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A Measurement of the Neutron  
Asymmetry in  $d(\vec{p}, n)p$   
at Low Energies.

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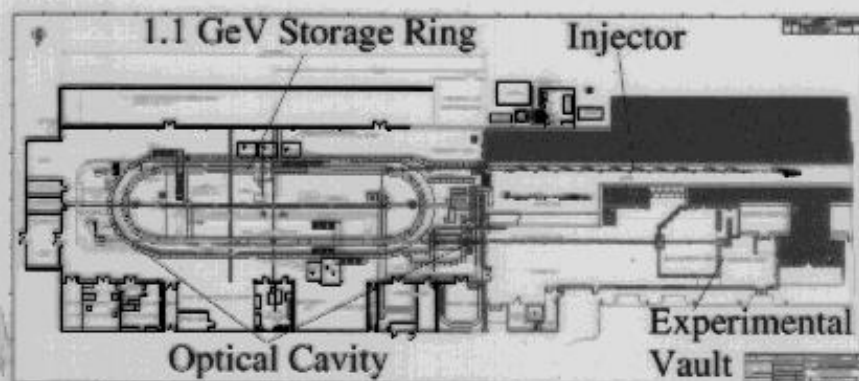
Experiment:  $d(\vec{P}, n)_p$

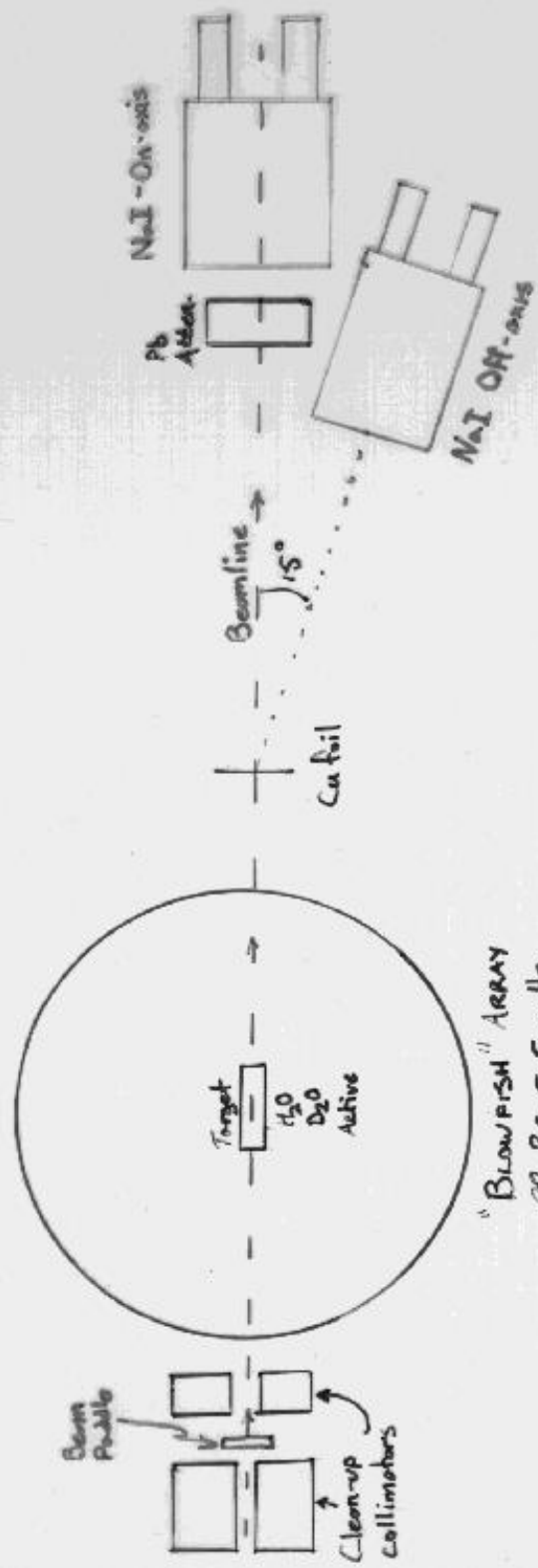
$E_\gamma = 6.0, 4.0, 3.5, 2.6 \text{ MeV}$

Why?: Asymmetry  
M1 contribution to n-p capture  
cross section  
(Absolute cross section?)

Where: HIGS  
High Intensity Gamma Source  
Duke University

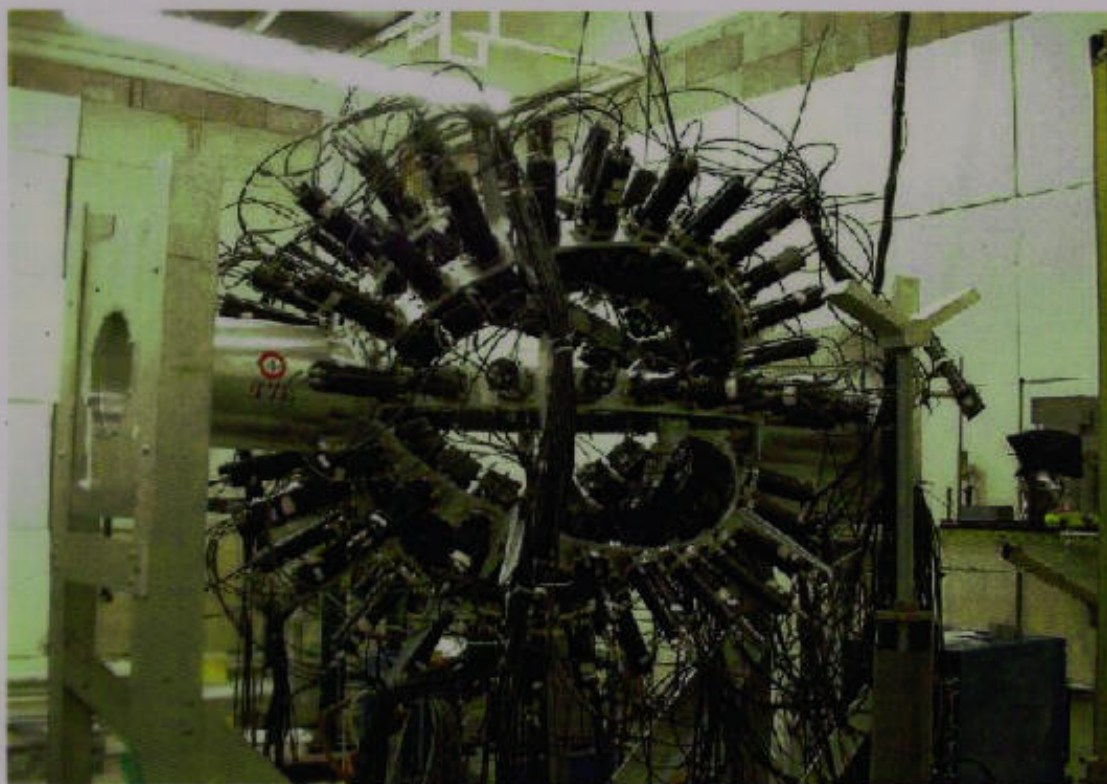
- monochromatic ( $\frac{\Delta E}{E} \rightarrow 2-3\%$ )
- 100% linear polarized
- high intensity ( $10^6 \text{ n/sec}$ )



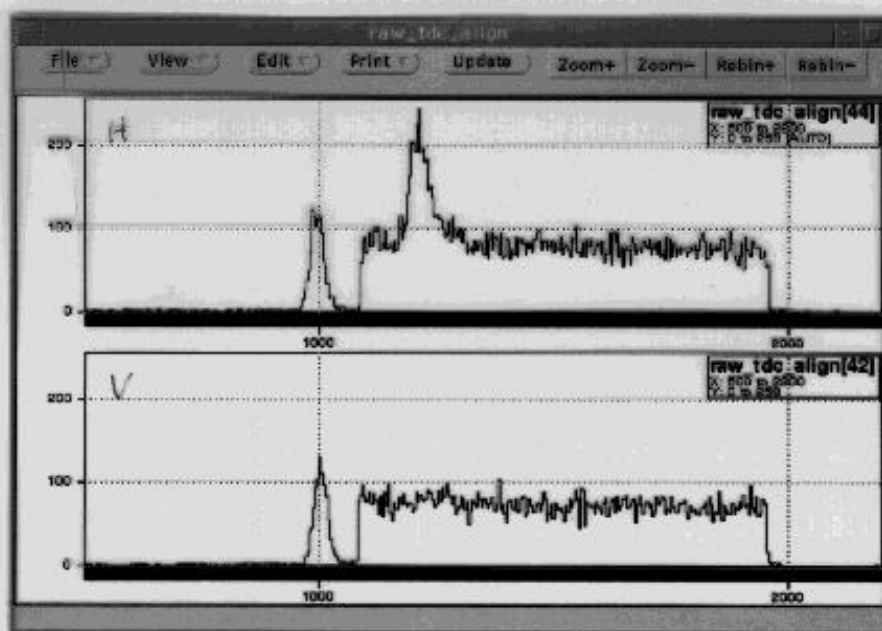


"Blowfish" Array  
 88 BC-SOS cells  
 ~ 4π coverage

BLOWFISH ARRAY  
(UVA / USub)

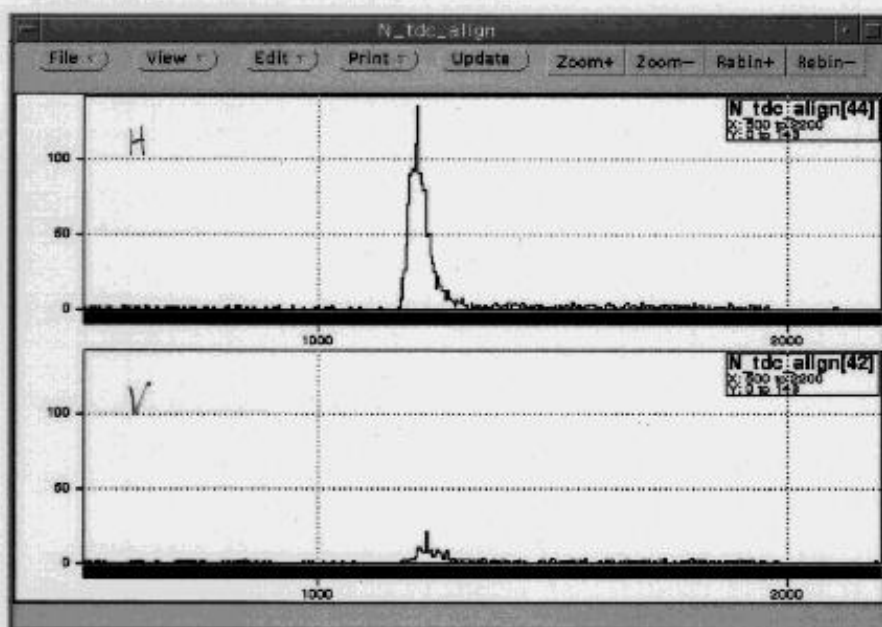


RAW:

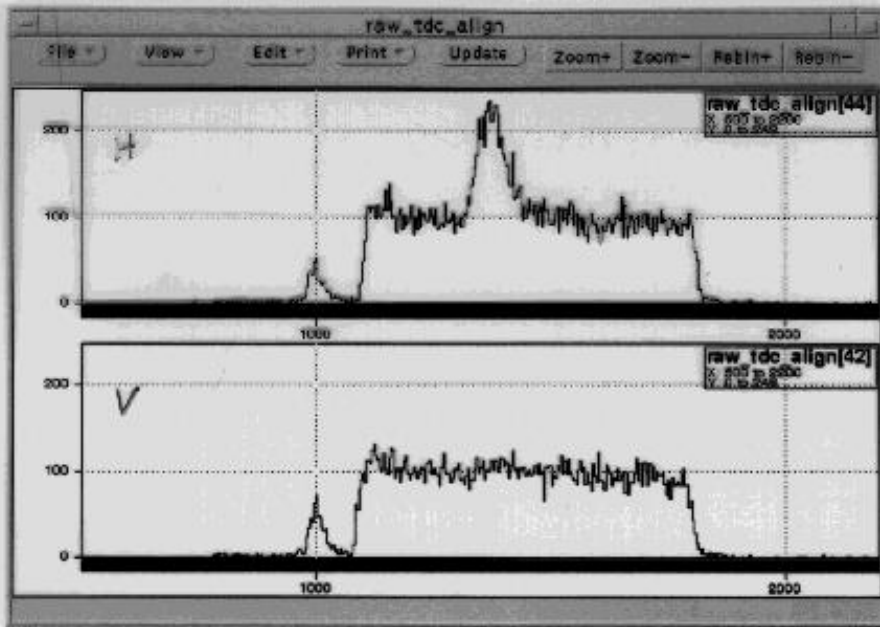


6.0 MeV

w/  
PSD cut

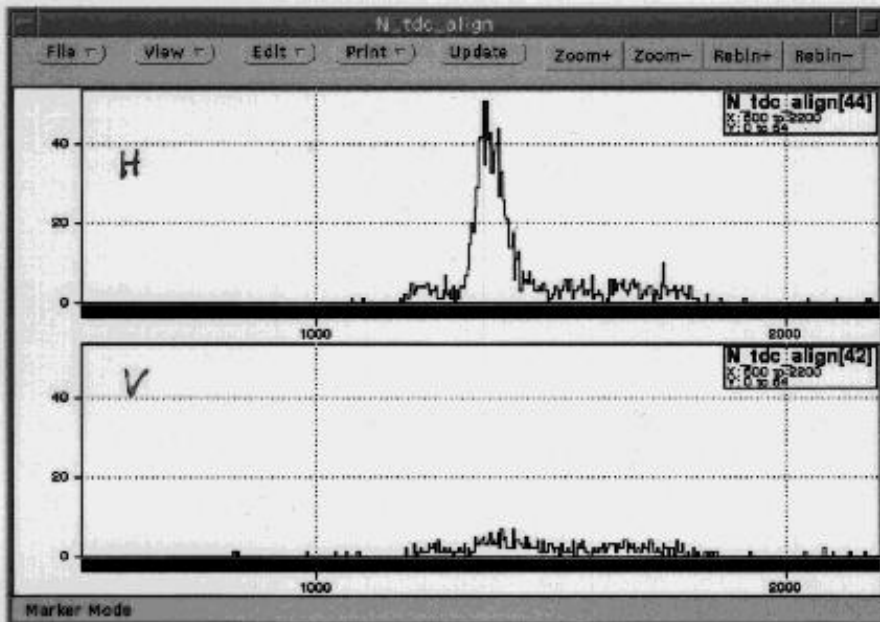


Raw:



3.5 MeV

w/  
PSD Cut



## Asymmetry

neutron yield/cell =  $\Sigma$ (neutron cut) -  $\Sigma$ (background window)

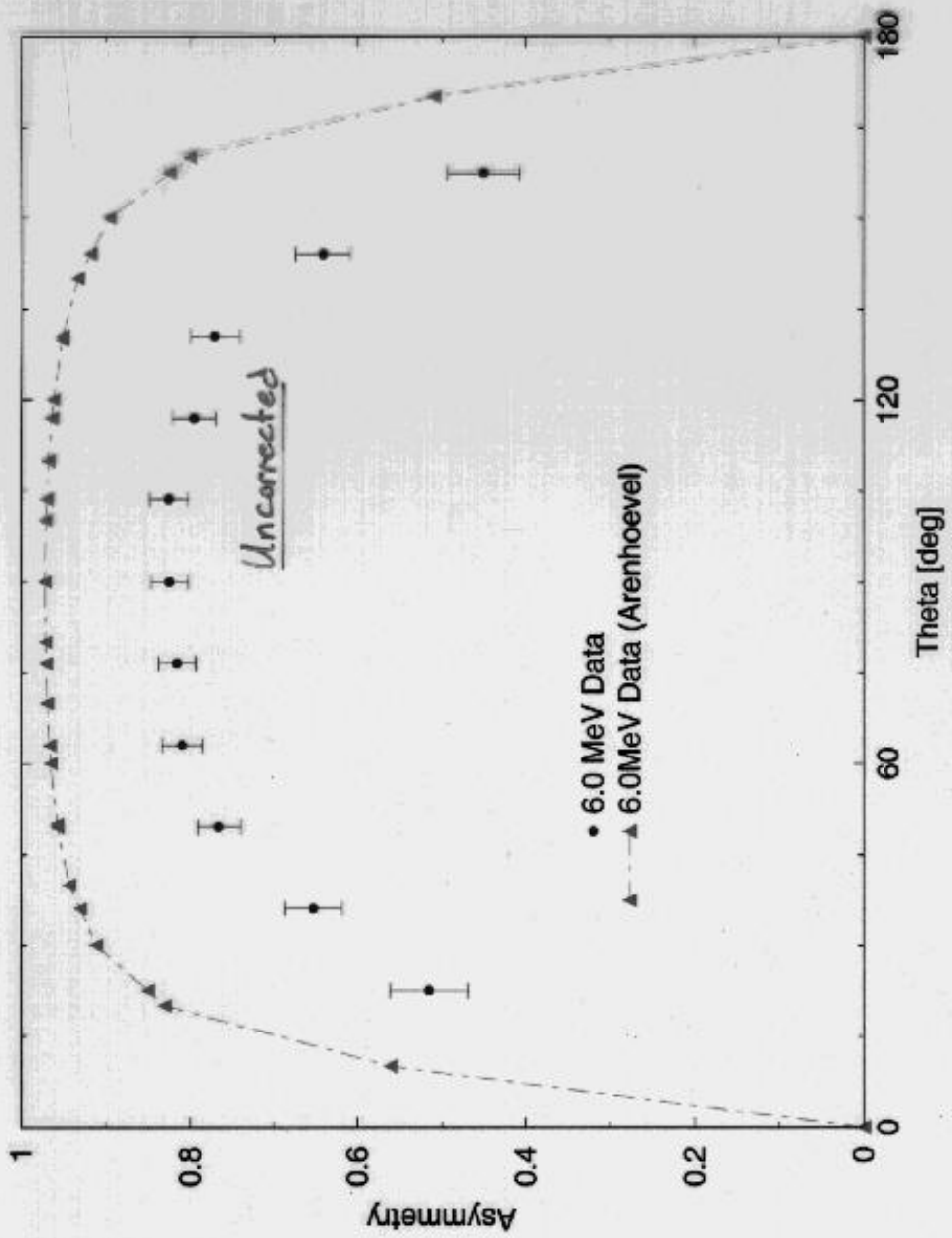
$$\text{Asym}(\theta) = \frac{\Sigma H(\theta) - \Sigma V(\theta)}{\Sigma H(\theta) + \Sigma V(\theta)}$$

## Cross Check

- some Asym calculation for other 4 arms
  - ↳ should be zero
  - ↳ but it was not !?

## Corrections

- polarization axis
- finite detector size/acceptance
- n-scatters in target





## Summary

- completed  $d(\bar{\nu}, n)_p$  measurement at 6.0, 4.0, 3.5, 2.6 MeV
- excellent statistical precision
- quality data

## Still to be done:

- Monte Carlo corrections to match experimental results to theory
- additional refinements and cross checks on systematics