The background of the slide is a photograph of a university campus. On the left, there is a large, multi-story brick building with many windows. In the foreground, there is a body of water with a fountain spraying water upwards, creating a rainbow. The sky is blue, and there are some tree branches with green leaves in the upper corners.

**Pair Spectrometer: Built-in  
Calibration Systems and Tools,  
Radiation Hardness Studies**

**Stephen JD Kay  
University of York**

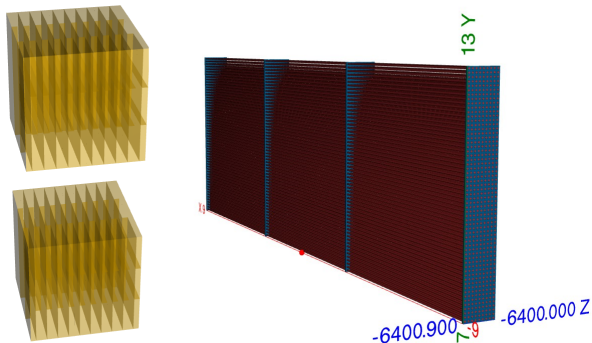
**ePIC TIC Meeting  
29/01/24**

# Radiation Hardness

- **Radiation hardness not a major concern for the Pair Spectrometer Calorimeter.**
- Design of calorimeter is very similar to that of the FECal.
  - See Oleg's slides from TIC meeting on 11/12/23.
  - Epoxy for PairSpec same, no concerns.
  - Scintillation fibers, no concerns.
  - SiPMs/readout electronics, no concerns.
    - Space/flexibility in design to move if problematic.
- **Regardless, plan detector tests with prototype at A2 (MAMI) to verify. Focusing on SiPM performance.**

# Monitoring Systems - Pair Spectrometer Layout

- Pair spectrometer calorimeter - two  $18 \times 18 \times 18 \text{ cm}^3$  cubes.
- Each cube formed of 20 layers, each 0.9 cm thick.
  - Each layer formed of three modules.
  - Scintillating fibers running along length of module.
  - Readout from one end of module only.



# Monitoring Systems

- Readout from one end leaves space for LED system at other.
  - Widely used elsewhere, utilise similar principles.
  - Can monitor LY, correct performance of system as needed.
  - Co-ordinate with fECAL group on monitoring system
- Temperature monitoring system for SiPMs.
  - Add system for monitoring, space available for cooling.
- Extra redundancy for system from complementary detectors
  - Low  $Q^2$  Tagger.
  - Pair Spectrometer Trackers.
  - Not self monitoring aspects... but, a nice extra redundancy.