

Hardware Improvements for the Measurement of EJ-200 Scintillating Tiles

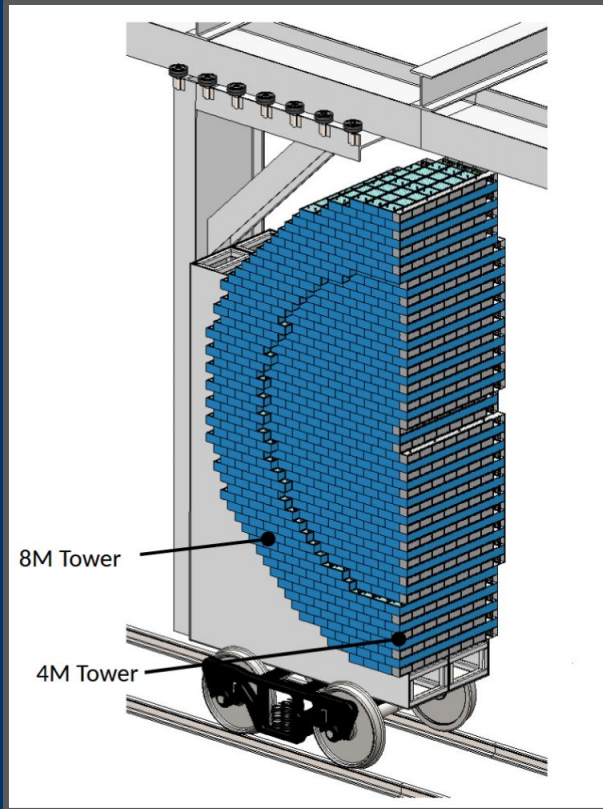


Cameron Jensen

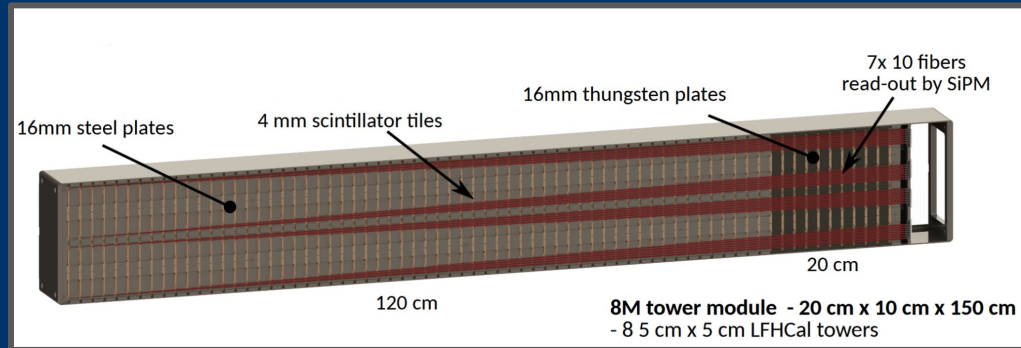
Advised by Dr. Helen Caines and Dr. Prakhar Garg



The Longitudinally-segmented Forward Hadronic Calorimeter (LFHCal)

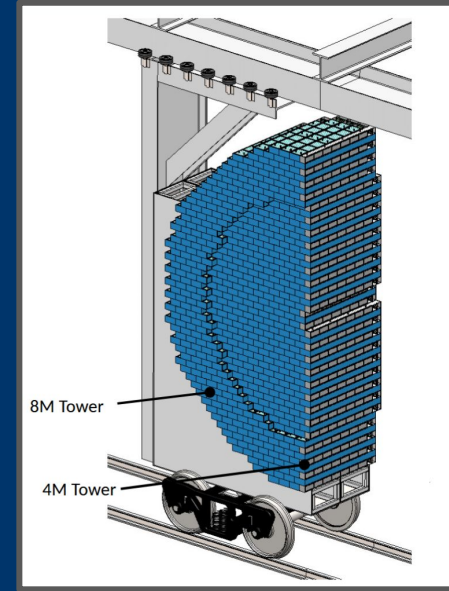
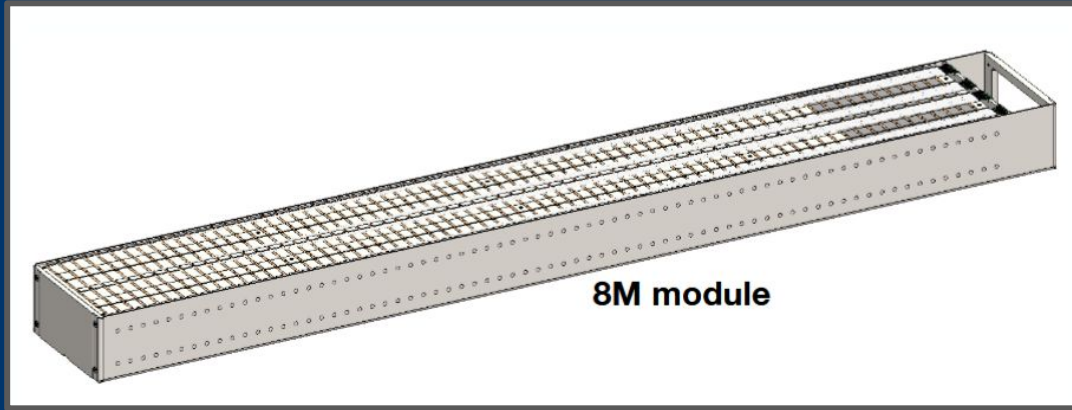


- Incident radiation causes avalanche in SiPMs → quantitative readout → backout of incident particle properties.
- LFHCal uses ~100,000 machined tiles and ~500,000 moulded tiles.



The Problem

- Tight packing of tiles means dimensions must be uniform.

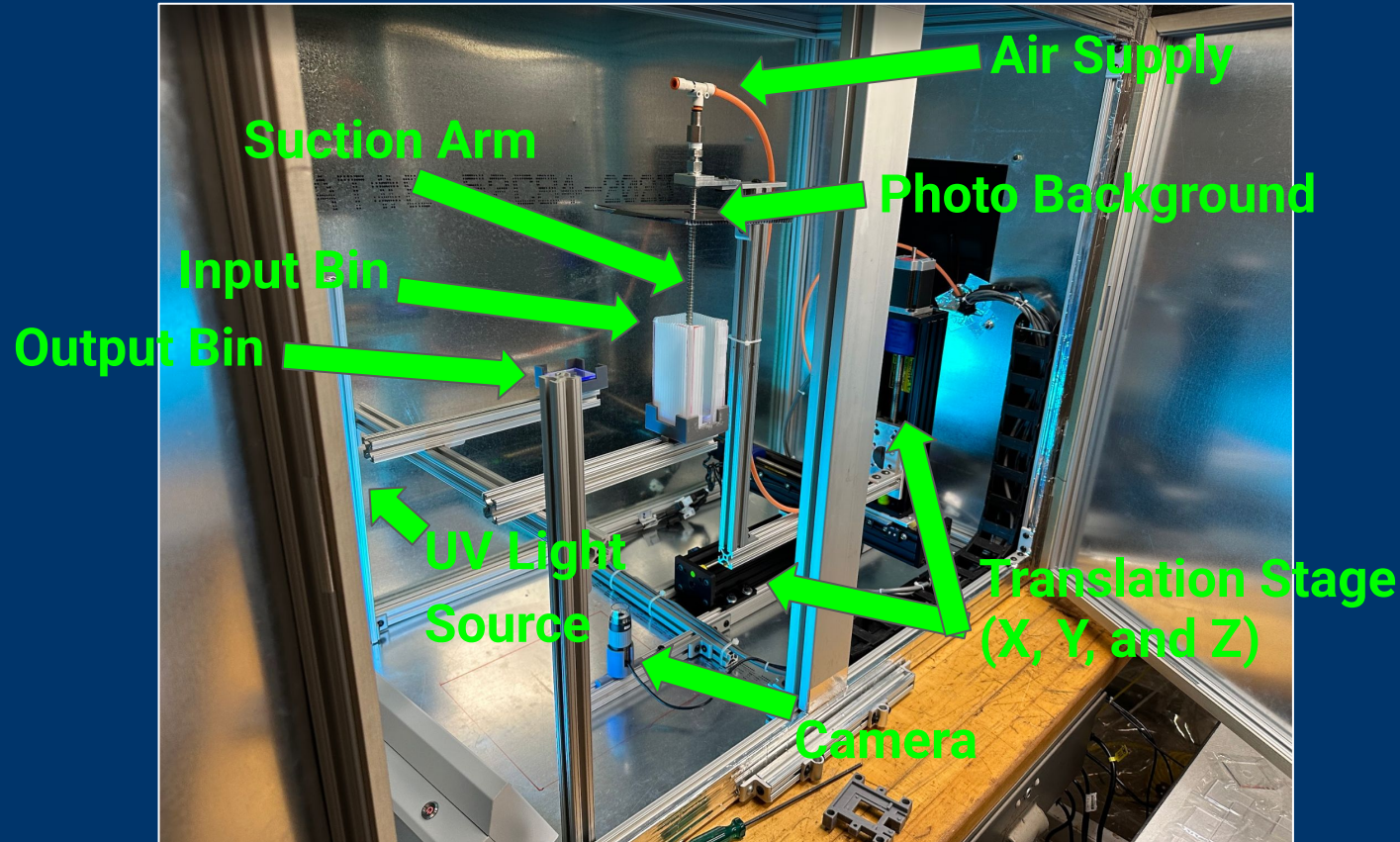


100,000 ← Big Number

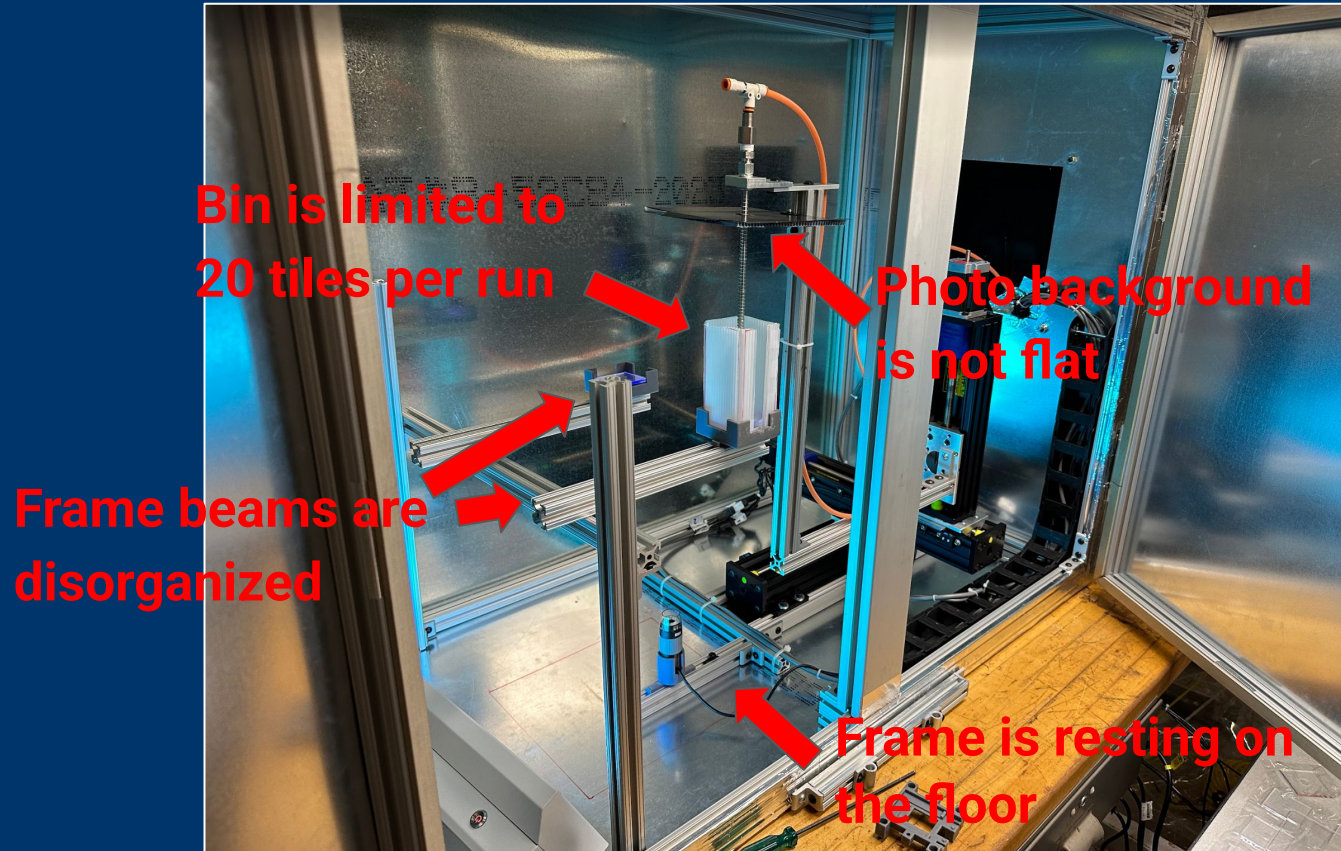
Imprecise Tools



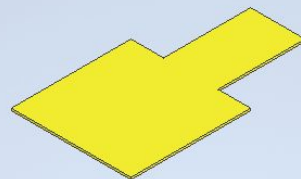
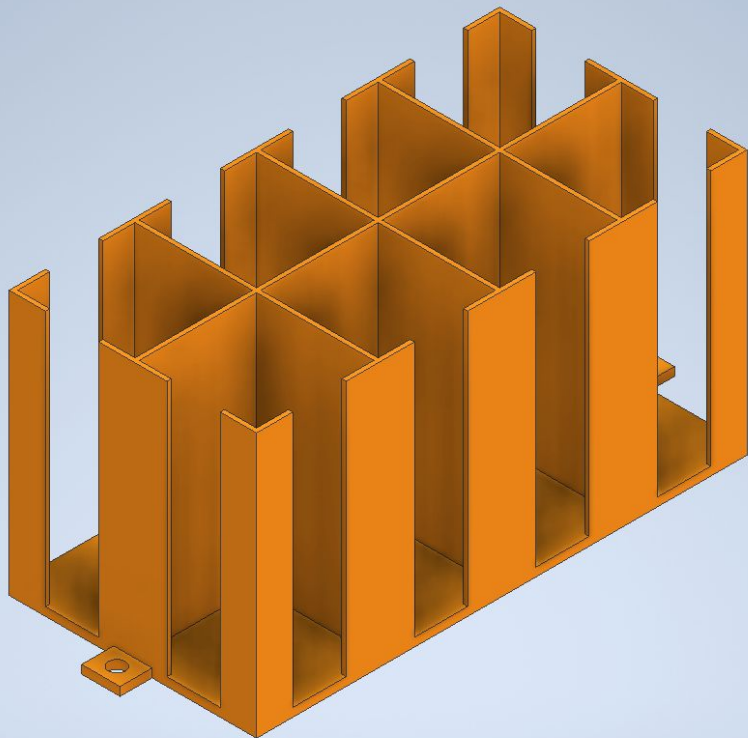
The LFHCal Scintillator Measuring Box



The LFHCal Scintillator Measuring Box

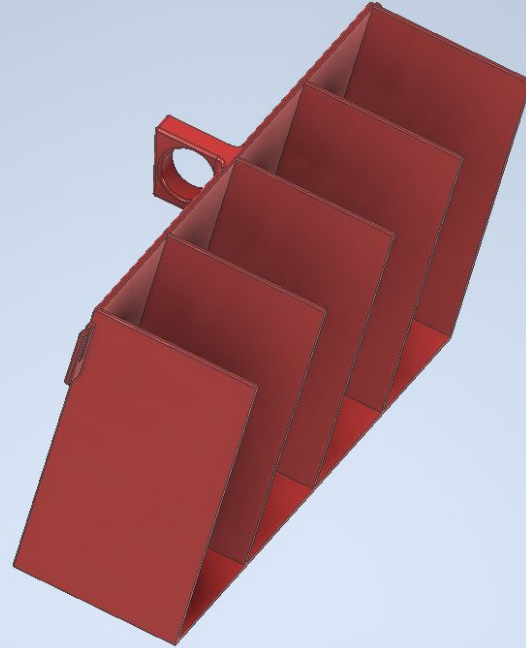
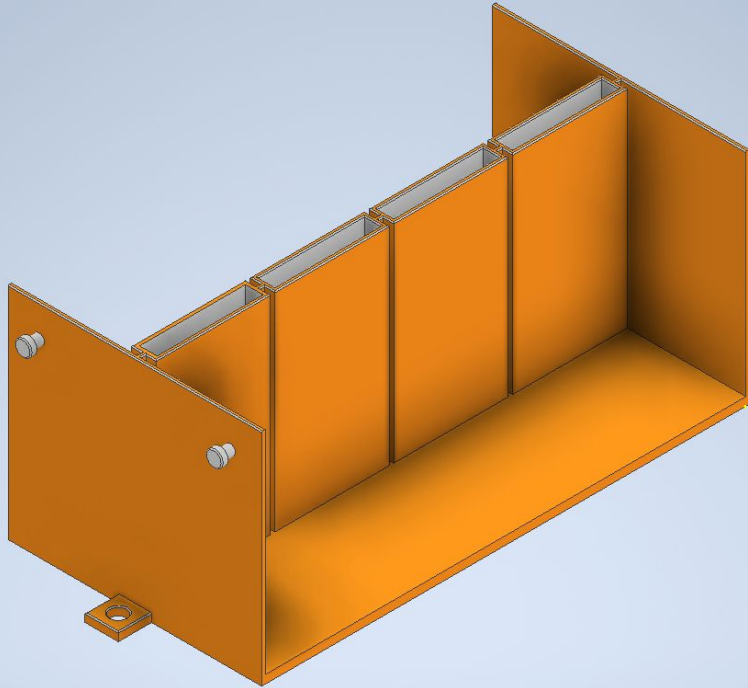


Versions 0.1 - 0.4

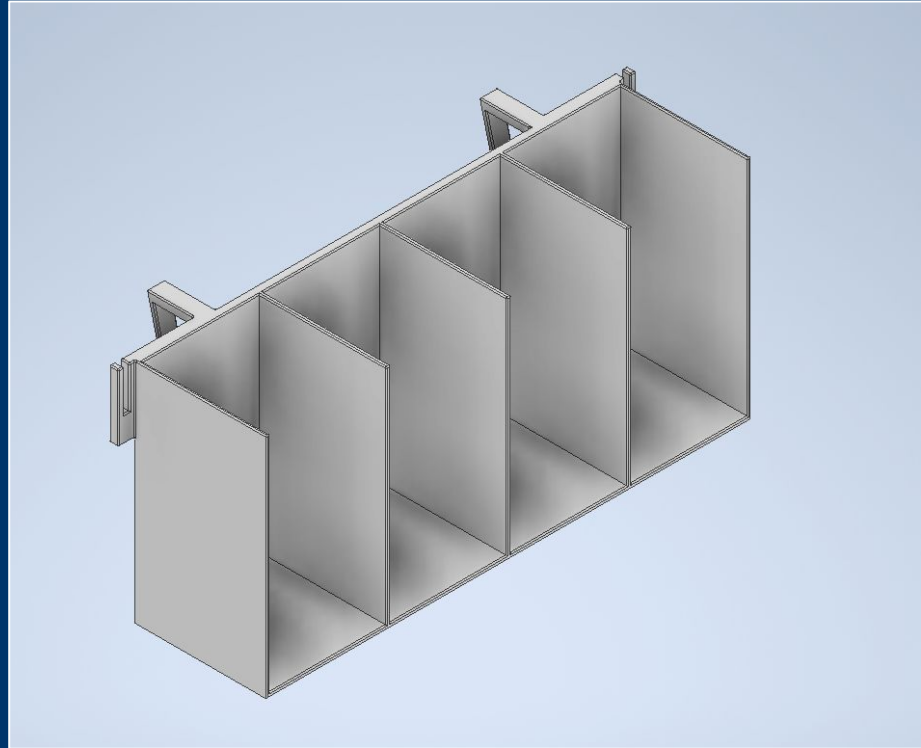
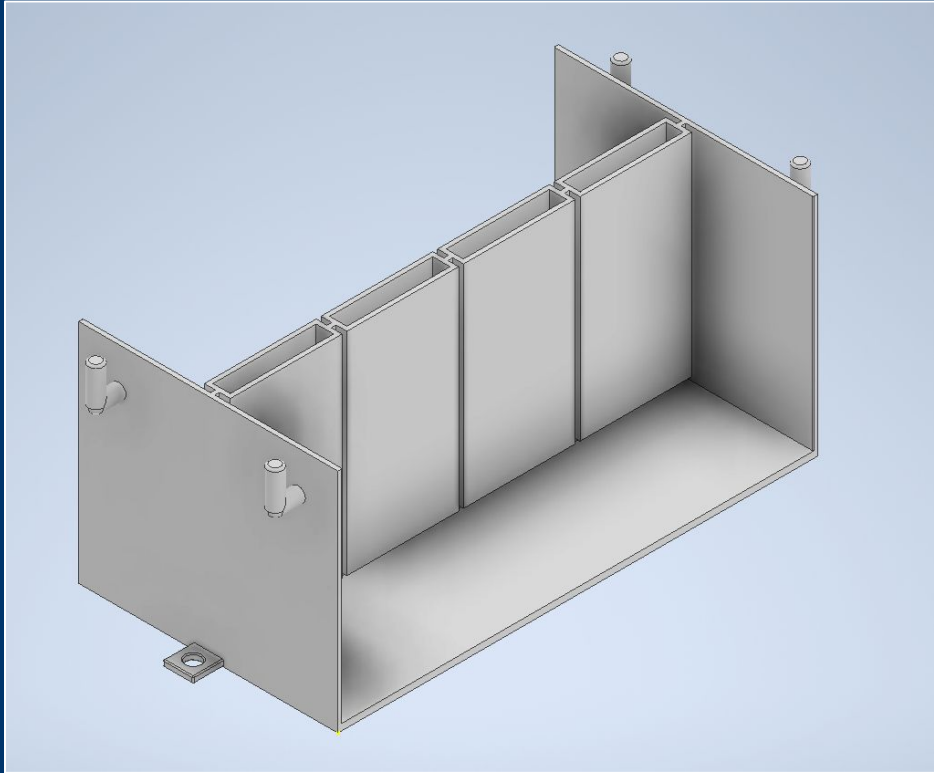




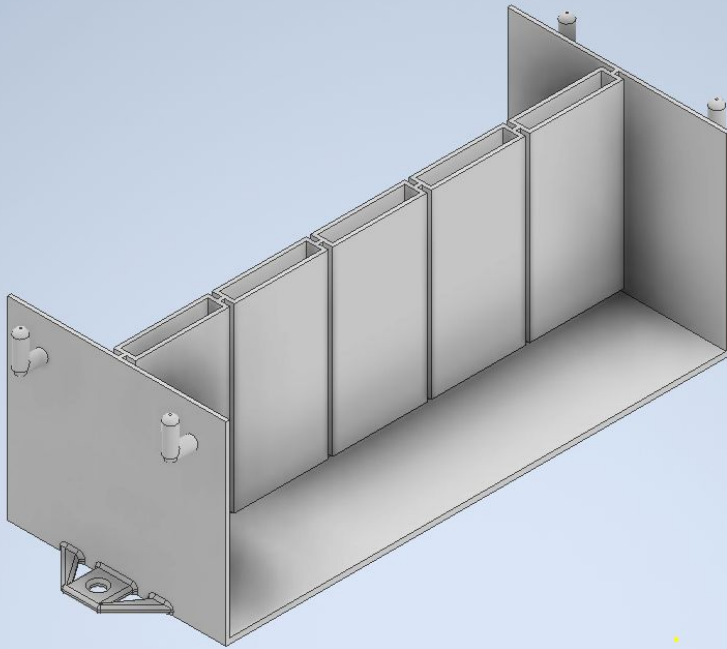
Versions 0.5 - 0.6



Version 1.0

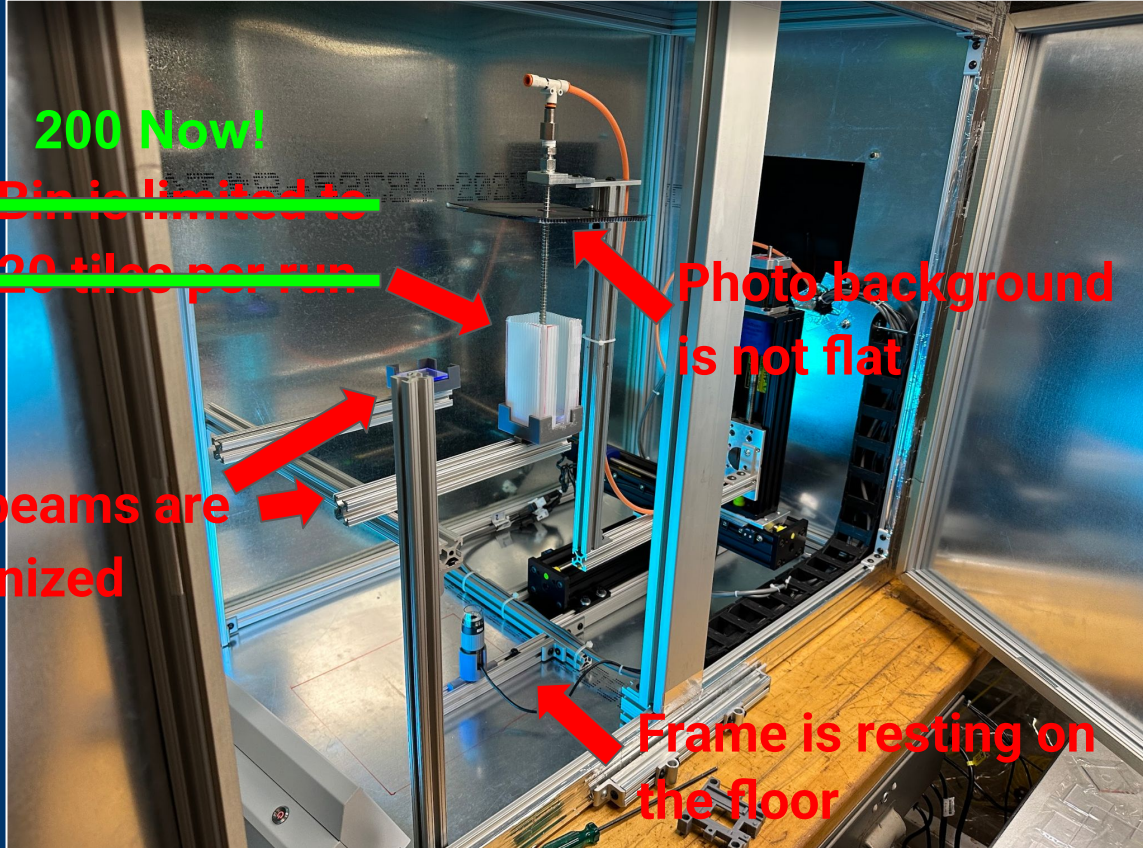


Version 2.0



- **Prevented by Printer Limitations :(**

The LFHCal Scintillator Measuring Box



200 Now!

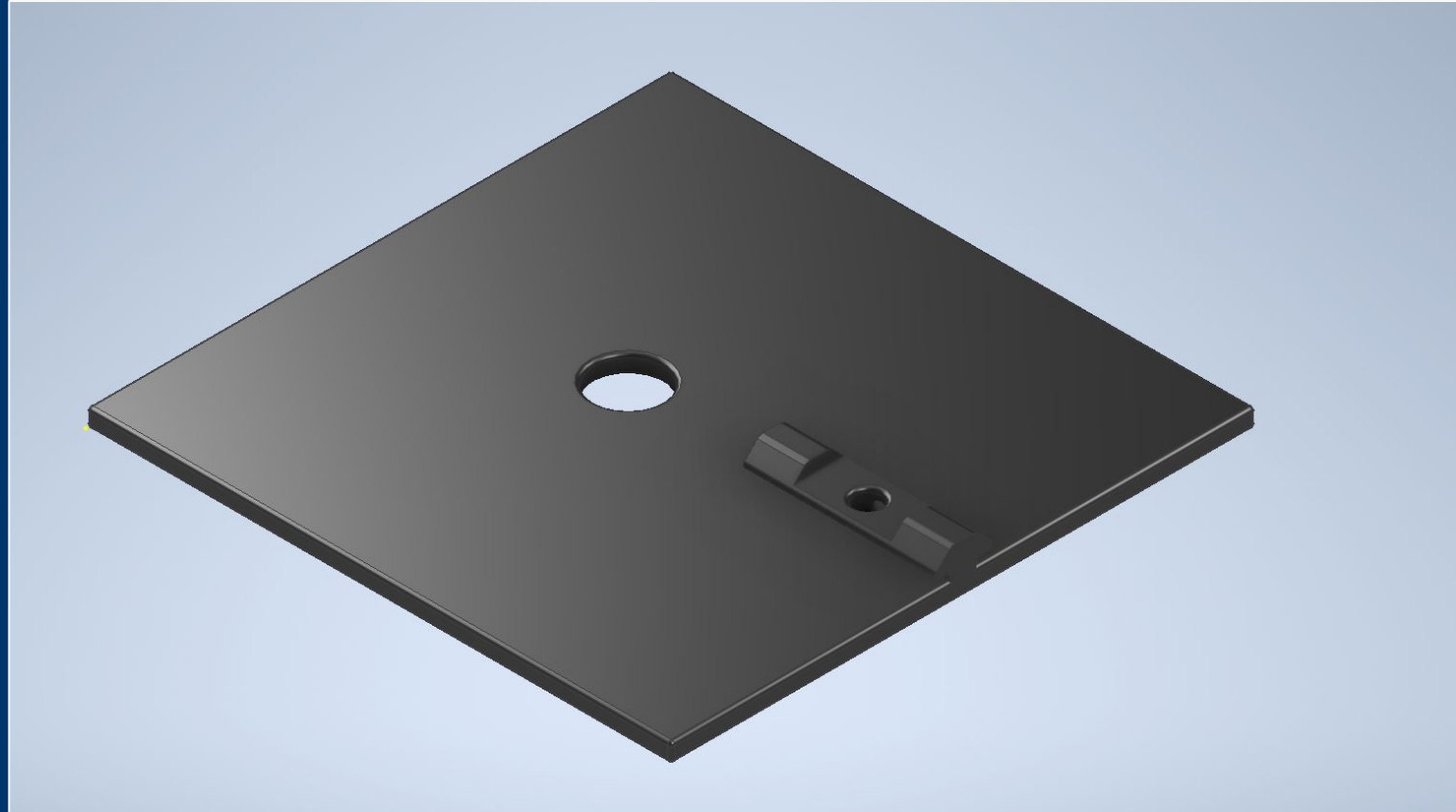
~~Bin is limited to
20 tiles per run~~

Photo background
is not flat

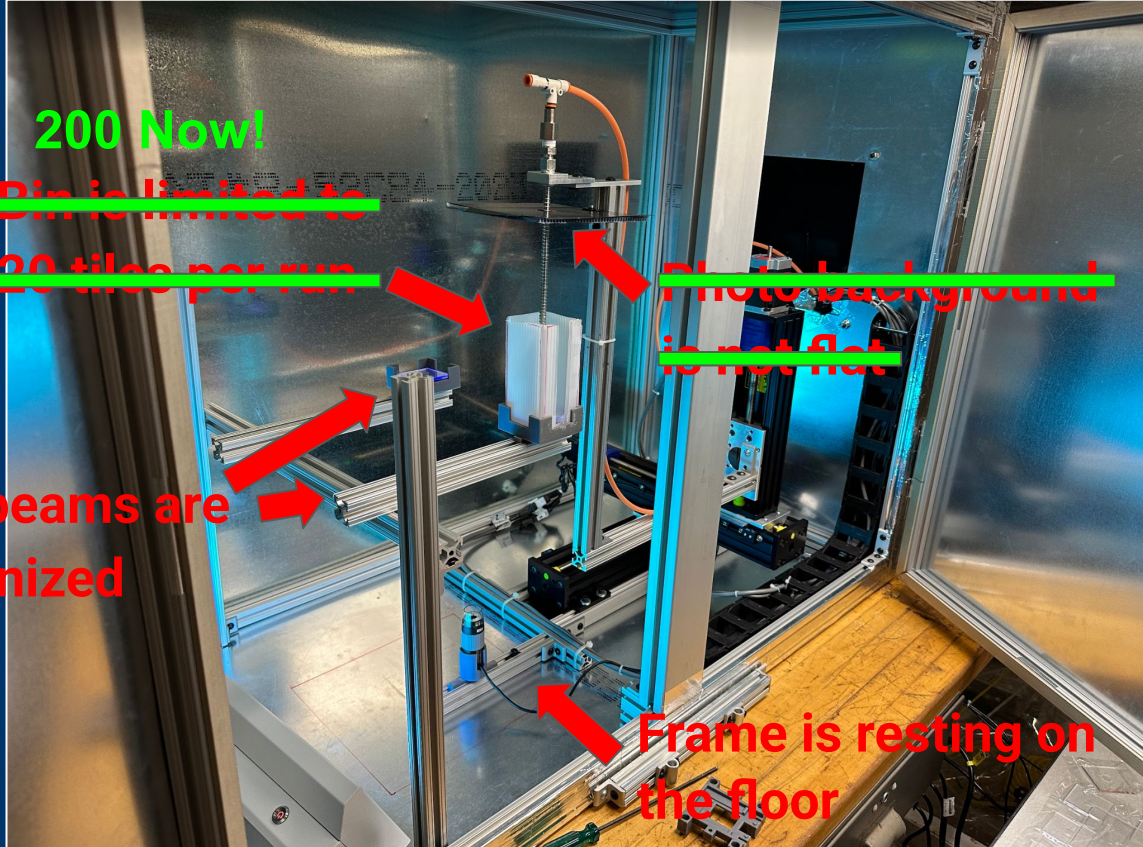
Frame beams are
disorganized

Frame is resting on
the floor

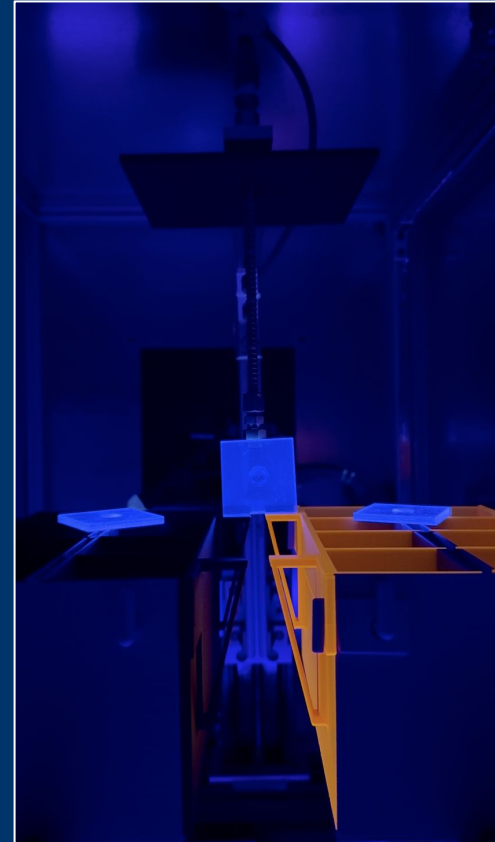
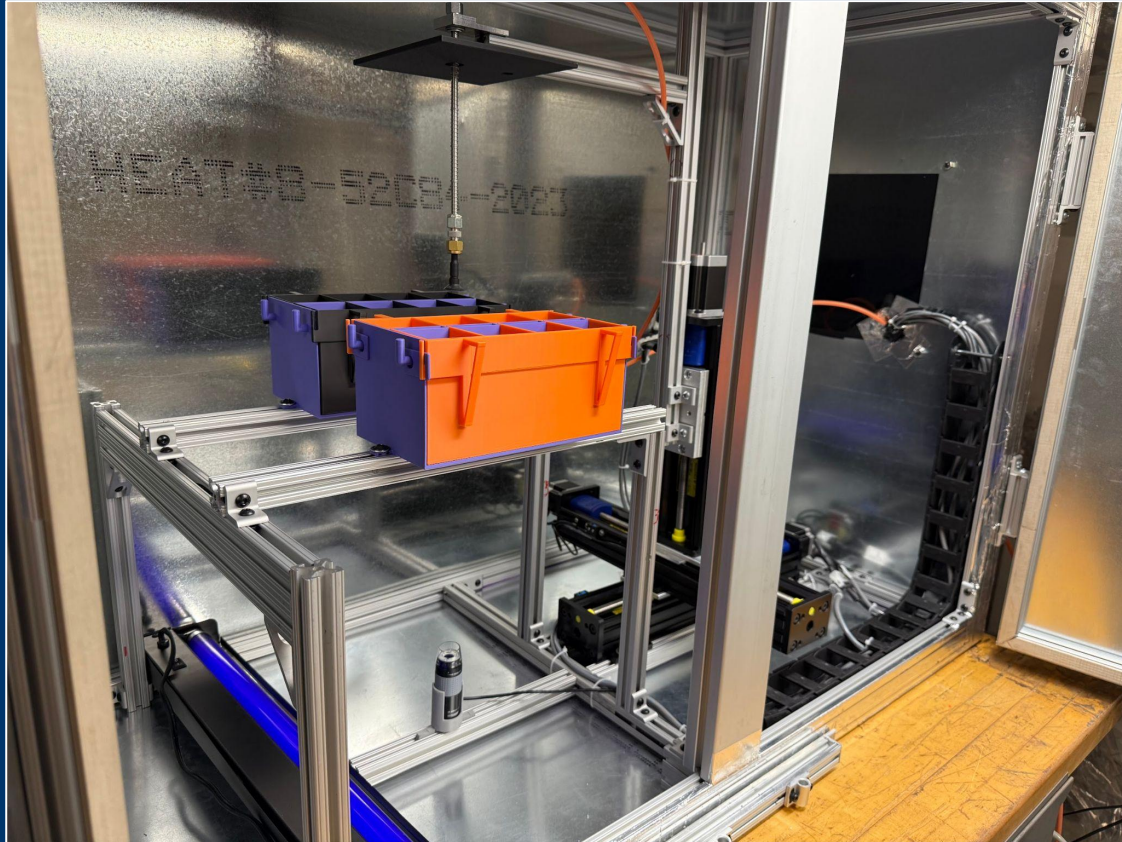
New Photo Background



The LFHCal Scintillator Measuring Box



The New and Improved Box

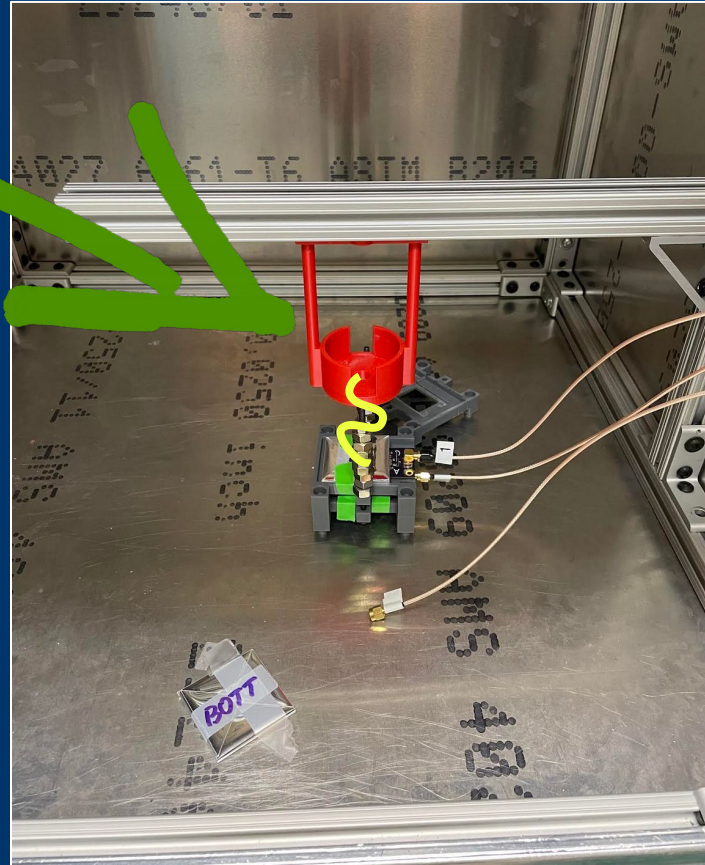
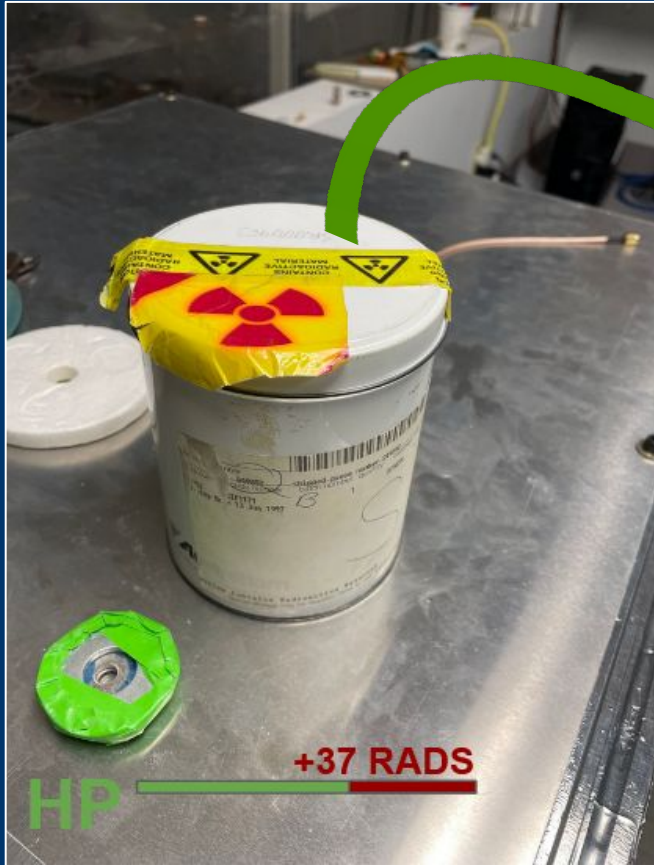


Current Issues

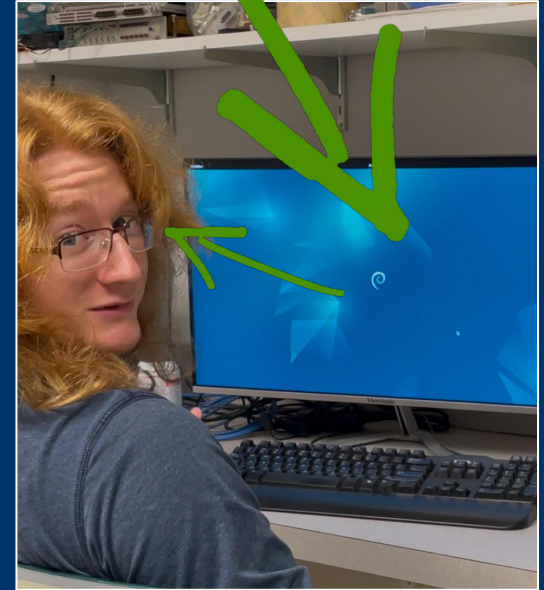
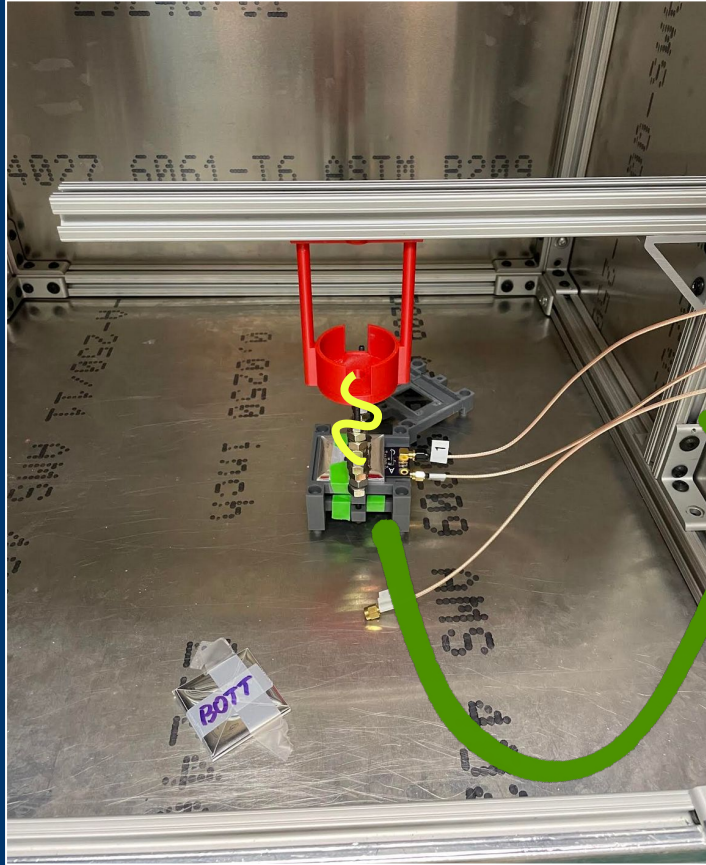
- Images occasionally fail to yield accurate measurements
- Space inside the dark box is tight
- Tile bins don't hold tiles perfectly still
- Static friction sometimes causes multiple tiles to lift at once



The ^{90}Sr Tests



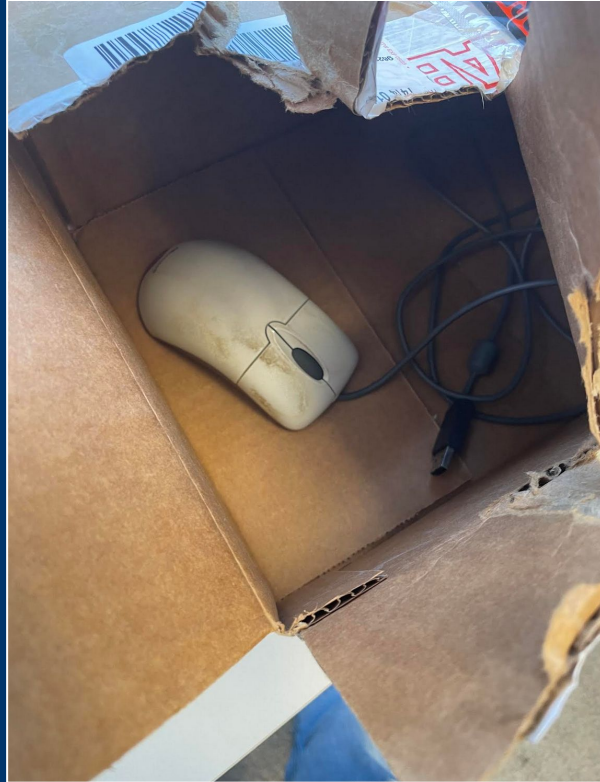
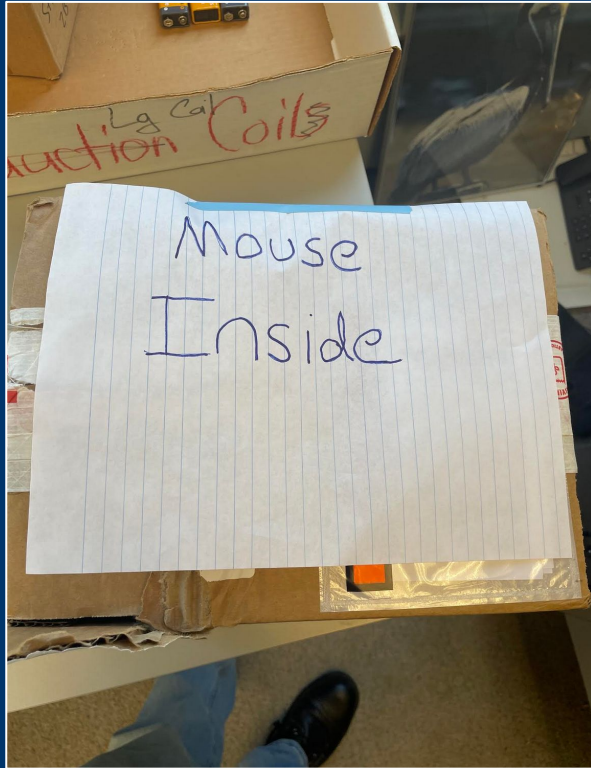
The ^{90}Sr Tests



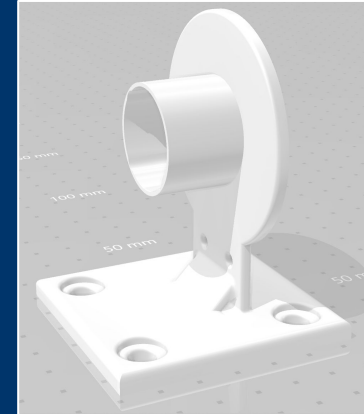
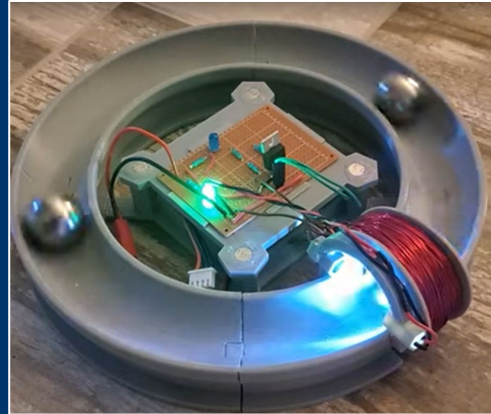
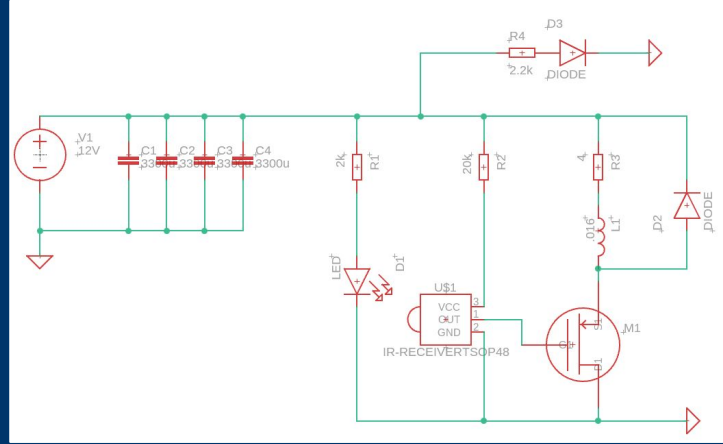
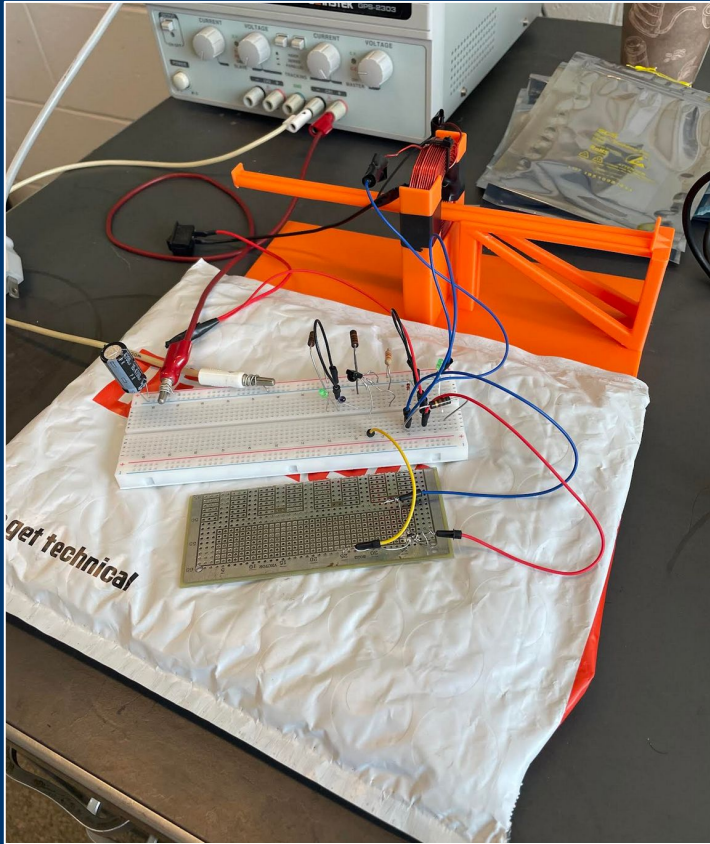


And a little side questing...

The Mouse Saga...



The Cyclotron Demo



Trying to Explain What I do to my Friends and Family...



Ooh! Is that what you were describing at Panera? :0

Ok but seriously what the fuck is a scintillator

Does this make sense to you?

v

oh nice!! (i had to google what scintillators are again)

v

ngl i had to google what a van der graff generator was...

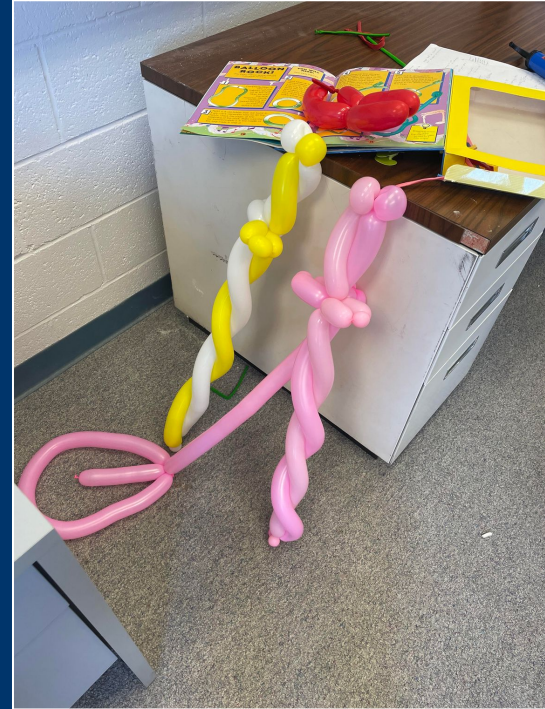
o

What is the thing that you should not, under any circumstance, eat?

Meeting With Congresspeople



Balloons!



Acknowledgements



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Dr. Helen Caines

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And the entire Wright Lab community for an awesome summer :)



U.S. DEPARTMENT OF
ENERGY

Thank You!!



Title Text

