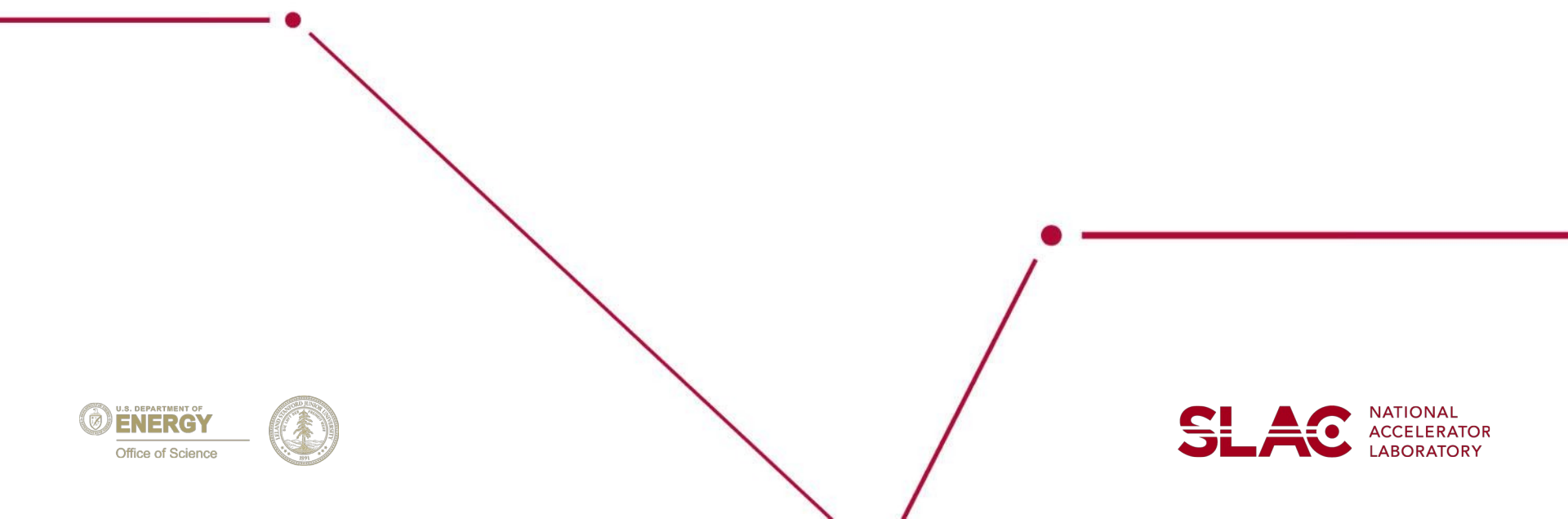


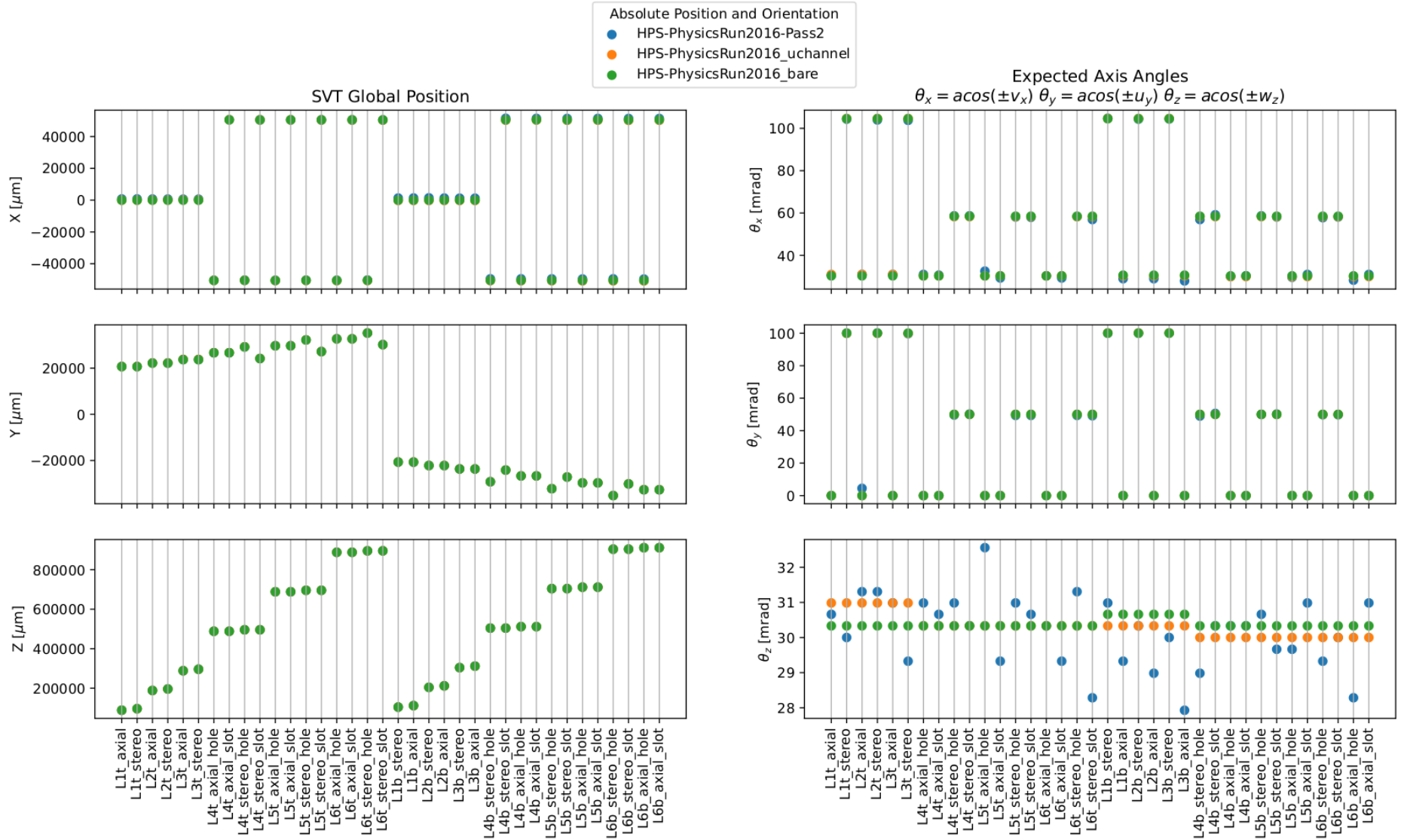
# Comparing SVT Geometries

Cameron Bravo (SLAC)



- Want to make sense of the 2019/2021 SVT geometry in the context of the 2016 geometry
- This is a cross check more than anything else
- Look at global positions and orientation of sensors and confirm they make sense
- Also looking at sensor positions for geometries relative to others, can try to track down where discrepancies originate
- Compare different combinations of survey numbers using the two different geometry classes (2016 vs 2019)
- Same survey numbers should give the same detector
- 2019 back sensor positions should be pretty much the same as 2016

# Global Positions in SVT Frame for 2016 Geometry

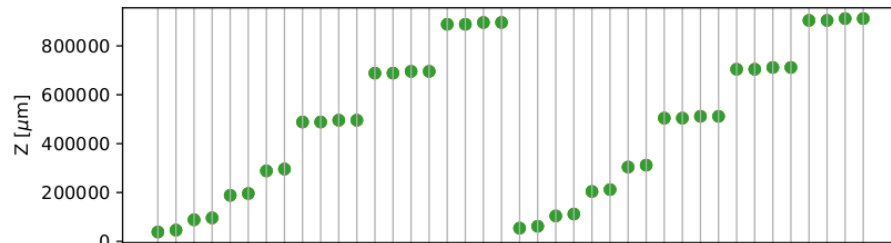
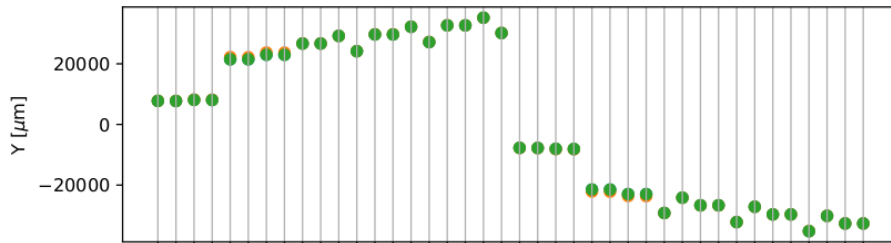
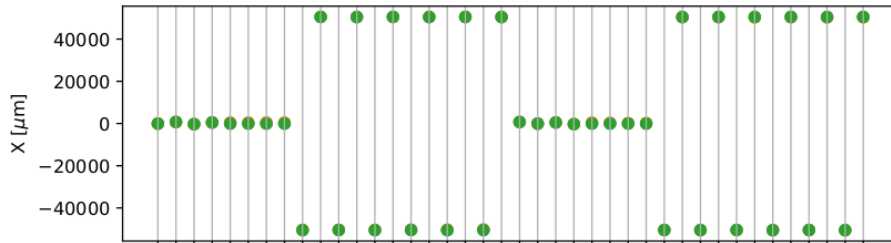


# Global Positions in SVT Frame for New Geometry

Absolute Position and Orientation

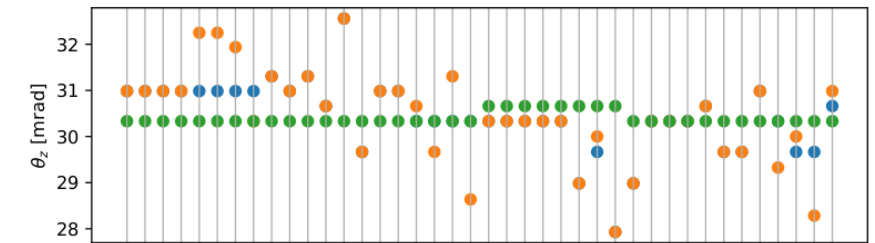
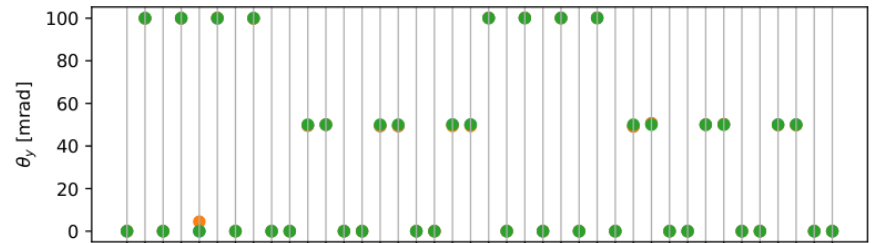
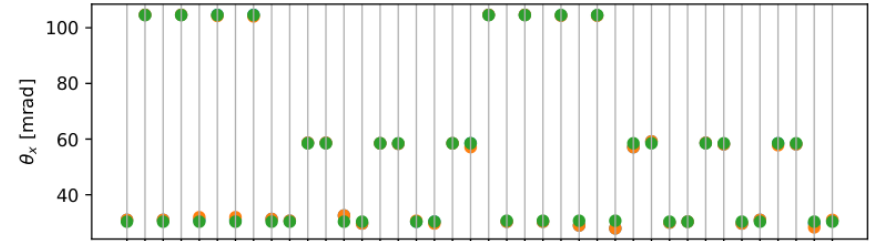
- HPS\_TimDesign\_iter0
- HPS\_ShoSurvey\_iter0
- HPS\_bare\_iter0

### SVT Global Position

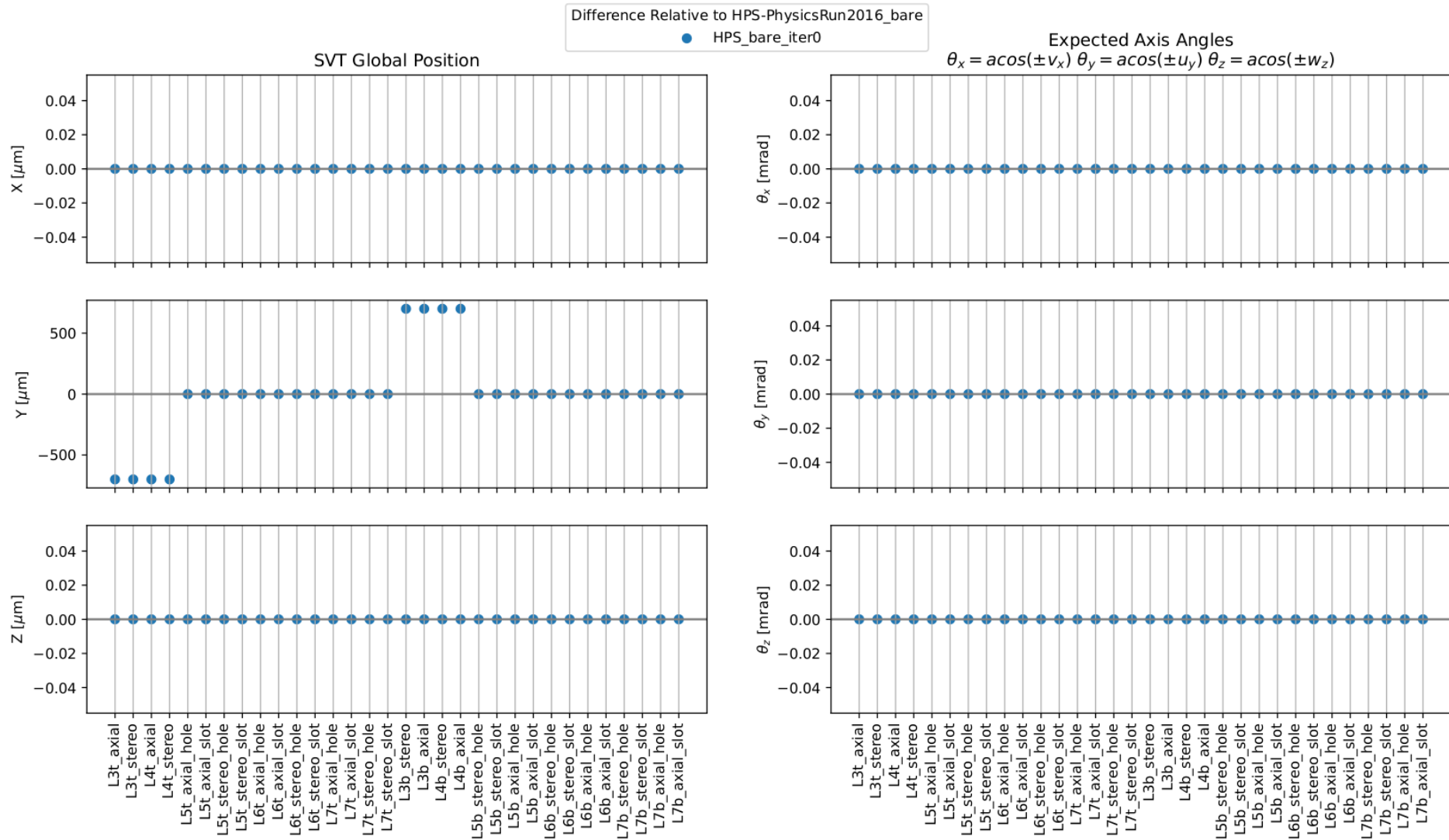


### Expected Axis Angles

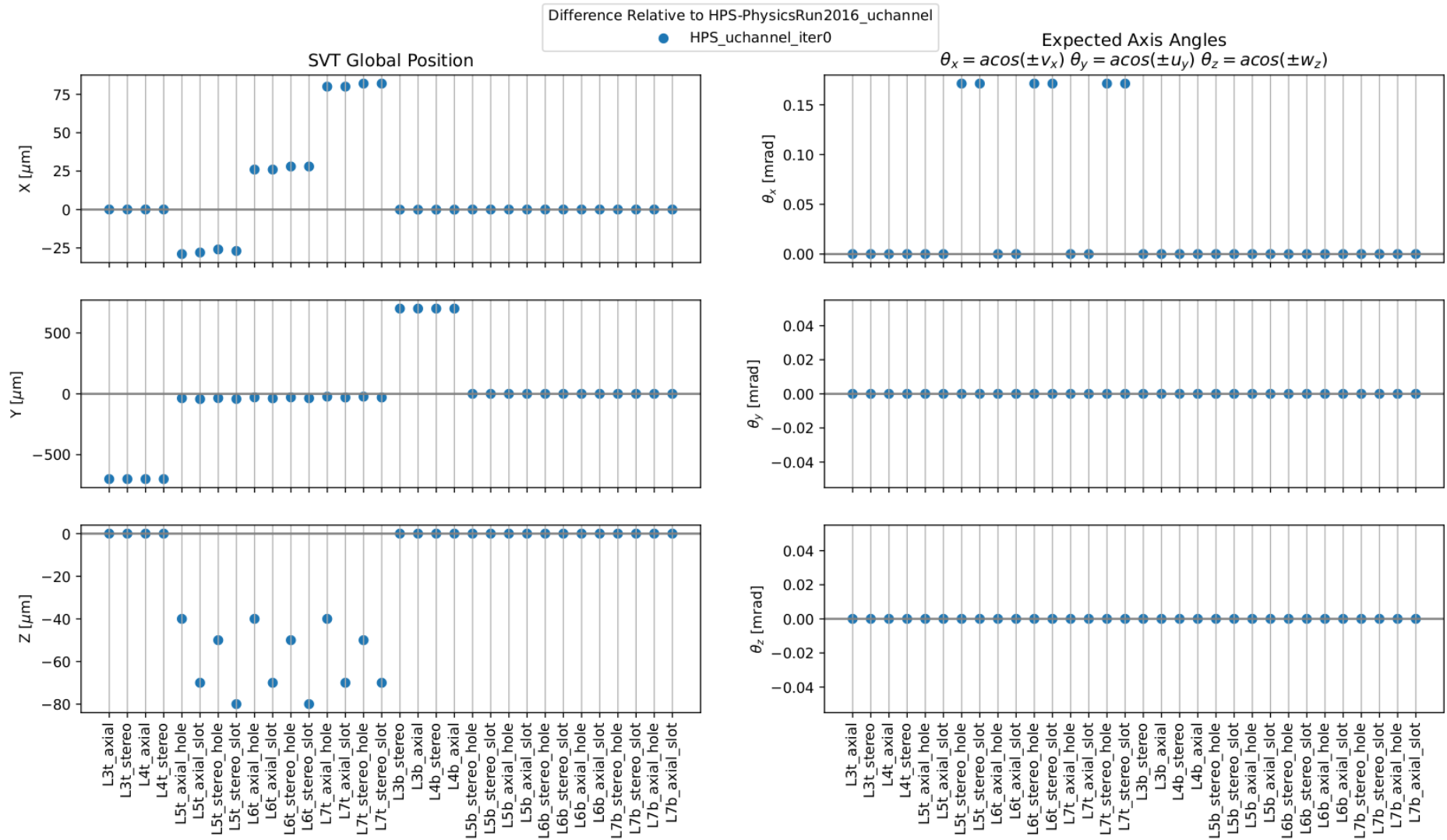
$$\theta_x = \text{acos}(\pm v_x) \quad \theta_y = \text{acos}(\pm u_y) \quad \theta_z = \text{acos}(\pm w_z)$$



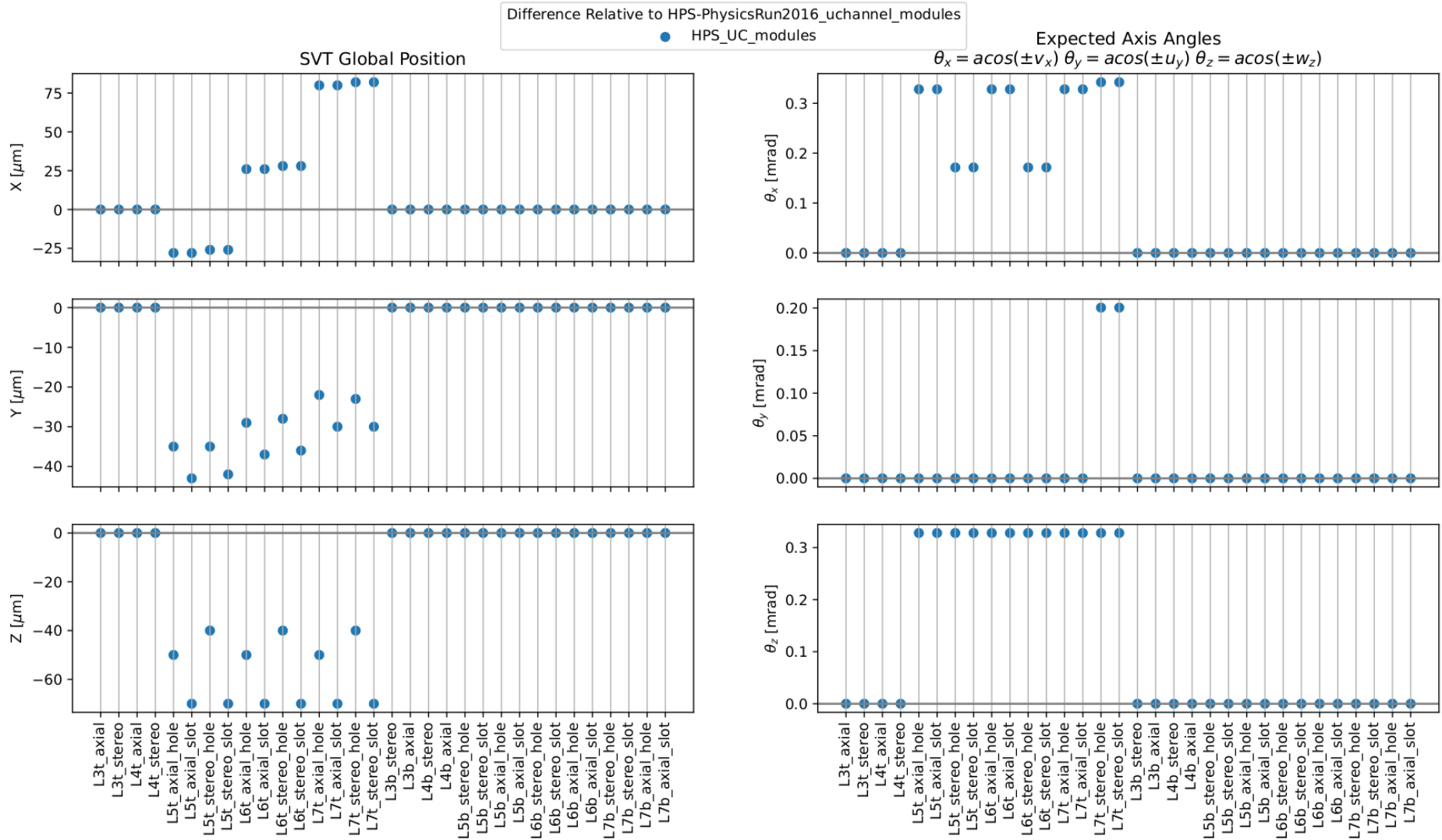
# Remove All Survey and Alignment Constants



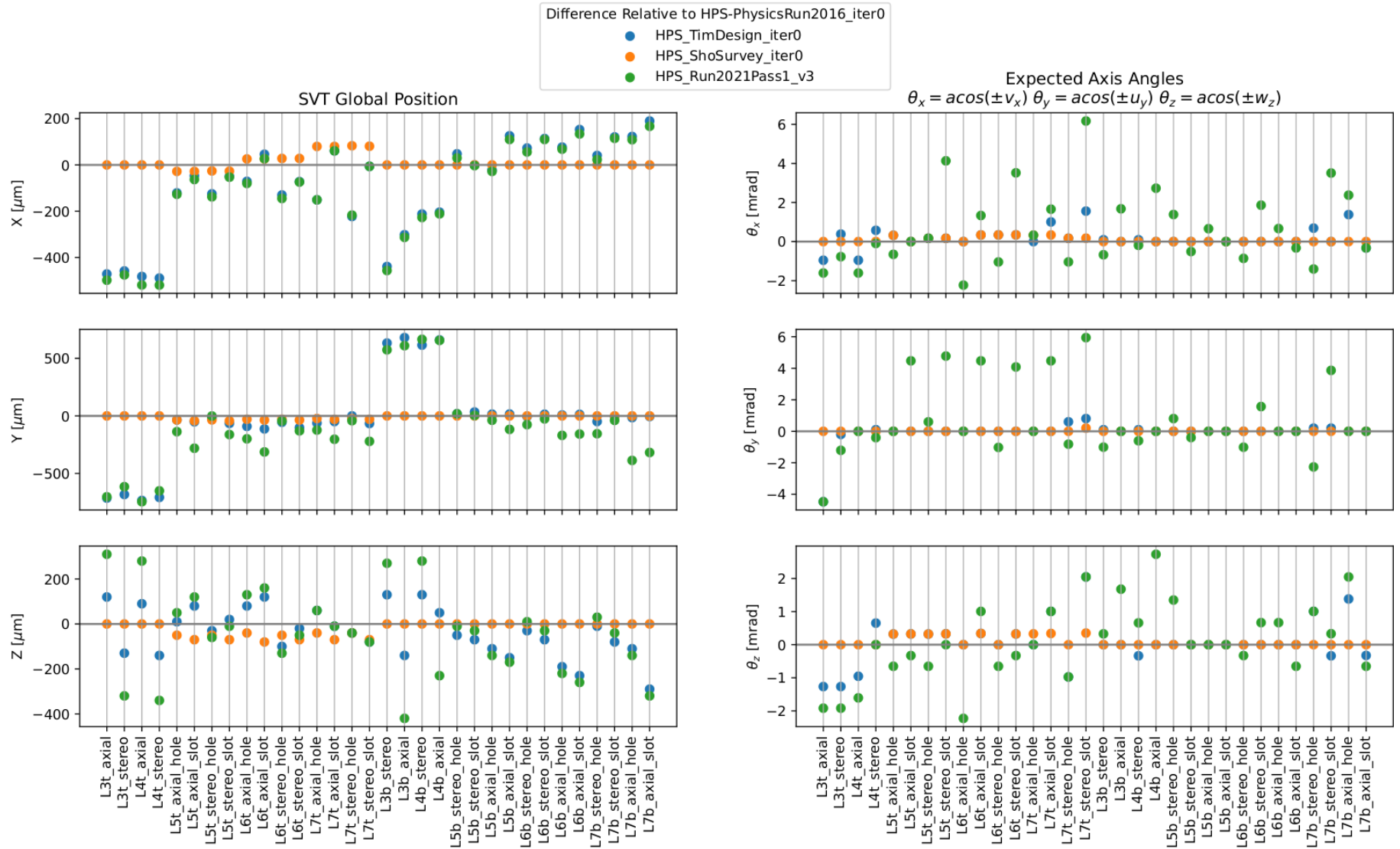
# Uchannel Survey Numbers Only



# Uchannel and Module Survey Numbers Only

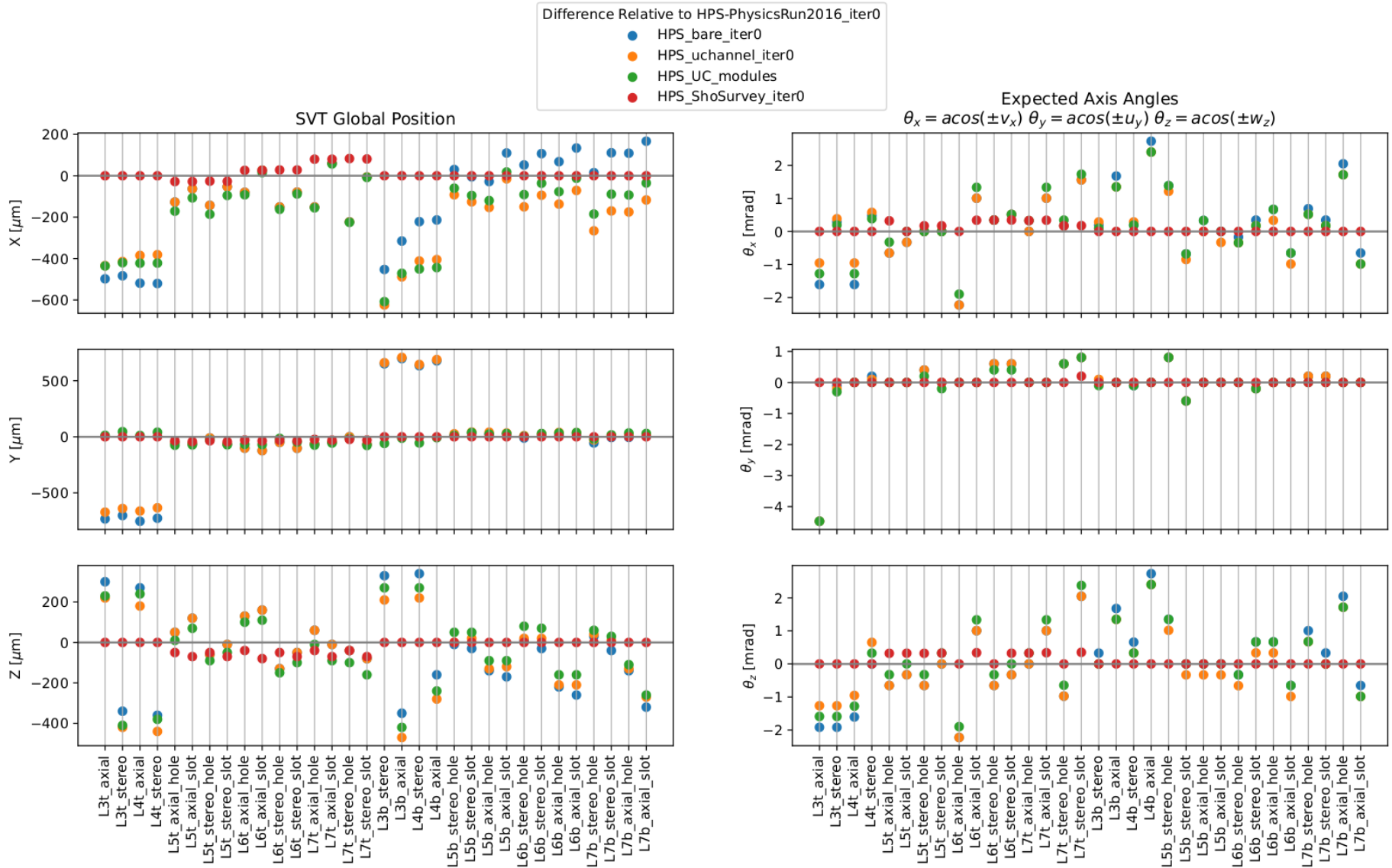


# Comparing pre-alignment (only survey) and Design





# Comparing pre-alignment (only survey) and Design



- New SVT geometry class does not reproduce same detector with same survey numbers
- Everything is the same except the top-back with all the survey numbers
- Need to account for shims now in layers 3 and 4
- Using a subset of the survey numbers throws off the top-front
- Now that we have tools to make these kinds of plots, need to use them to get the top-back to match independent of the SVT geometry class used
- Longer term we will need to focus on cross checking the slim edge sensors, trickier since no 2016 reference to use
- Big thanks to Tom for helping build the tools to make these plots