



# Phase II Geometry

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# Goal

Design Phase II System Test detector geometries for use in simulations.



# Plan



1. Study Phase I and LZ geometries
  - a. Find reusable files
2. Design simplified geometry
  - a. Test for basic functionality
3. Increase complexity of geometry
  - a. Add optical surfaces
    - i. AlMgF2 coating
    - ii. Variable Teflon Reflectivity
  - b. Add PMT's
  - c. Other features
4. Work towards final Phase II geometry
  - a. More components, most realistic
5. Work on macros for Phase II



# Done Last Week:

- Fixed problems with simple visualization
- Added an new material for the AlMgF2 coating
- Fixed issues with optical border surfaces
- Found macro commands for setting Teflon reflectivity
  - Bacc/materials/LXeTeflonRefl 'double'
  - Bacc/materials/GXeTeflonRefl 'double'

# AlMgF2

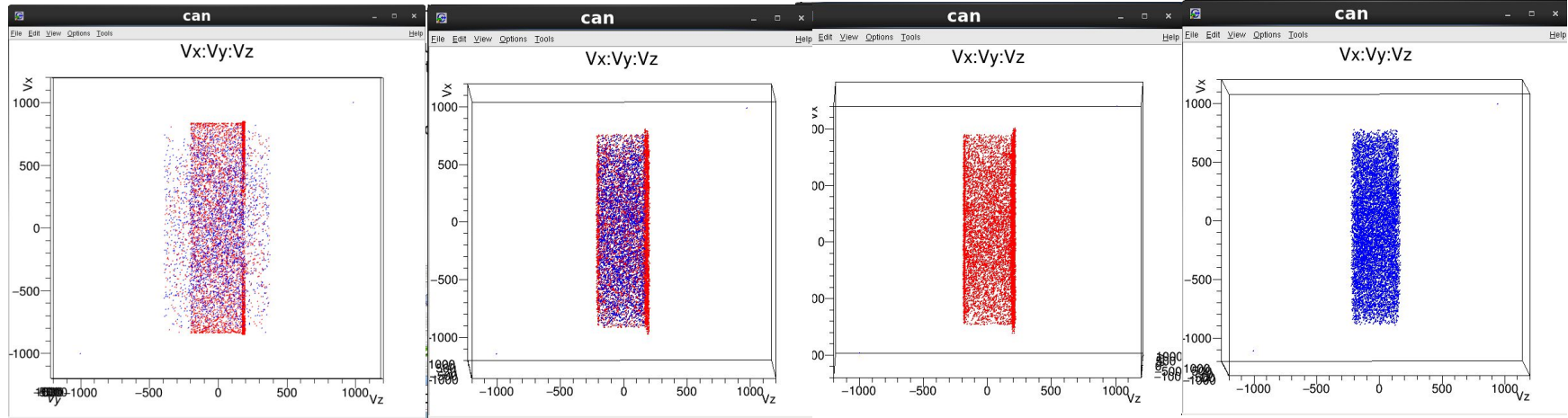
Accessed with: `CoatingAlMgF2()`, `GXeAlMgF2Surface()`

- Defines a new material with many of the same properties of Aluminum but with reflectivity of AlMgF2 (approximation)
- Defines AlMgF2 MaterialPropertiesTable (followed format of Teflon)
  - **Reflectivity = .88**
  - **Specular lobe constant = 0**
  - **Specular spike constant = 0**
  - **Backscatter constant = 0**
  - **Efficiency = 1**
- Creates a boundary surface for the gas Xe - AlMgF2 interface with above properties

**Any other suggestions for improvement?**



# 2 Component Visualization



Both (before)

Both (after)

GXe space (after)

IV (after)

- All particles accounted for and within defined geometry

- Error caused by overlap in geometry dimensions



# Next Steps

- Add PMT's
  - R8778 PMT's from LUX
  - PMT locations from Rachel soon
  - Any other type of PMT I should implement?
- Start optical simulations in comparison to Rachel's LightGuide sims