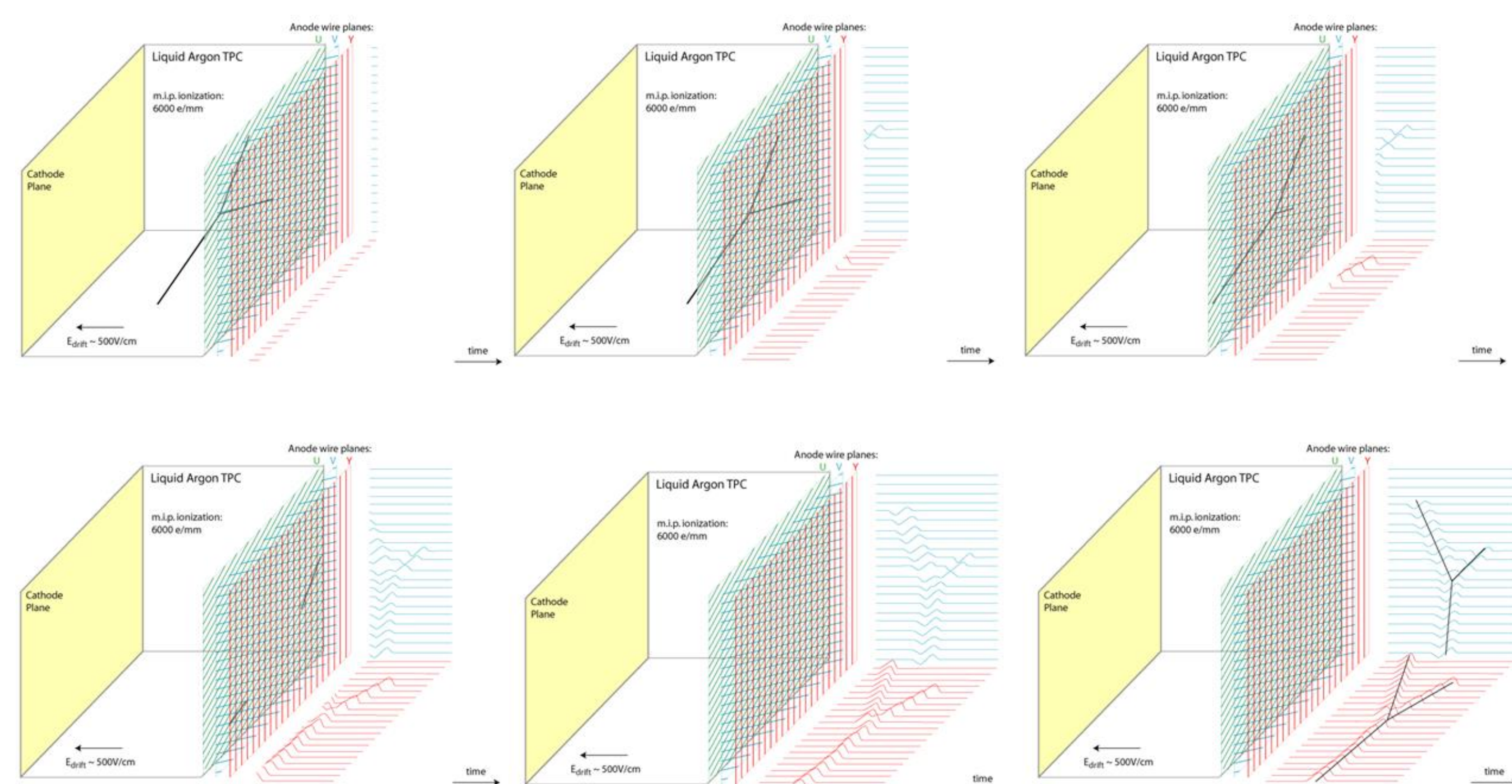


Building Tiny LArTPC to Measure Low Energy Events

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Introduction

Neutrinos are the most abundant particle in the universe. However, they interact with matter very weakly. **Liquid Argon Time Projection Chamber (LArTPC)** can be used to **detect neutrinos** by measuring the resultant **charge and light** after the interaction between neutrino and Argon particles. However, in LArTPCs **light** is collected with very **low efficiency**. Therefore, the project explores adding **photosensitive dopants** to the TPC to **convert more light particles into charge particles**. It will enable us to **explore the physics in low energy region**. Additionally, we will be testing the **performance of LArPix V2**.



Scientific Diagram of the LArTPC in Time
(Source)

Liquid Argon Time Projection Chamber (LArTPC)

In a LArTPC, an **incoming neutrino** interacts with an **Ar nucleus** which results into the production of **Ar ions** and **Charged particle/s**. The **energy and trajectory** is measured through the **ionization signal** as **time** is measured through **scintillation light**. Using these information, we can create a **3D picture of the particles' trajectory**.

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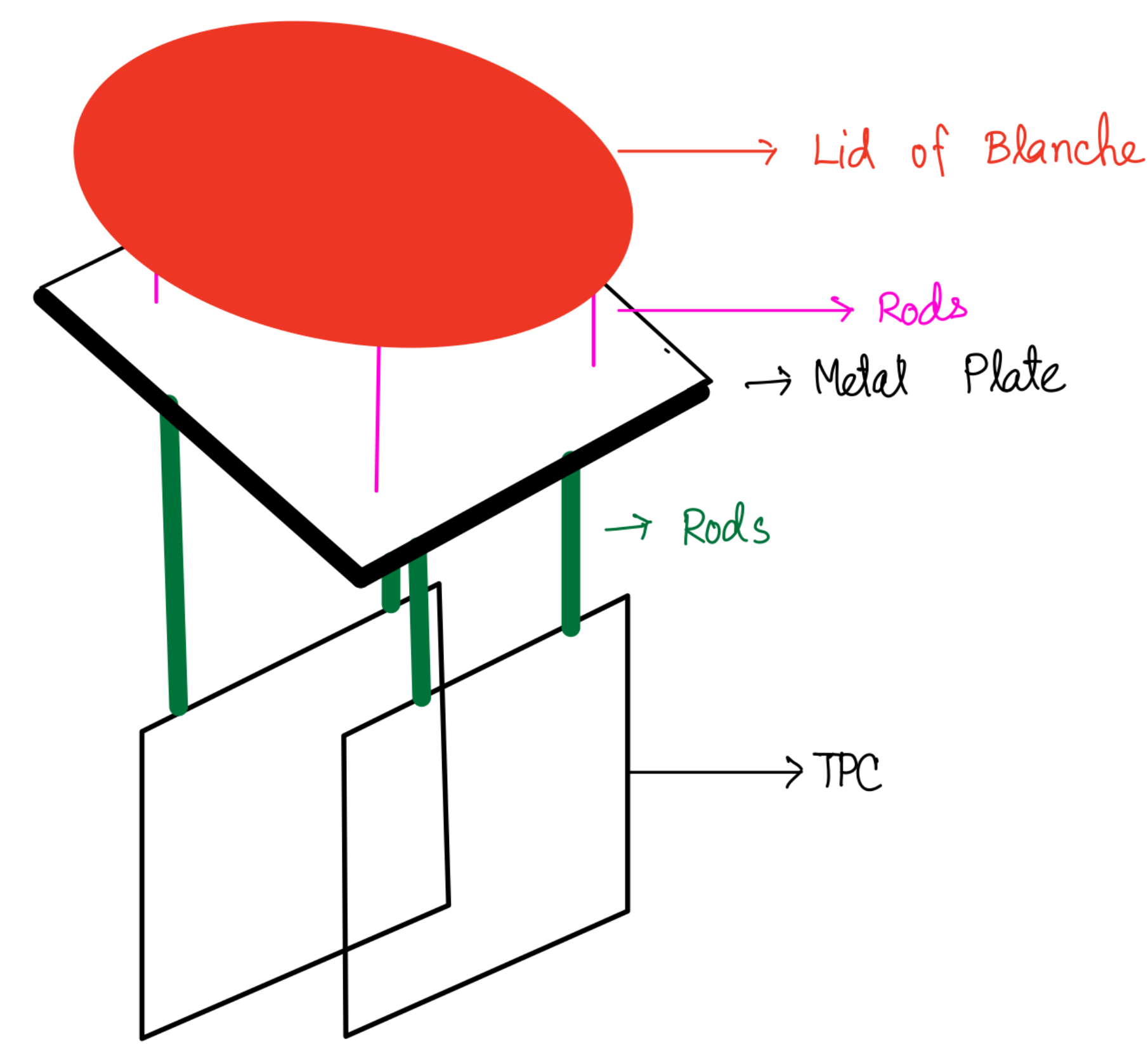
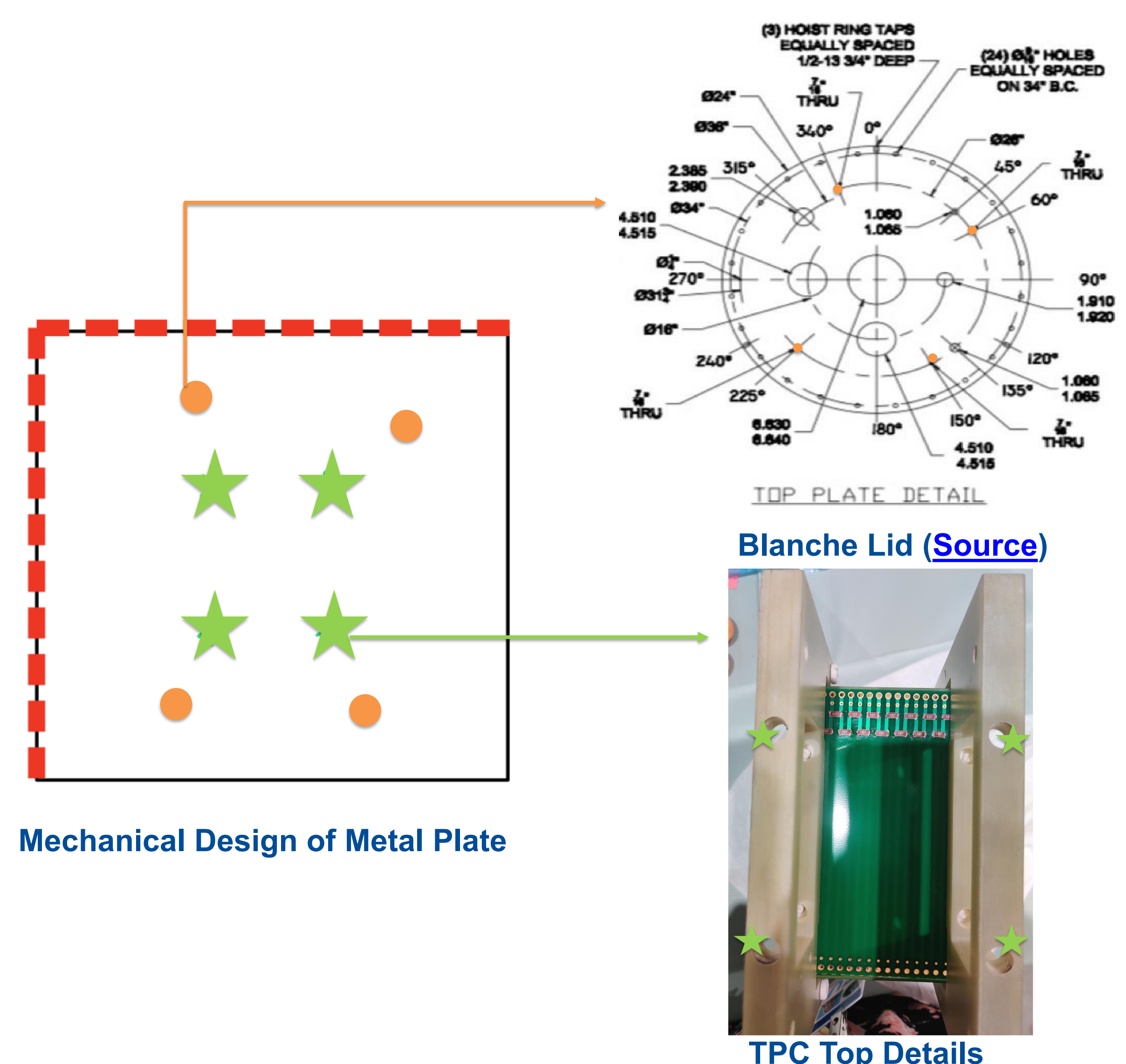


Diagram of TPC when Deployed in Blanche

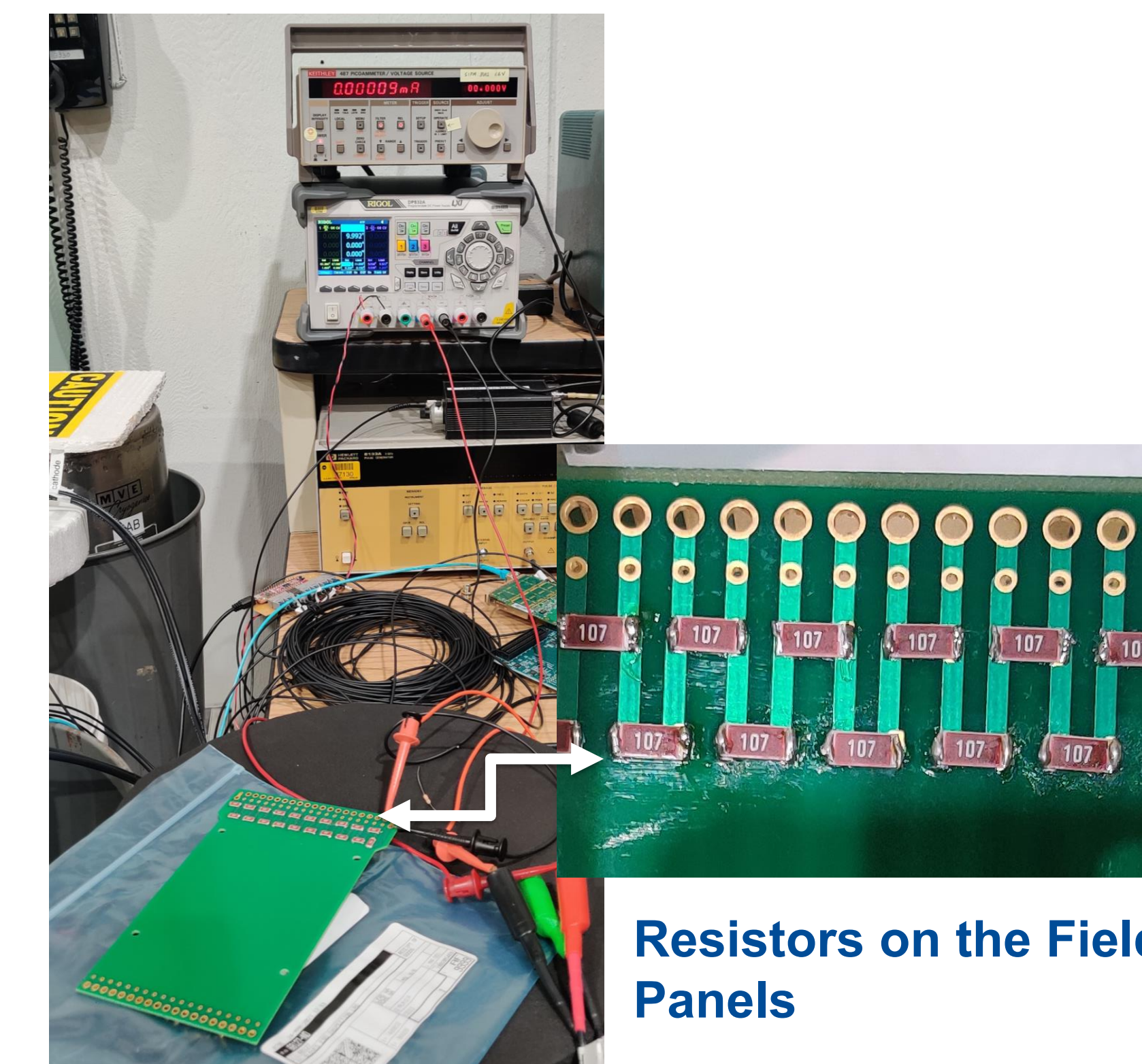
Preparation to Deploy the TPC in Blanche at PAB

The TPC will be deployed in the cryostat Blanche to explore the effects of photosensitive dopants and test LArPix V2.

We will use a metal plate to stabilize the TPC once deployed. The image below illustrates how the plate will be connected to the lid and the TPC.



Metal Plate and the Corresponding Locations on Blanche Lid and TPC



Setup Used to Test the Electronic Equipment

We inspected the **resistance of the Field Cages Panels** to ensure all of them working properly. Then we assembled the TPC following the steps shown below.

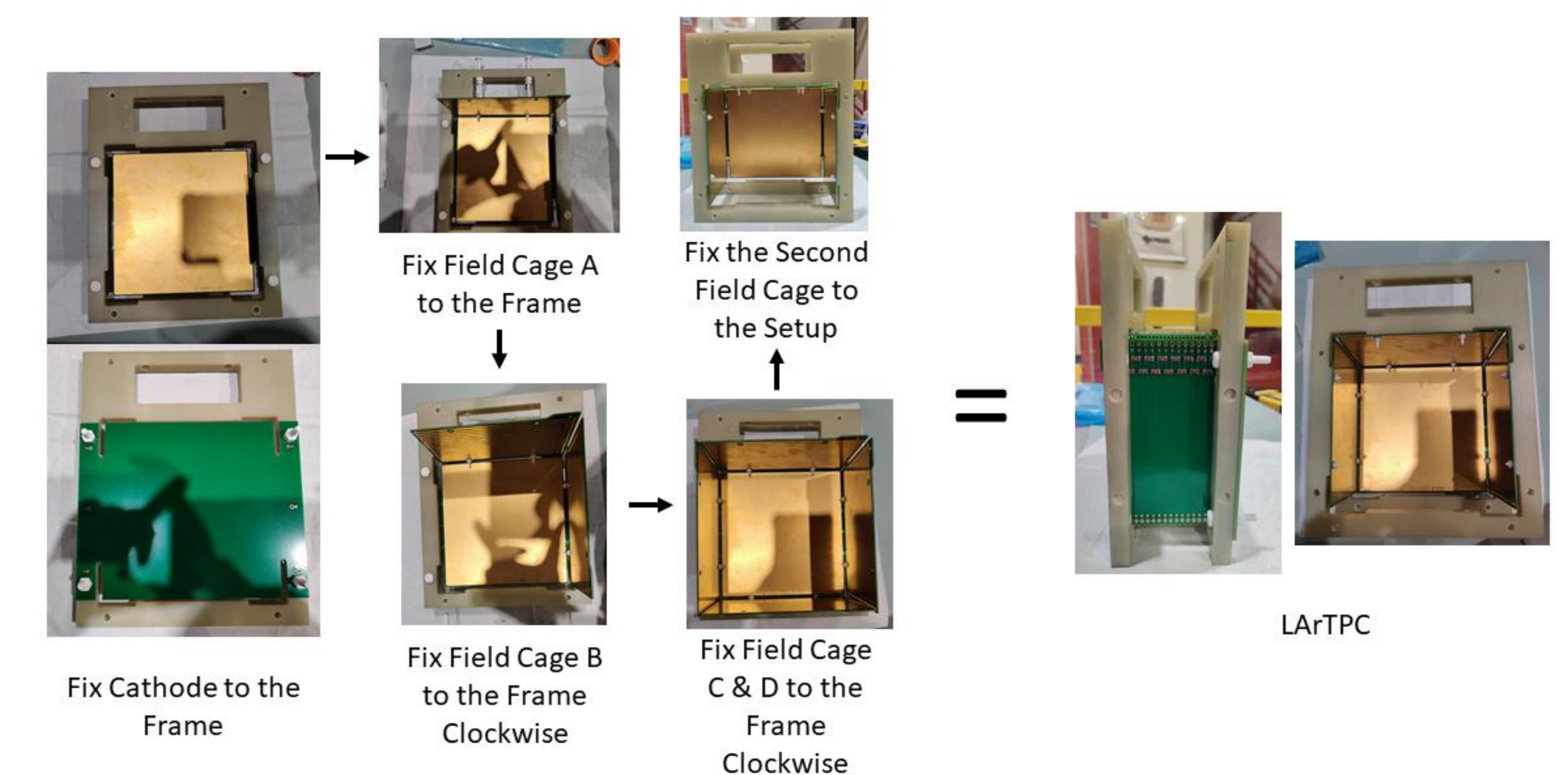


Diagram of the TPC Assembly

Future Steps

- Correct the mechanical design of the Metal Plate
- Finalize the Flanges used for Blanche Lid
- Conduct Bench tests once the Anode/Pixel plane arrives
- Finish the TPC assembly and conduct tests

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