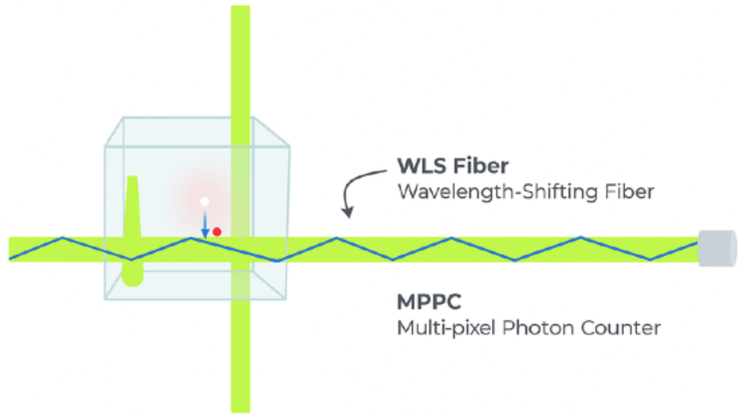
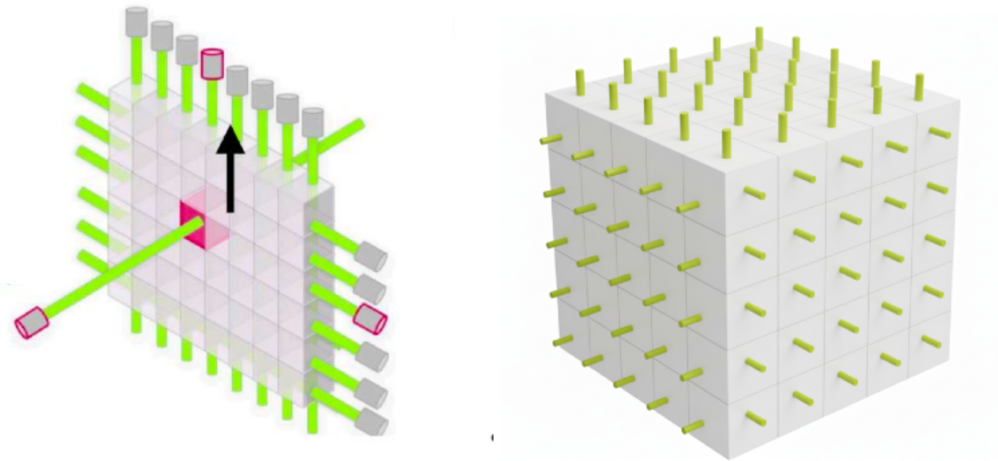
ForwArd Search ExpeRiment

3DCal Modules

- **The Basic Unit - Scintillating Voxel:**
  - Detector built from half a million of **1 cm³ plastic cubes.**
  - A **charged particle crossing a cube** → cube scintillates, emitting photons.
- **Capturing the Light: Wavelength-Shifting (WLS) Fibers**
  - Three orthogonal fibers pierce each cube.
  - Fibers absorb scintillation light → re-emit & guide photons to sensors at detector edges.
- **Same technology as SuperFGD:**
  - Very Successful in T2K experiment.
  - 2 million voxels.





[The Super FGD for the T2K neutrino oscillation experiment: Link]

The Read Out

The Data Challenge

- **Three-Plane Readout:**
  - Light collected from fibers along **X, Y, Z axes.**
  - Produces three independent 2D projections of the event.
- **Creating a 3D Image:**
  - Combine 2D views → S*parse* 3D event.
  - Allows us to pinpoint **energy deposits** with fine resolution.
- **However:**
  - Energy reconstruction from 2D views is not unique.
  - E.G: Z plase has 1 active projection → 3 voxels.