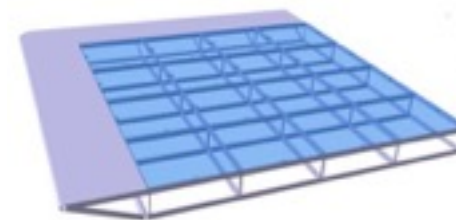
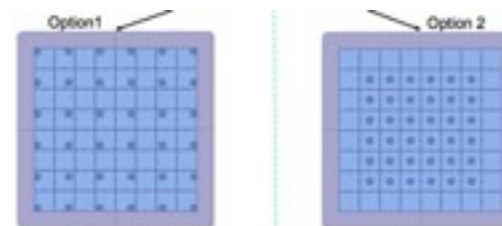


Update on the WA105 PMMA cathode

Status



- Main design parameters for the cathode fixed
 - Use of double sided ITO coated PMMA plates of 650x650 mm² size
 - Top sides will be TPB coated
 - Gap-free assembly on top of a rigid SS tube structure in 4 identical super-modules
 - In total 64 plates (SS plate border, ~0.5m, still under discussion)
 - Electrical couplings with high ohmic resistors among the plates
 - PMT layout still under study



- Basic R&D finished
- Mock-up of 4 plates planned (each ~30x30cm²) to be tested in 182 (end 2016)
- Cathode for ton scale LAr TPC pending (results 2016?)
- Starting to think about a schedule for procurement, assembly, installation

ITO coating defects

**Appeared on 2 surfaces out of 6
Presently under investigation with Visiontek**



A panel was returned due to damage and coating loss. There has been reported a coating loss and is shown here in a contrast enhanced image (enhanced as it's difficult to see in a standard photograph)..

Response from Visiontek

The area of coating loss was imaged using:-

- A standard phone camera. These images are about 200mm high.
- An optical microscope image (VEHO VMS-004). These images micrographs are 15mm wide.

In both cases the images were taken in different lighting situations:-

- In diffuse light, this method highlights the lost coating.
- In bright transmitted light. No evidence of hard coat loss can be seen,
- Checking for the presence of a hard coat using a spectrophotometer
- Use a more powerful optical microscope and view the edges of the coating loss. At higher magnifications the depth of the hard coat can be seen at the failure edges and also any lifting hard coat.

CONCLUSIONS

The surface of the part is badly scratched. These scratches are certainly on the same side and area as the coating loss.

- The part would not have passed our inspection here (either incoming prior to coating or after coating and prior to shipment).
- We don't know what has been done to the parts to scratch them so badly, and how this might have affected the adhesion of our coating.
- In the light of the scratch damage can a harder substrate such as glass be considered?

- **Replacement panel was sent free of charge**
- **Plate would not have passed inspection @Visiontek**
- **Need to develop QA procedure**

Summary / next steps

Summary

- **A v1.0 design for a PMMA plate cathode is existing**
- **Quotation: ~100sheets - 1.5kCHF/plate, 10 plates per week (total ITO ~2months)**
- **Need to develop QA plan for acceptance of delivered plates**
- **Scheduling further treatment (machining, TPB ...) – Infrastructure existing**

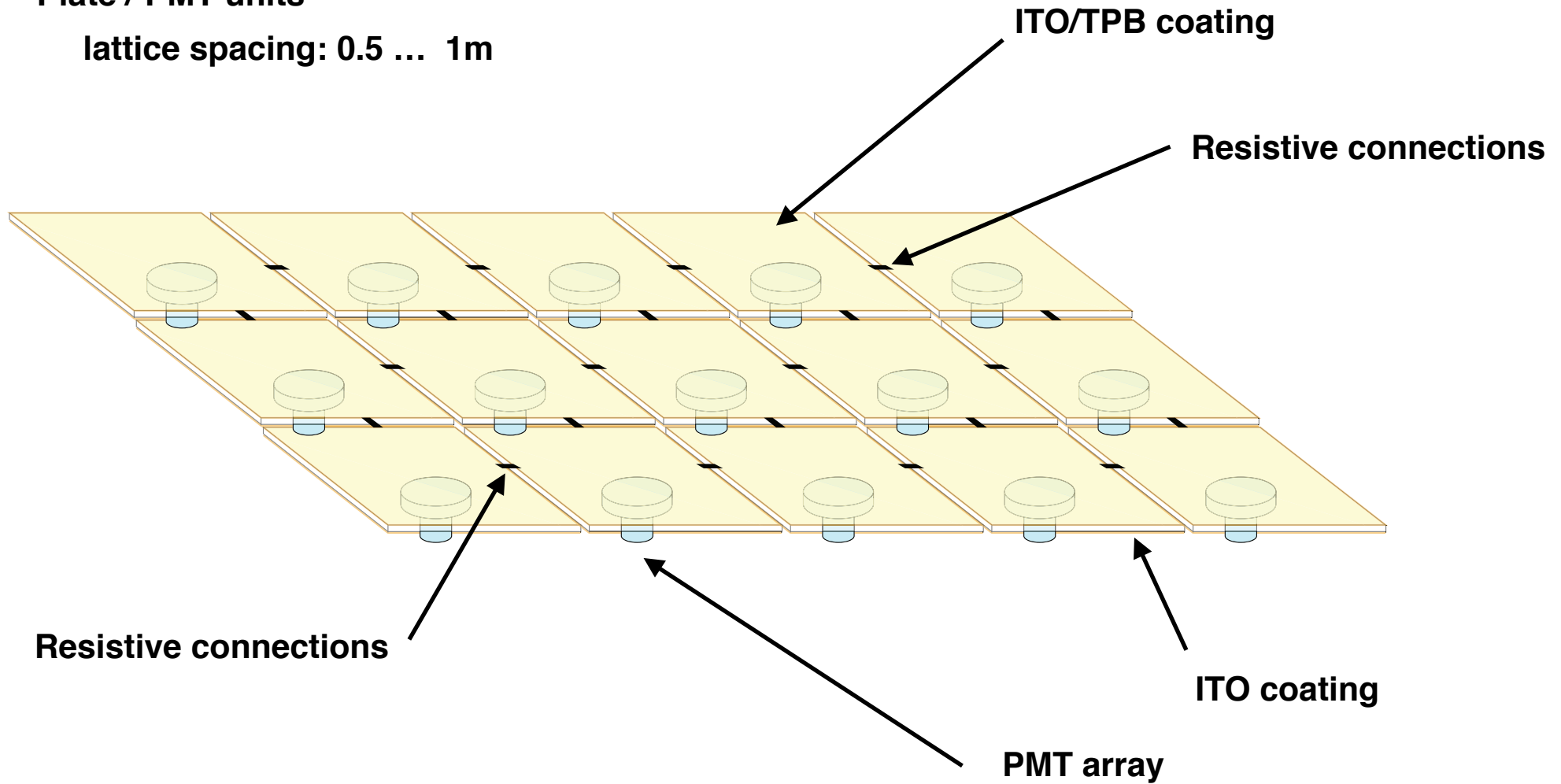
To do

- **Get information from simulation on optimal PMT geometry**
- **Prepare mockup and tests in cryostat (B182)**
- **Integrate project in the WA105 time line**

Conceptual design

Plate / PMT units

lattice spacing: 0.5 ... 1m



Resistive connections

ITO coating

PMT array