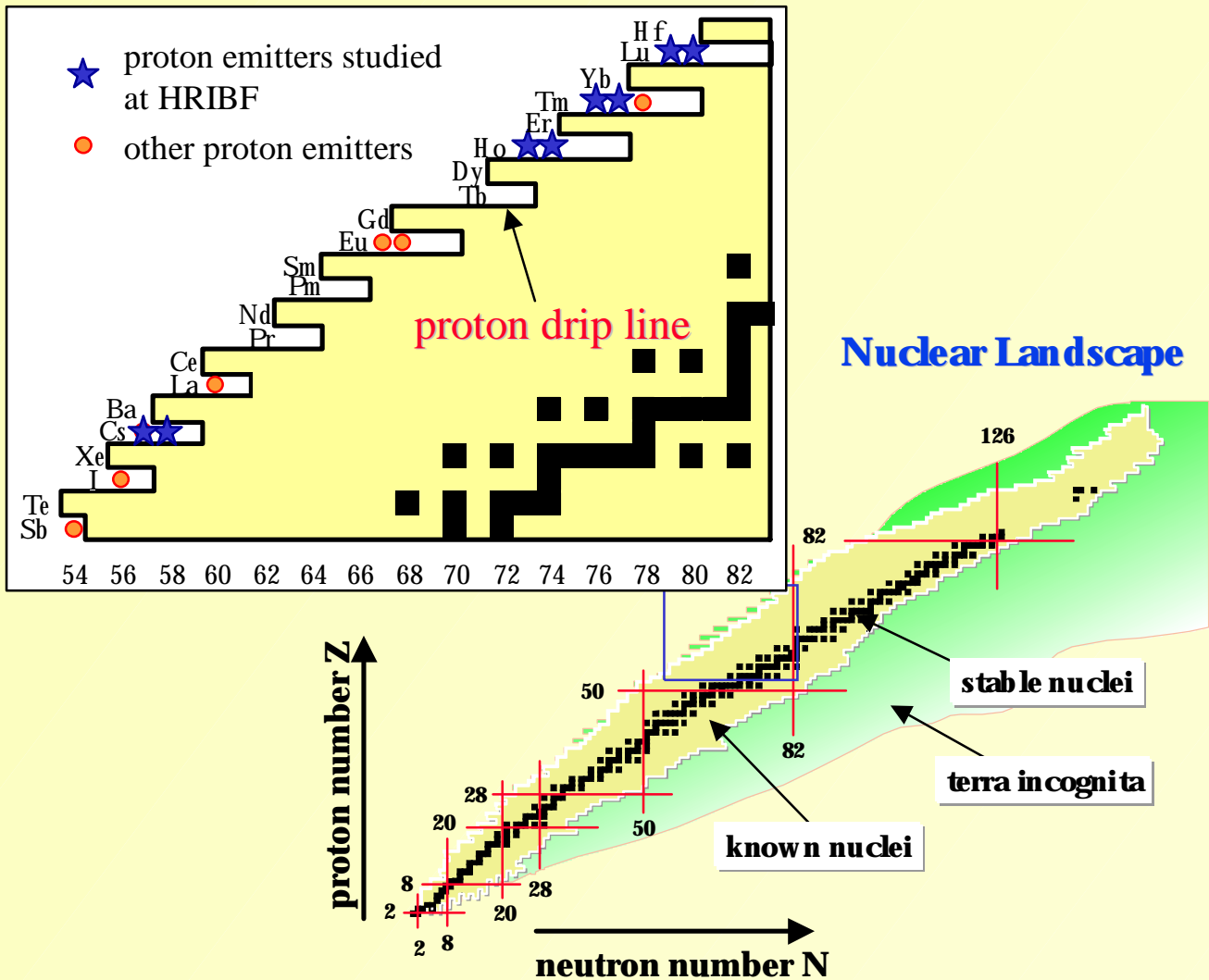


Search for Proton Emitters - Life Beyond Proton Drip Line

Our Work:

- We have identified and studied five new proton emitters, including ^{145}Tm - the emitter with the shortest half-life (3 microseconds) yet measured for proton radioactivity.
- We observed for the first time fine structure in the proton emission in the decay of ^{145}Tm , $^{146\text{g.s.}}\text{Tm}$, and $^{146\text{m}}\text{Tm}$, the later two cases represent the first experiment where neutron states were studied via proton radioactivity.
- We have developed a system based on digital signal processing for decay spectroscopy which allows us to reach sub-microsecond particle emitters.



The Science:

- Nuclei beyond the proton drip-line are unstable to proton emission. The partial half-lives of these narrow resonance states range from seconds to microseconds for the most exotic emitters.
- The experimental challenge is to identify very rare signals in the presence of a very high background. This is related to the very small production cross-sections and short half-lives of these emitters.