Discussion on Charge Readout Planes improvements

LEM/CRP workshop April 6-7th 2020

From the ProtoDUNE-DP experience:

- CRP Planarity of ProtoDUNE-DP Phase I is +-2mm instead of +- 0.75 at cold 1.
 - => structure much more stiff





2. Grid sparking (independently of the mechanism) is harmful to the readout electronics: need to be minimized and controlled to eliminate all risks for the electronics

 \Rightarrow Guard rings to catch the potential sparks

Would it be efficient enough and what is the impact on Efield configuration on the LEM borders?

Validation? Simulation needed and tests program to do



Operation stability issues to get rid off:

Liquid argon surface instability complicated the operation: new design should integrate several modifications to be less sensitive

 \Rightarrow Larger gap grid-LEM: add 2 mm

⇒ Comb positioning and shape to take into account the vertical displacement and horizontal position of wires due to electric force.

Charging up of materials or ions may generate electrostatic effects (grid currents...)

=> Adapt a system to drain the charge accumulated with resistive material layer on the combs.

alidation

4/7/2020

Would it be efficient enough and what is the impact on Efield configuration on the LEM borders?

Simulation needed and test program to do

Extraction grid and LEM capacitive couplings and stability over time => revise the electrical configuration of both LEM and grid HV distribution gesterday





Operation stability issues to get rid off:

- Existence of microphonic effects due to potential vibration mode
 - => optimise the LEM-anode sandwich system and adapt possible damping system?



Simulation and tests needed





LEMs/Anodes modal simulations to explain microphony phenomena

How to modify the LEM-anode sandwich system?