ForwA**rd** **S**earch **E**xpe**R**iment

FASERCal Detector Conceptual Design

3DCal modules   *RearCal*   *HCAL*   *µTag*

Proposed Solution: *FASERCal*

- Fully electronic 3D Precision Calorimeter for High Energy Neutrinos, and sub-detectors. (A. Rubbia et al)
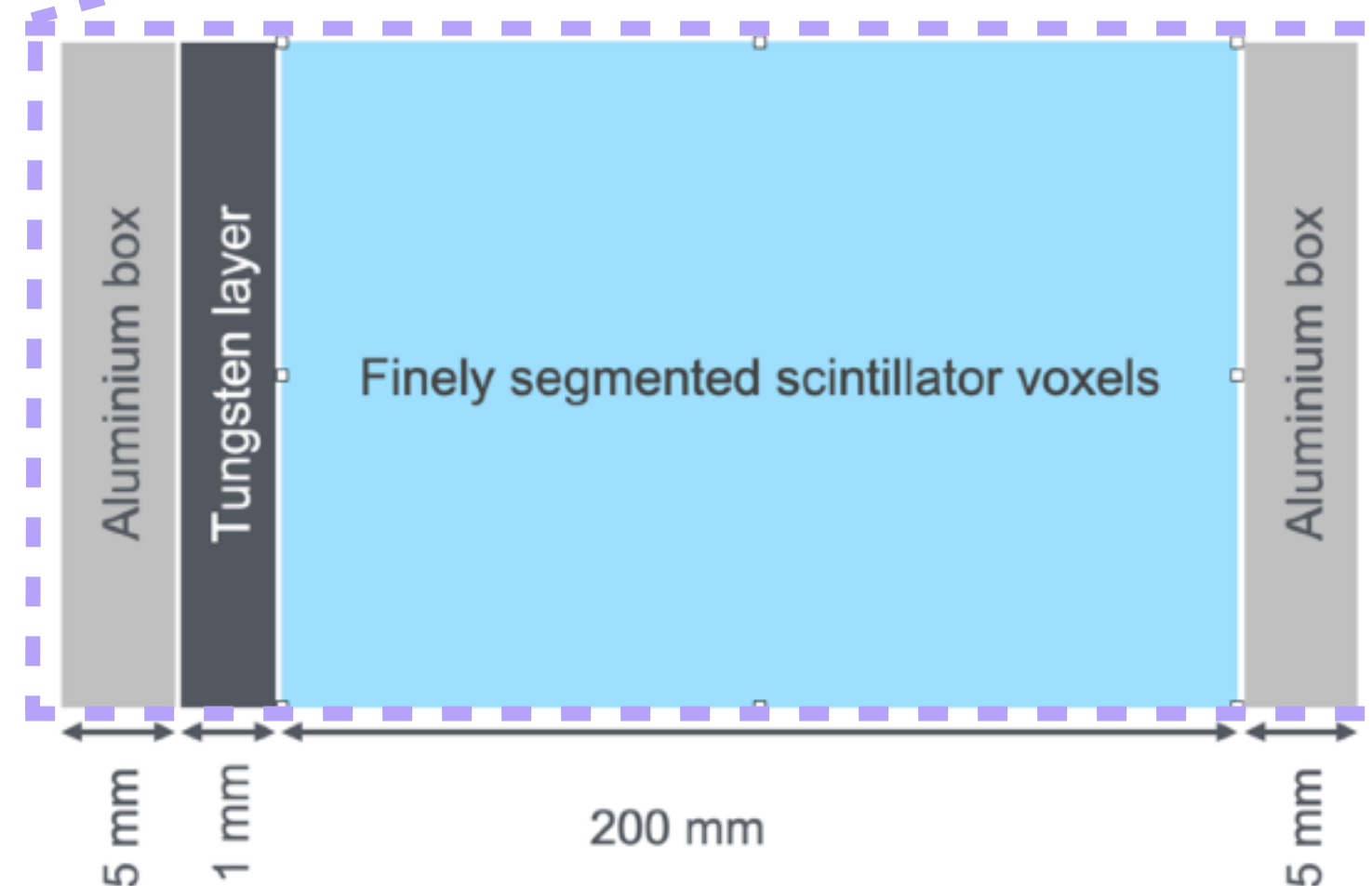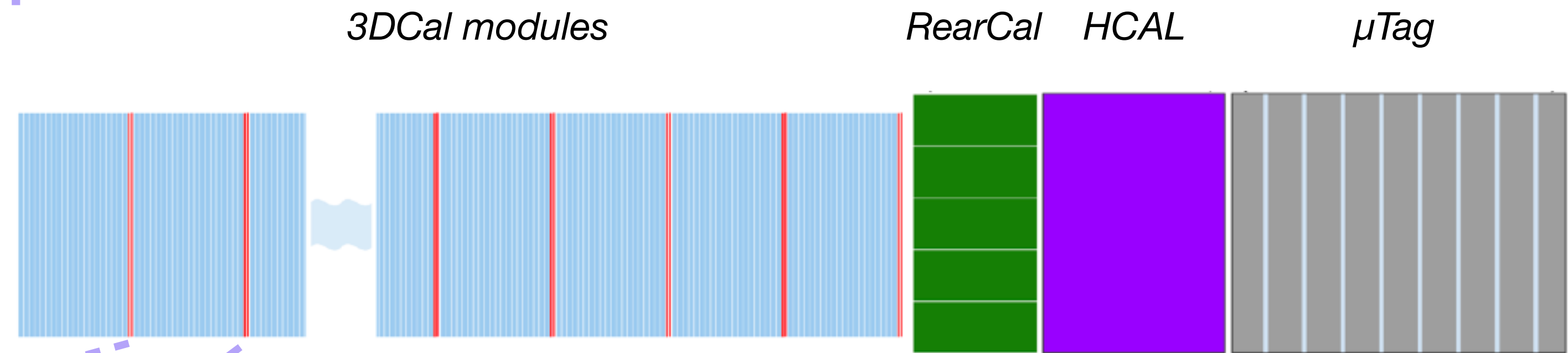

- **10 3DCal modules (520 kg):** each with 20 layers of 48x48 3D scintillator voxels → calorimetric information and tracking.

- **RearCal**: sampling calorimeter to enhance EM shower containment + energy measurement.

- **HCAL**: sampling calorimeter for hadronic energy measurements.

- **µTag / spectrometer**: dedicated detector for muon measurement.

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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.

WLS Fiber
Wavelength-Shifting Fiber

MPPC
Multi-pixel Photon Counter
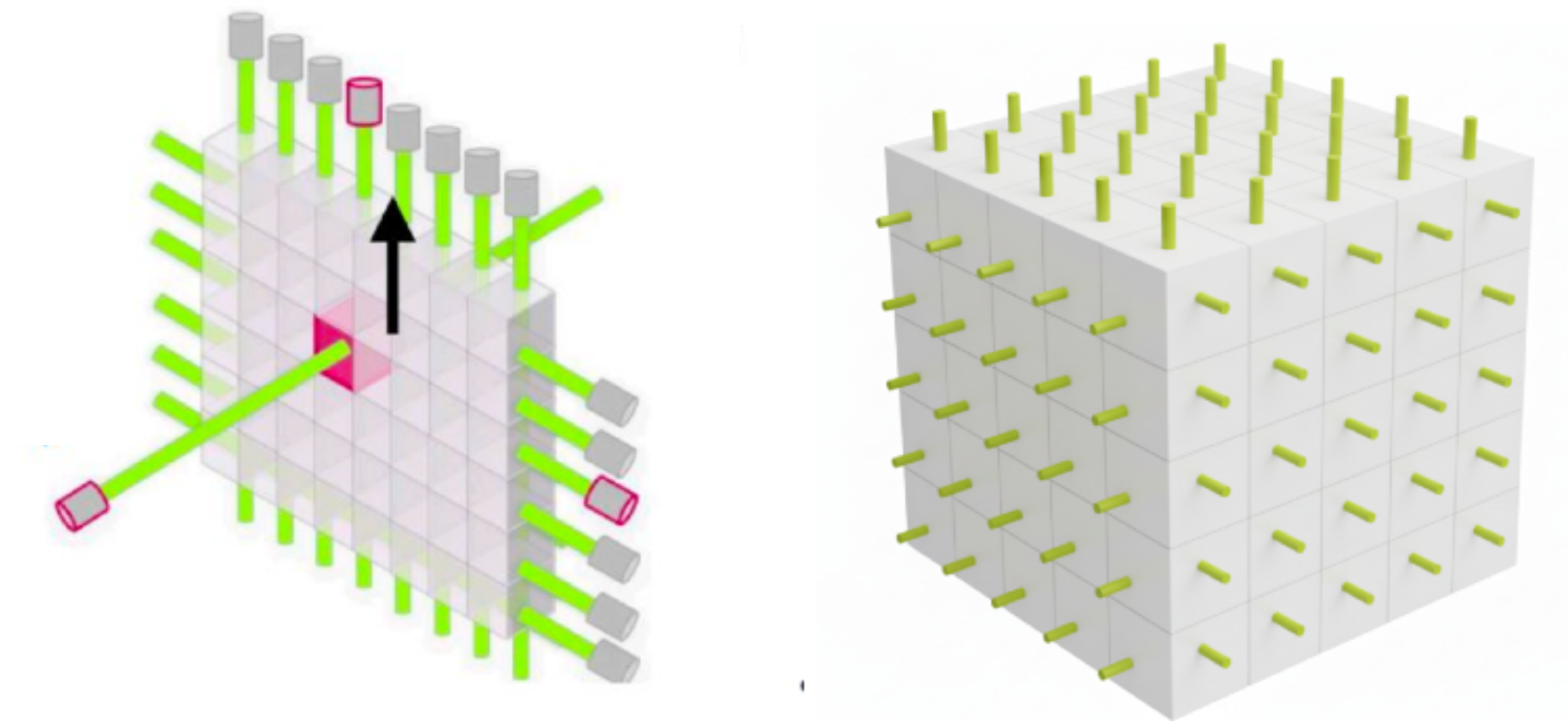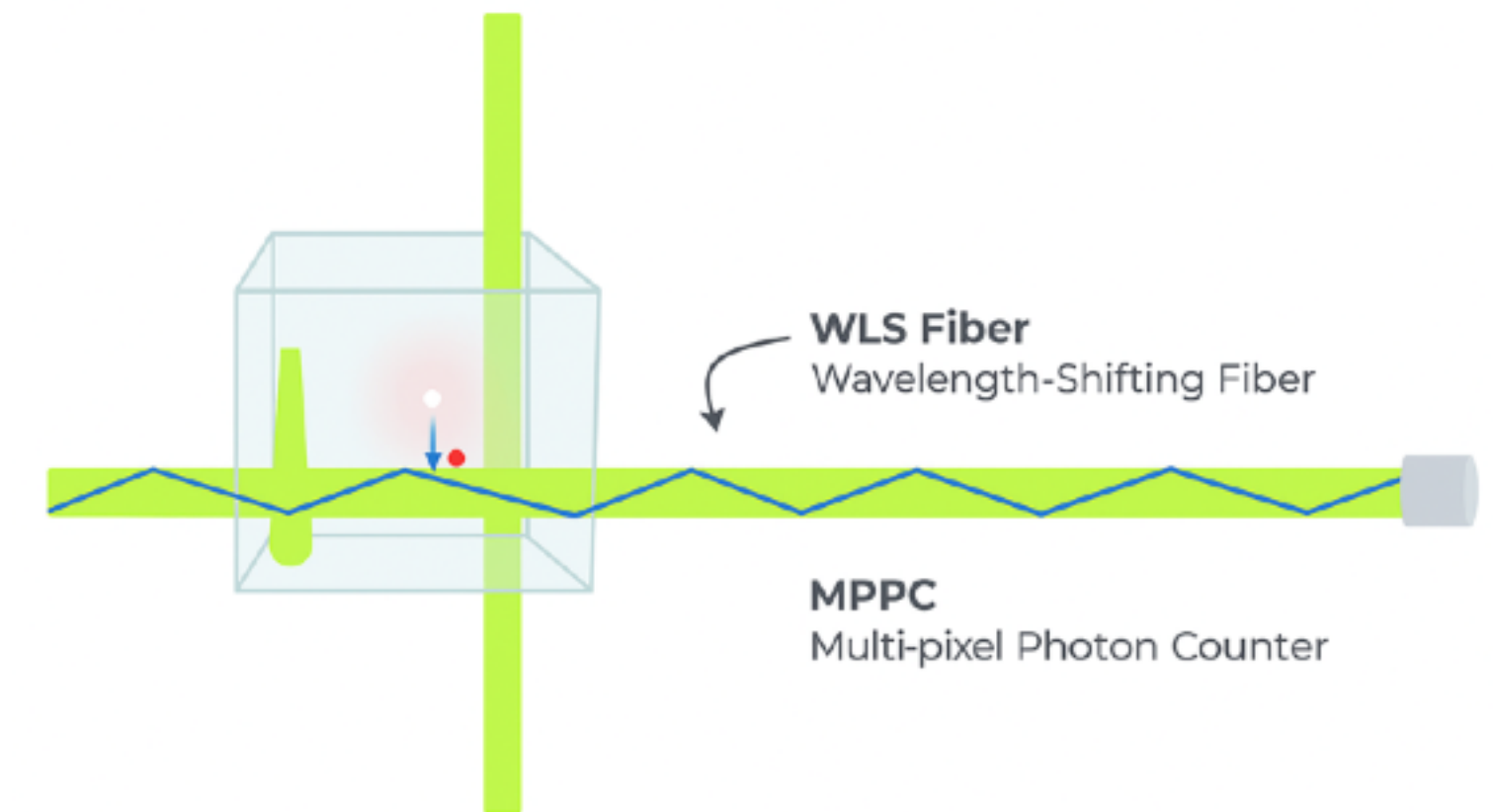
[The Super FGD for the T2K neutrino oscillation experiment: Link]