

What Should We Do?

WMS

→ GOALS

→ Constraints / Context

→ \$

→ epithermals

→ cold neutrons / 9 Å

→ what else must be
done for proposal...

GOALS

cold neutrons

→ highest possible fluence (%
of ~~polarized~~ cold neutrons
with low background, no frame
overlap)

^4He UCN

→ highest possible n/sec ,
low background, low $\Delta\lambda$ /
epithermal (but factor of
 2^2 in UCN on
broad spectrum)
→ highest possible flux ($\frac{n}{\text{cm}^2 \cdot \text{s}}$)
low background, low $\Delta\lambda$,
straight beam or $\frac{\text{Th}}{\text{s}}$?

Flexibility!

Other Facilities: Comparison

facility	guide	flux(n/sec, time-averaged)
ILL PF1 (older)	6X12 cm, m=1	1.5 E+11
ILL H113 (new)	6X20 cm, m=3	1E+12
NIST NG6	6X15 cm, m=1	1E+11
LANSCE	10X10 cm, m=3 (160 kW, 20 Hz)	6E+10
SNS HPTS	10X12 cm, m=3 (2MW, 60 Hz)	4E+11
SNS LWTS	12X20 cm, m=3 (340 kW, 10 Hz)	4E+11
other facilities in Japan, Germany,...(?)		
->even time-averaged, SNS~ILL!		

Constraints

- 60 Hz ⇒ frame overlap for cold neutrons ⇒ choppers, short flight path
- moderator ⇒ 10x12 cm, cold/UCN size
- instrument ⇒ tight space hall
- # [-25 K/meter 3D_c guide; guide/beamline
shielding]

Epithentials

needs:

- straight beamline
(no guide)
- γ detector barrel
- letter of intent
- more applications
in addition to astro?

Inner Guide Section?

- flux gain is significant
- preliminary data => valid.
damage OK
- will also get some
experience at LANL

⇒ yes

to do: get details on
current data

Curved vs Straight

=> need at least either
 $T\phi$ or curve for background

=> flux losses comparable

=> all experiments care
about γ/fastn in beam

=> benders could improve

=> no other US beams are
bent

=> yes, lets bend it (B)

2 Beams vs. 1 Beam

=> looks like two 10x12 guides will not interfere, view the same neutrons from moderator

=> if it is shown later that 2-beam option leads to flux compromise, we should not do two beams

Beam #1:

- ~15m, 3 choppers, bent 10x15
- meets needs of many experiments
- need to maximize space both for existing & future expts. not yet proposed

19 Å Beam

- doesn't need choppers for frame, just α/λ 19 Å
- the further from the source, the better for α/λ if flux not compromised
- xtal diffraction from $KC_x \Rightarrow$ at least 90° , space problem
- chopper would give better α/λ by almost an order of magnitude
- only 2 experiments, but big ones!

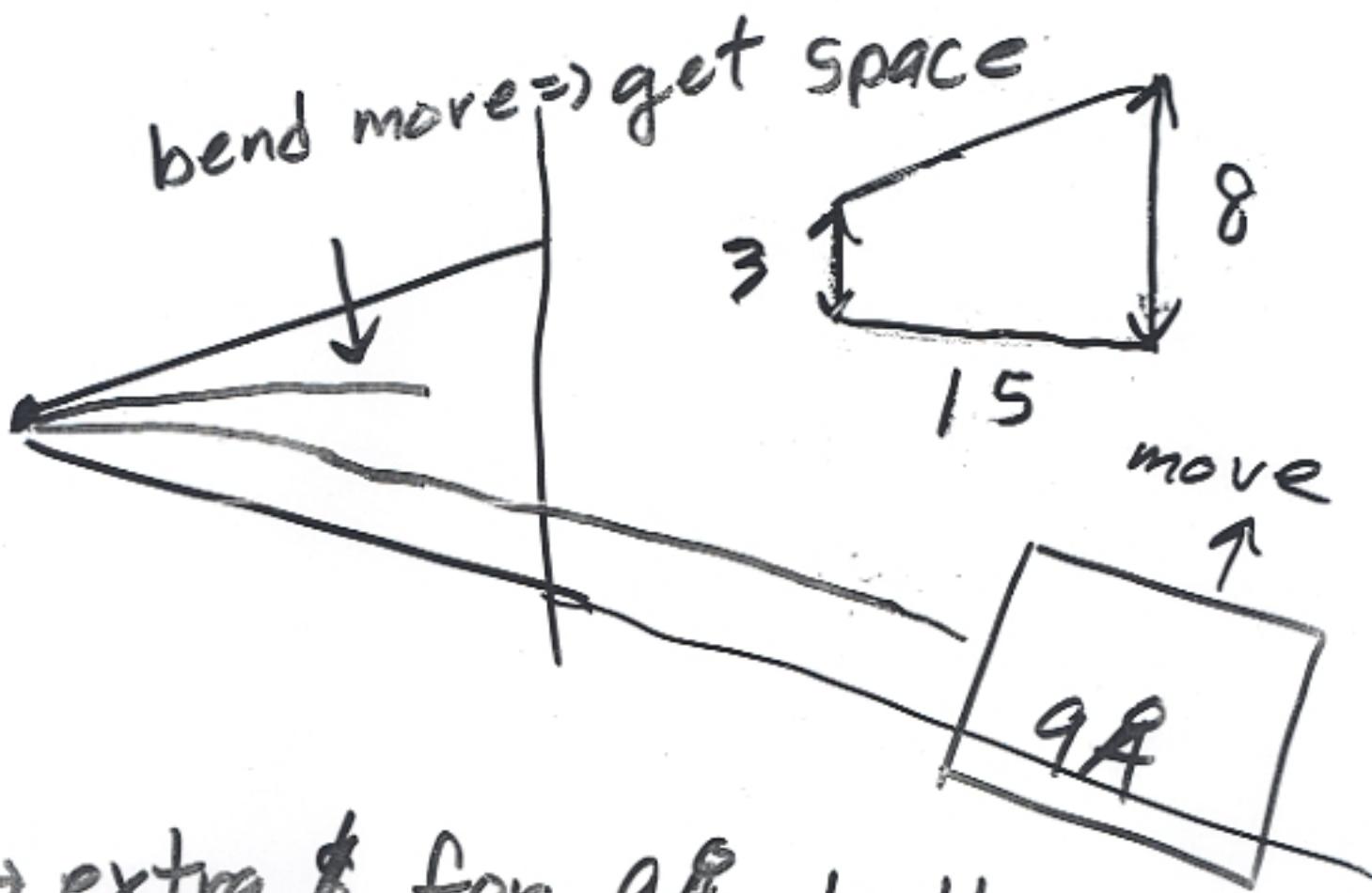
Alternatives?

=> double xtal, take the
9Å beam up []

=> install inclined guide
section e 15m, alternate
between Beam 1 expts
& 9Å

=> extend guide 2 outside
the expt. hall, use
ballistic guide

Option 3



→ extra \$ for 9ft hall

→ guide cost decreased by
going ballistic?

