VANDLE Reaction Studies

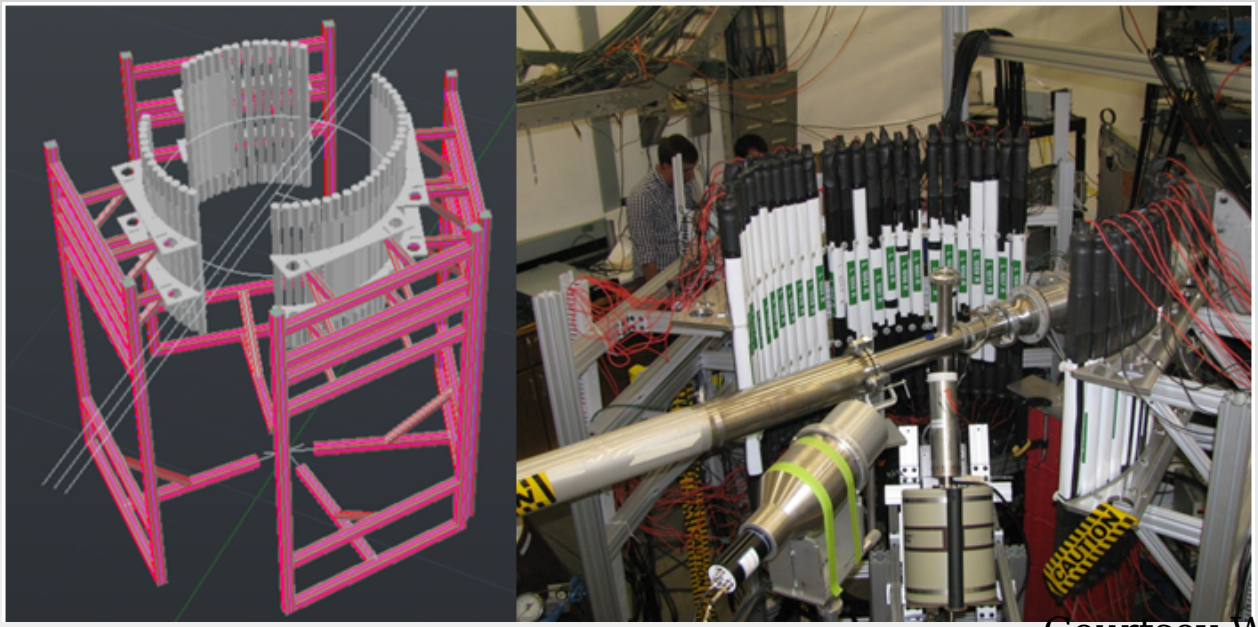
S. V. Paulauskas

Why study neutrons from reactions?

- We can study (d,n) as an analogue for (p,γ) for stellar nucleosynthesis in novae and x-ray bursts.
- Non-proliferation needs accurate cross sections for reactions involving neutrons.
- Can be used to study nuclear structure of nuclei such as ^{8,11}B.

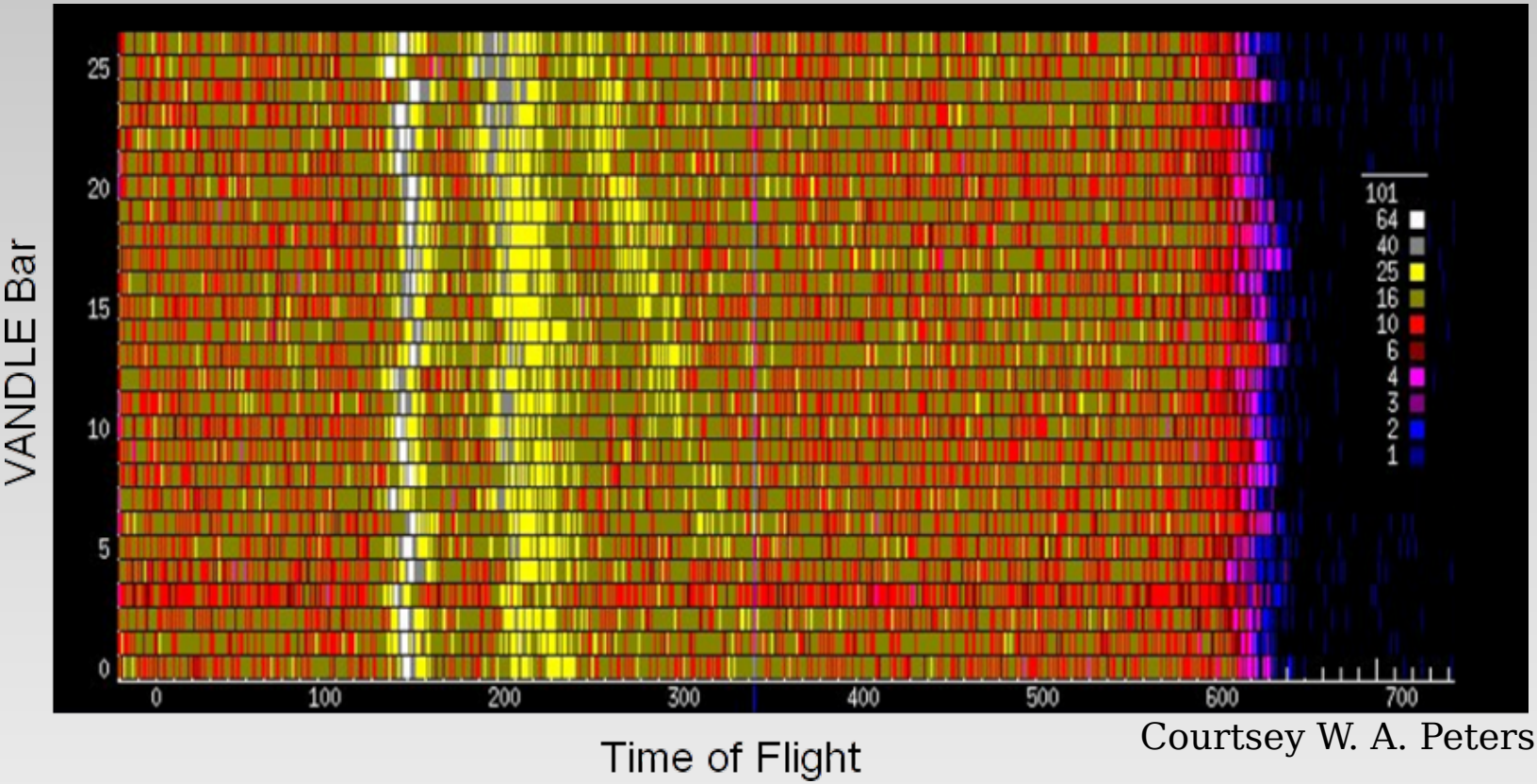
$^{19}F(\alpha,n)$

- NNSA put out call to study cross section for applications to in-field detection systems and assay of UF_6
- Measurement performed at Notre Dame



Courtesy W. A. Peters

Preliminary Results

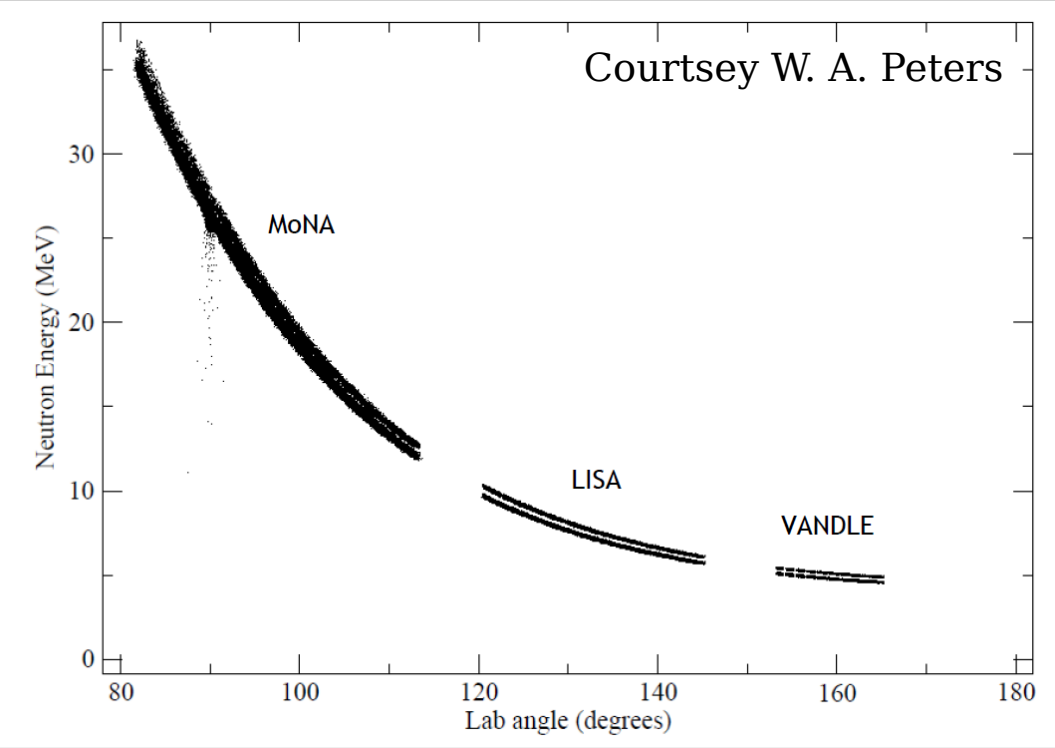


Courtsey W. A. Peters

This experiment will be continued at HRIBF

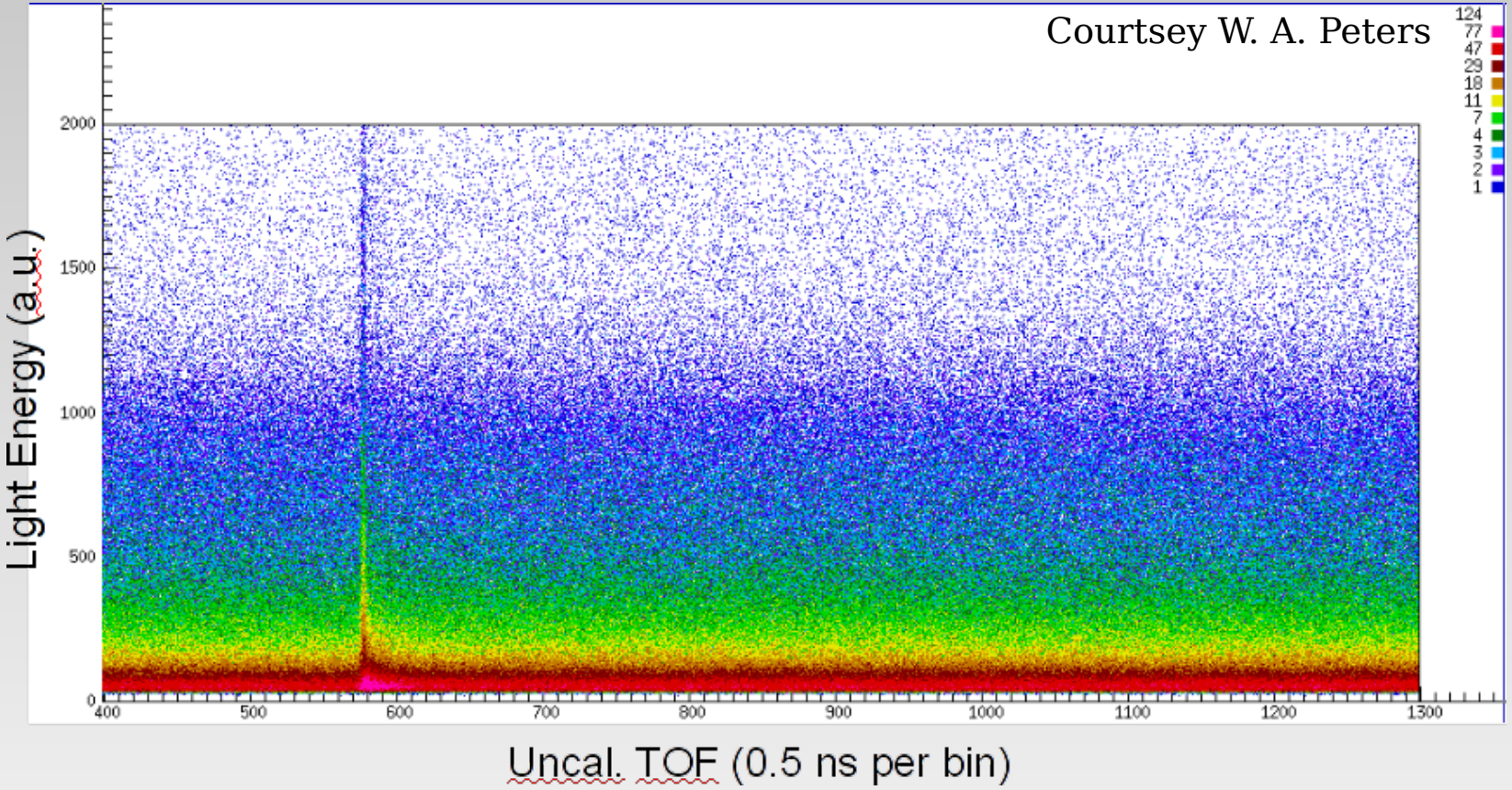
^{56}Ni(d,n)

- Important waiting point nucleus in rp-process
- Measurement performed at NSCL
- Merged VANDLE with MONA/LISA array



^{56}Ni - setup

^{56}Ni - Preliminary Results



Summary

- VANDLE can be used to study a variety of reactions involving neutrons.
- Because it is a versatile (ha) array it can be molded to fit nearly any physical situation
- The fully digital acquisition system works stand alone but can be coupled to existing systems
- VANDLE provides potentially simple augmentation to other established detection systems.