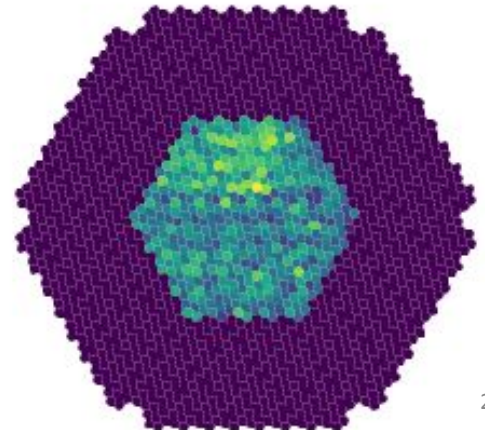
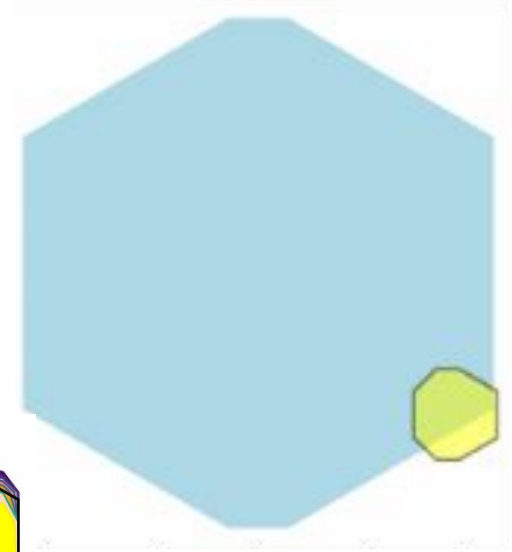
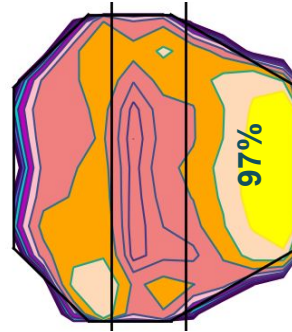


NectarCAM Calibration System

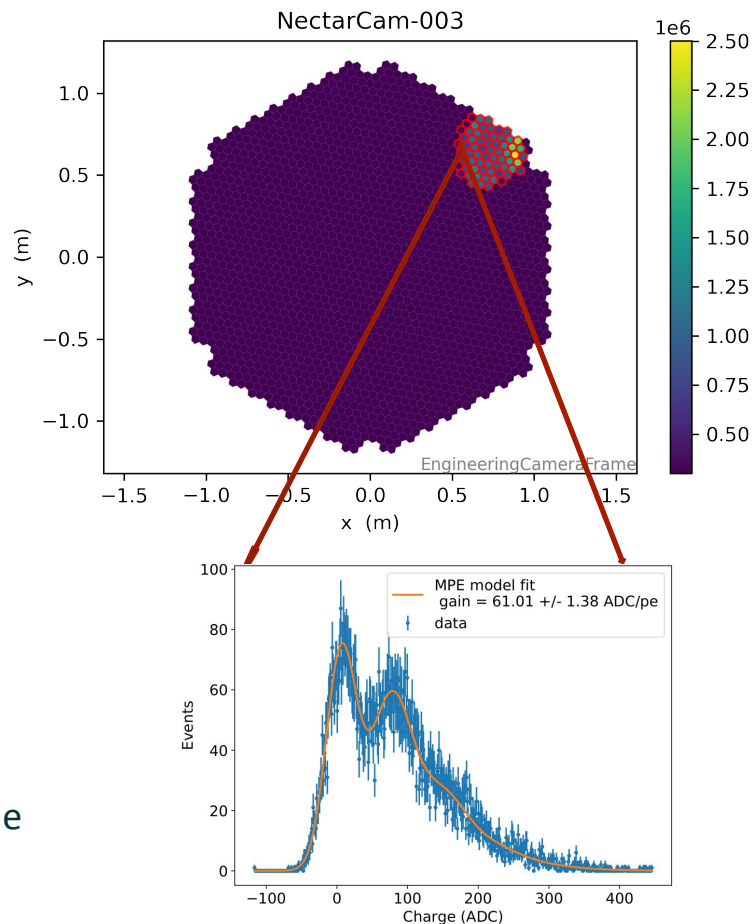
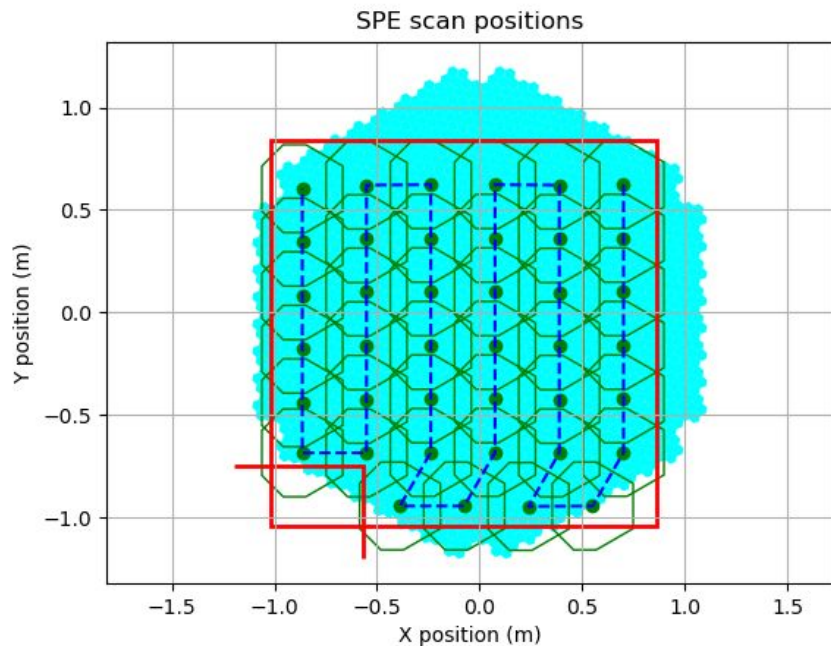
*Calibration system performance tests and
reproducibility*

Analysis tools

- 1) The design of the calibration screen was finalized.
For the present screen, up to 97% of the screen area is covered by 5 contours of light intensity.
- 2) Found the optimum scan positions required to cover all the PMTs.
- 3) From raw calibration data, found pixels illuminated by the calibration screen.
- 4) Fit the SPE spectra to deduce the gain of the PMT.



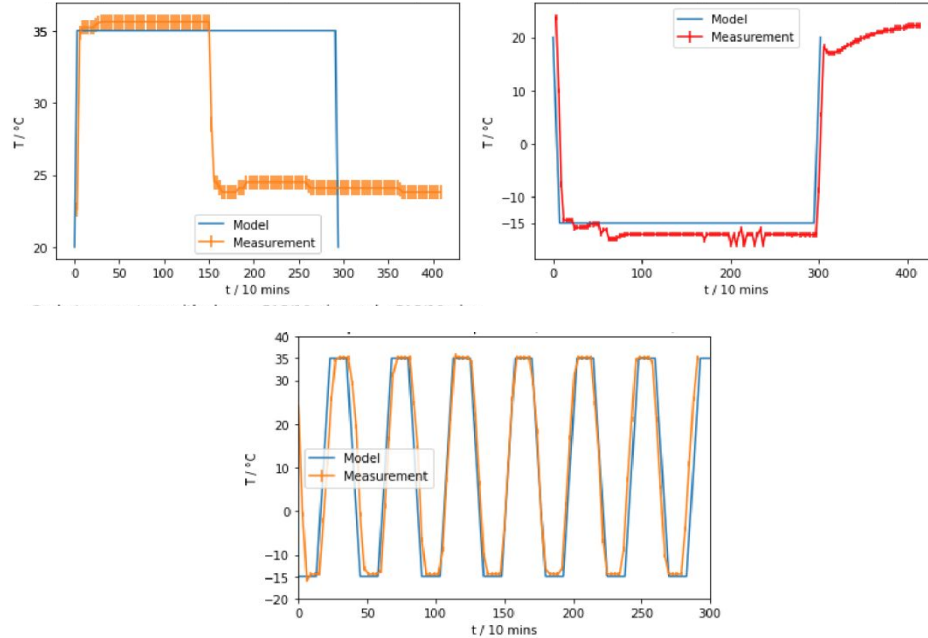
Calibration test at CEA



- Algorithms written have been tested at CEA.
- Presently only partial camera is accessible by the motors.

Temperature Tests

(Vtsch Industrietechnik VC4034)

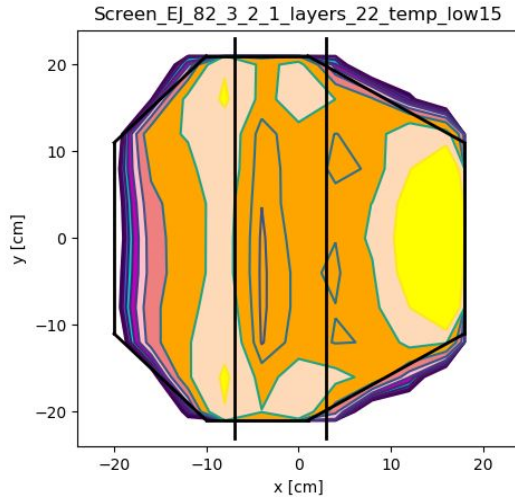


- Three temperature models were tested: Low, High and Cycle.
- The calibration screen, its frame, optical box, along with the cables, were put inside the climatic chamber for a selected time. We also put a temperature sensor inside the chamber to check if the climatic chamber worked well.
- Shown above are the plots of different temperature model in solid blue line and the temperature observations from the sensor in orange/red points.



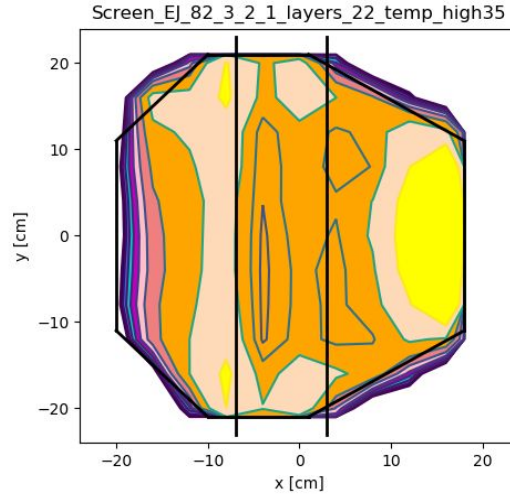
Temperature Test Results

Low



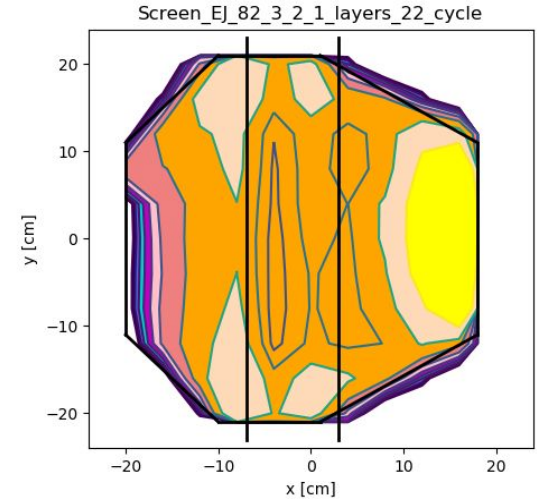
98%

High



99%

Cycle

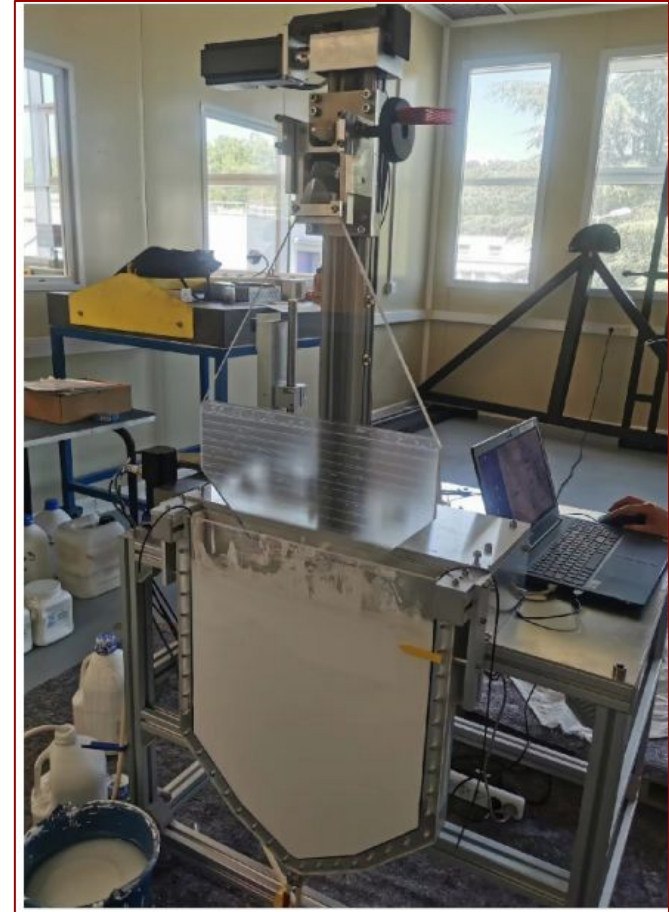


98%

- After the completion of each temperature test, a homogeneity test was performed on the calibration screen.
- Uniformity still lies within 10 contours. Almost similar intensity map - paint and hence screen can withstand temperature variations.

Dip-coating Setup at IJCLab

- A fully automated dip-coating machine has been set up at IJCLab.
- It consists of a:
 - Aluminium tank:* It is a rectangular container with a 'V-shaped' bottom used to store the paint.
 - Rail-belt system:* It is a system of trolley onto which the screen is attached and is used for the vertical dipping of the screen into the tank.
 - Stepper motor:* It is used to drive the rotation of the belt system.
 - Rubber tube:* It is electronically moved with the help of a pump and is used to stir the paint inside the tank.
- This entire setup is mounted on a table for mechanical support and is connected to a computer that can control the withdrawal speed, the stirring rate etc.
- Need to make minor adjustments before we can start mass production.



Conclusion

- Latest calibration screen gives good homogeneity up to 10 contours.
- We have finished testing the algorithm for efficient data acquisition and analysis at CEA for the first MST.
- We have performed temperature tests and concluded that the current calibration system can withstand temperature variations within the range provided by CTA guidelines.
- We have set up a fully automatic dip-coating machine at IJCLab. Need to make minor adjustments.
- To achieve reproducibility, we have ordered 20 calibration screens and will start the testing soon.

