

## Status update from Genova

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# Status and structure

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- Light emission, propagation and collection; ✓
  - ▶ For each sensor: number of hits,  $(X, Y)$  and direction of each hit on the sensor.

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- Propagation in LAr; ✓
- Light emission, propagation and collection; ✓
  - ▶ For each sensor: number of hits,  $(X, Y)$  and direction of each hit on the sensor.
- Coded masks and reconstruction;
  - ▶ MURAs and decoding arrays; ✓
  - ▶ Reconstruction of test images with MURAs (**STARTING NOW**)
  - ▶ ...

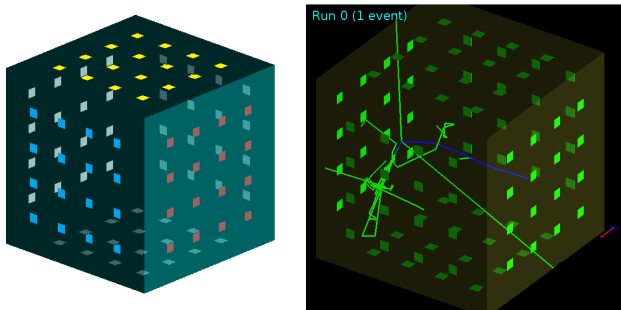


Figura 1: "Simple box" geometry. Test event with  $\pi^+$ .

- Geometry is a volume of LAr with sensors on each side.

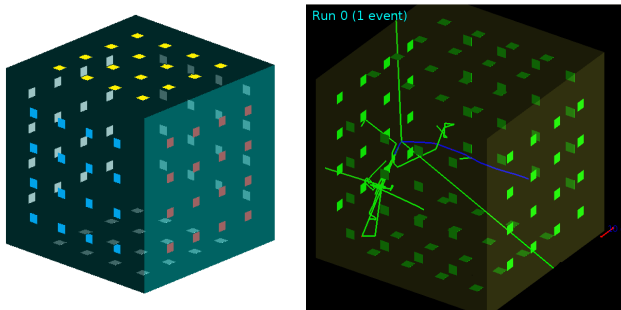


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- Geometry is a volume of LAr with sensors on each side.
- Box and sensors are scalable to required dimensions.
- Sensor: mask+SiPMs.

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- Light emitted is computed from energy released at each step.
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- Light emitted is computed from energy released at each step.
- Propagation is external to Geant4: solid angle + attenuation factor.
- For each hit: position  $(X, Y)$  on sensor is recorded, as well as direction for further propagation after the mask onto the SiPMs.

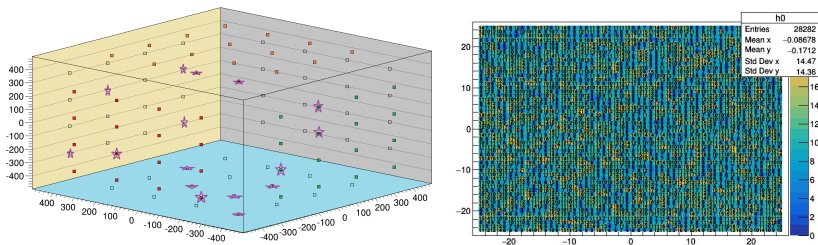


Figure 2: Hits on sensors. Sensor is pixelated, each "pixel" is open or close according to mask pattern.

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- MURA brought into their symmetric form by cyclic shifts.

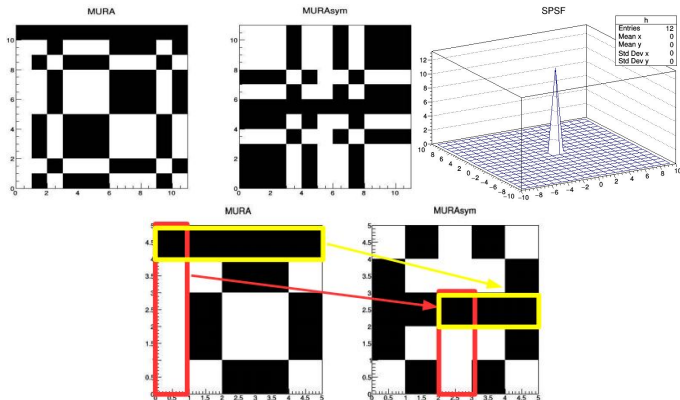


Figura 3: MURAs 5x5, 11x11. Cyclic convolution: MURA5x5 with decoding array.

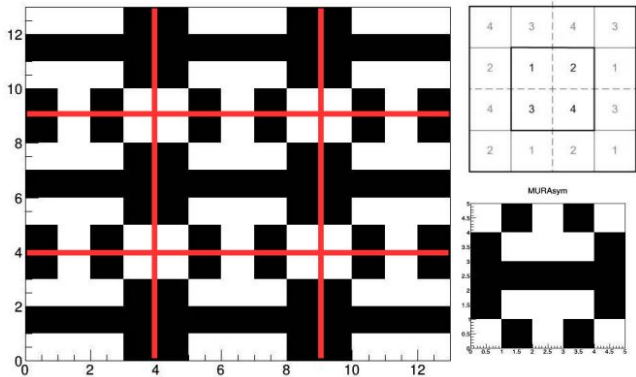
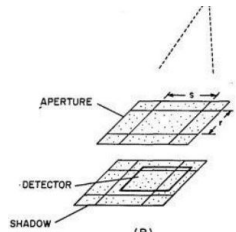


Figura 4: Cyclic 13x13 mosaic of 5x5 symmetric MURA.

- Basic MURA pattern is repeated in a mosaic to form a physical mask.
- Mosaic is cyclic: the basic pattern is always at the center.



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- GENIE as event generator;
  - ▶ not current priority.
- Optimisation of coded-masks and reconstruction:
  - ▶ Test masks and reconstruction algorithm on simple images.
    - ★ possibly evaluate other mask patterns and configurations.
  - ▶ Determine image reconstruction quality and optimize size and pattern parameters.
  - ▶ Tests on simulated neutrino events.
  - ▶ ...