



# PPPL & CVT



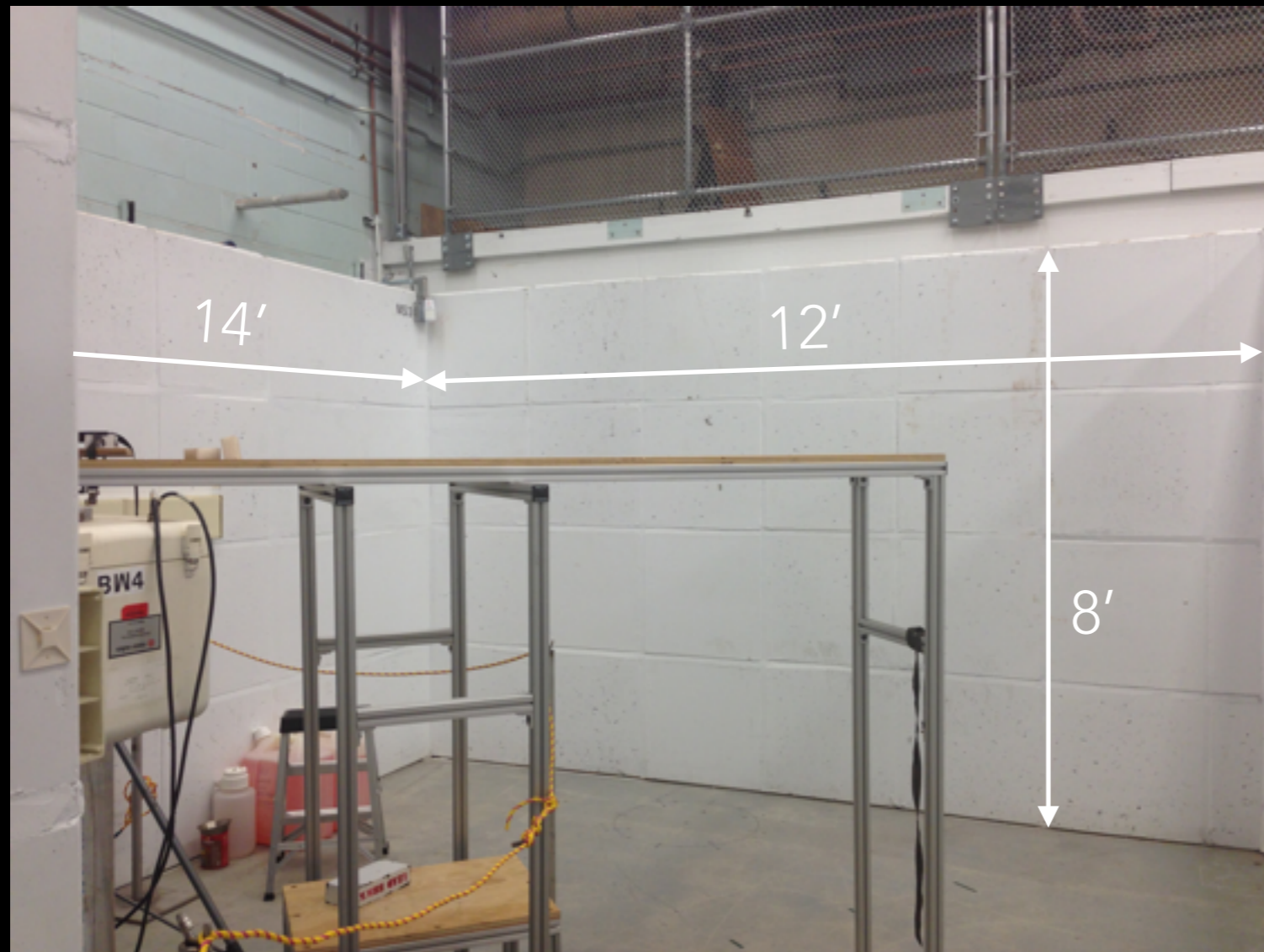
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PPPL DIRECTOR, 1997 – 2009

# PRINCETON PLASMA PHYSICS LABORATORY



- PPPL is DOE's national lab committed to plasma physics and magnetic fusion energy R&D.
- It is operated by Princeton University, and has close intellectual ties to the University.
- 88 acre campus, staff ~450, budget ~\$85M/year
- Extensive experience with and capabilities for measurement of nuclear radiation.

# PPPL IS PROVIDING A SHIELDED ROOM FOR ZKP



- 2' thick borated concrete block walls
- Slab floor
- Can add ceiling

- For non-electronic detectors, cannot use coincidence → low & reproducible room-return

# CAN ADD BORATED POLY TO WALLS AS REQUIRED



5%-borated PE thickness (inches)	Fraction of incident neutrons reflected at >1 MeV	Fraction of incident neutrons reflected at >10 MeV
0	17.7%	3.4%
2	10.5%	1.9%
4	8.2%	1.6%
6	7.6%	1.6%
8	7.5%	1.5%

S. Philippe, M. Walker

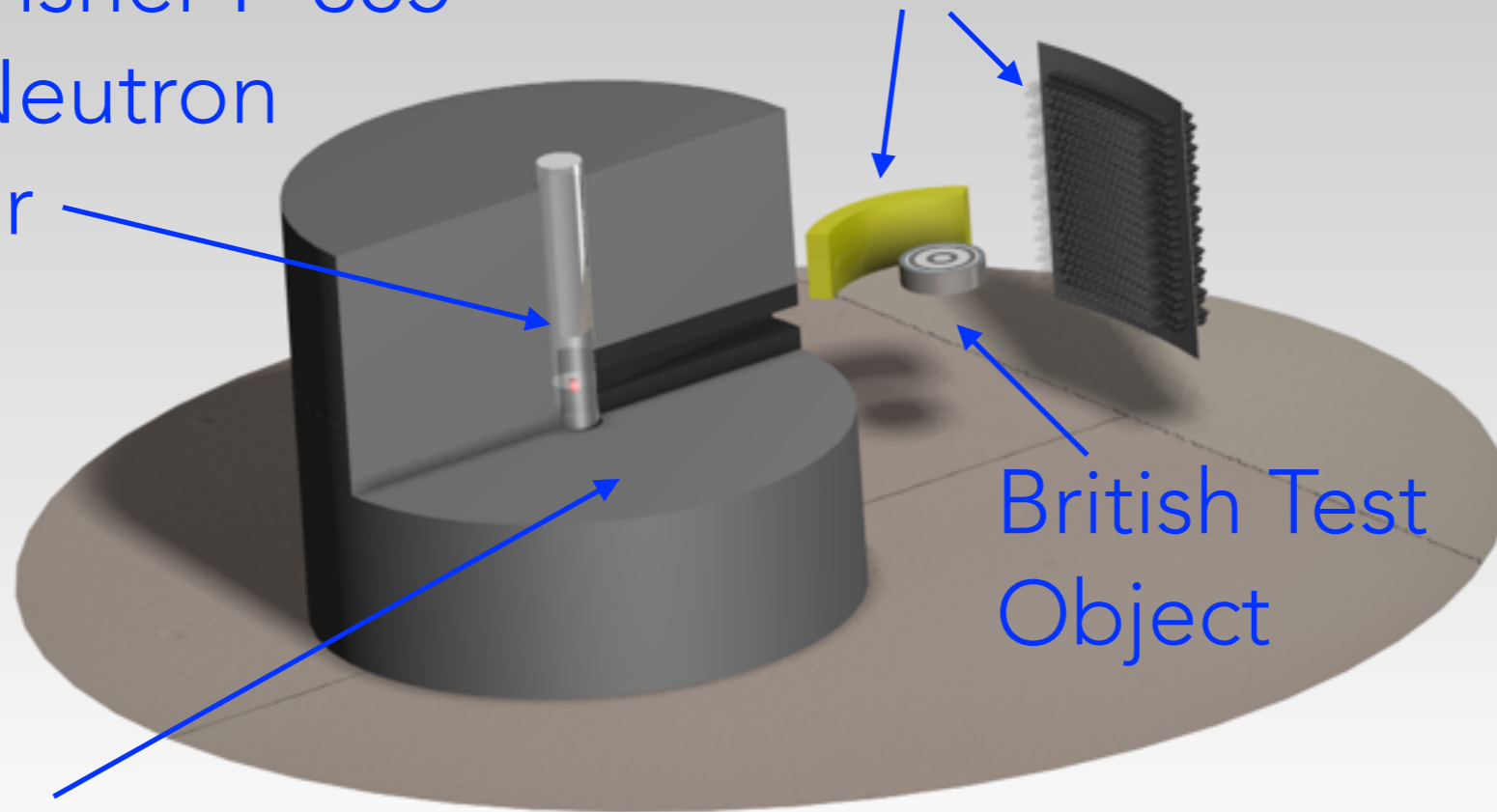
- 4" of poly is good for a factor  $>2$  reduction in returning neutrons with  $E > 1 \text{ MeV}$ ,  $10 \text{ MeV}$

# PLAN TO INSTALL AND TEST ZKP VERIFICATION SCHEME

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Thermo-Fisher P-385  
14 MeV Neutron  
Generator

Detectors



Collimator and shield

British Test  
Object

S. Philippe

- Have W-based British Test Object (BTO)
- Plan to build Al-based BTO

# PPPL MAINTAINS A LAB WITH HPGE DETECTORS

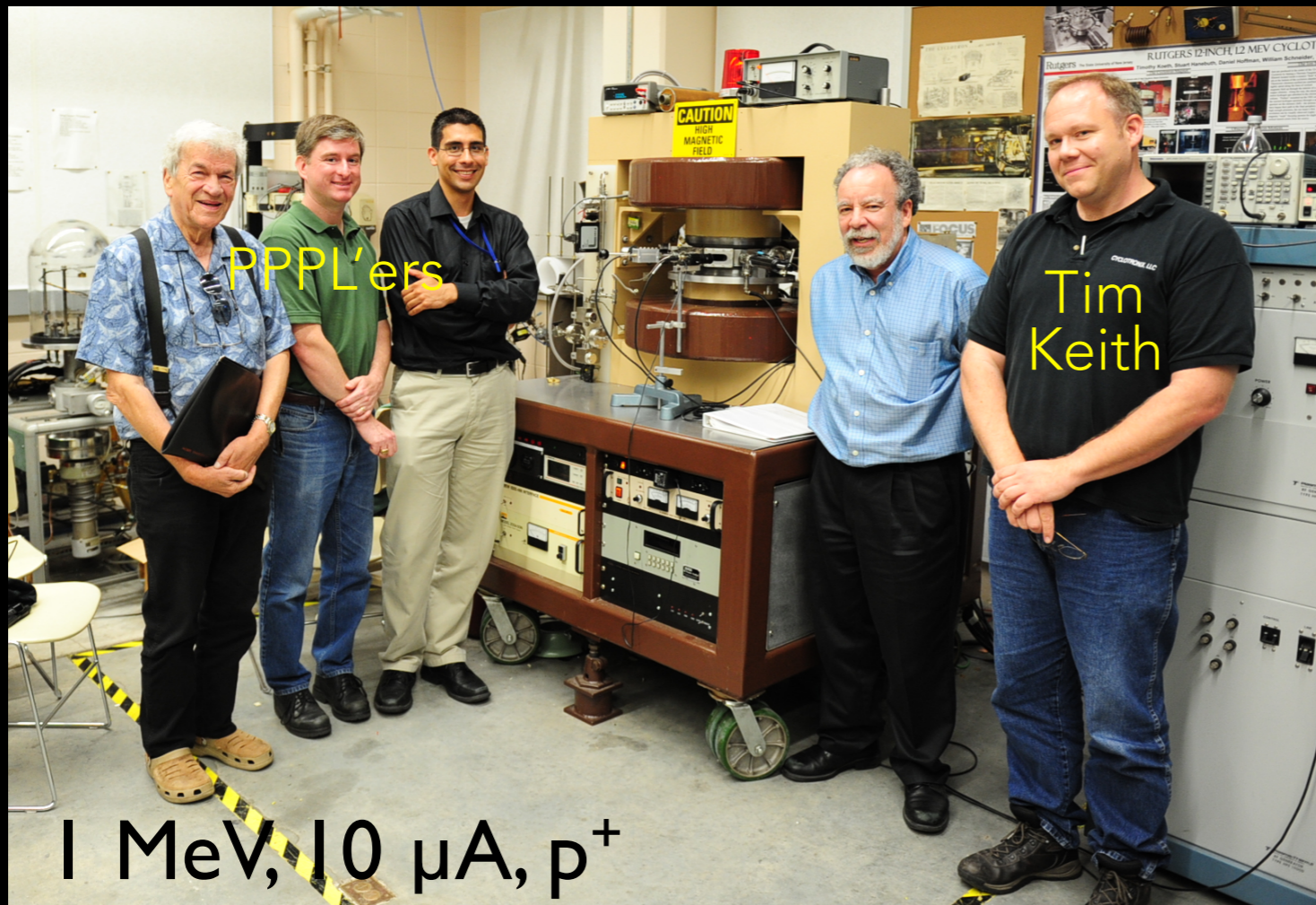
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- Well shielded, low background
- Will support new HPGe well detector.
- Have a range of NaI detectors, software, etc.

# WE WOULD LOVE A SOURCE OF ~250 KEV NEUTRONS

## Rutgers teaching cyclotron



PPPL'ers

Tim  
Keith

1 MeV, 10  $\mu$ A,  $p^+$

${}^7\text{Li}(p,n){}^7\text{Be}$   
 $Q = -1.88 \text{ MeV}$   
Resonance  $\sim 2.25 \text{ MeV}$   
 $\leq 10^{12} \text{ n/mC}$

Cyclotron?  
RFQ?  
Tandem?

Great discrimination for fissile vs. fissionable,  
no high-energy neutrons except from fission.

# WE ARE INTERESTED IN COLLABORATION

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- Strong collaboration in place with Princeton University + Yale University ZKP team.
- We will have a powerful DT neutron generator, shielded room, PuBe and Cf sources, test objects, and well-maintained  $\gamma$  counting facility.
- Let's talk!