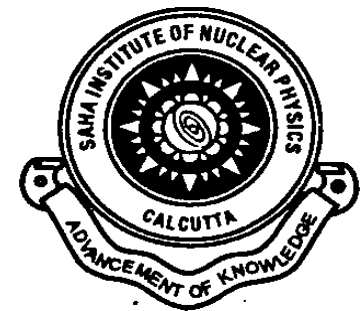


My work at CEA and future plan

Deb Sankar Bhattacharya

19 March 2014, CEA, Saclay.

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cea
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saclay



Overview :

My work

- working with 2phase CO2 cooling.
- taking part in Feb 2014 beam test.
- involvement in MARLIN based TPC software for event reconstruction- and analysis.

Future plan

Requirement For Cooling

we are using AFTER electronics which runs at 5 Volt

6 FECs	ASICs = 12 Watts	19 Watts
	Power Regulators = 7 Watts	
FEM		3.5 Watts
FPGA		3.5 Watts
Total		26 Watts

Requirement For Cooling

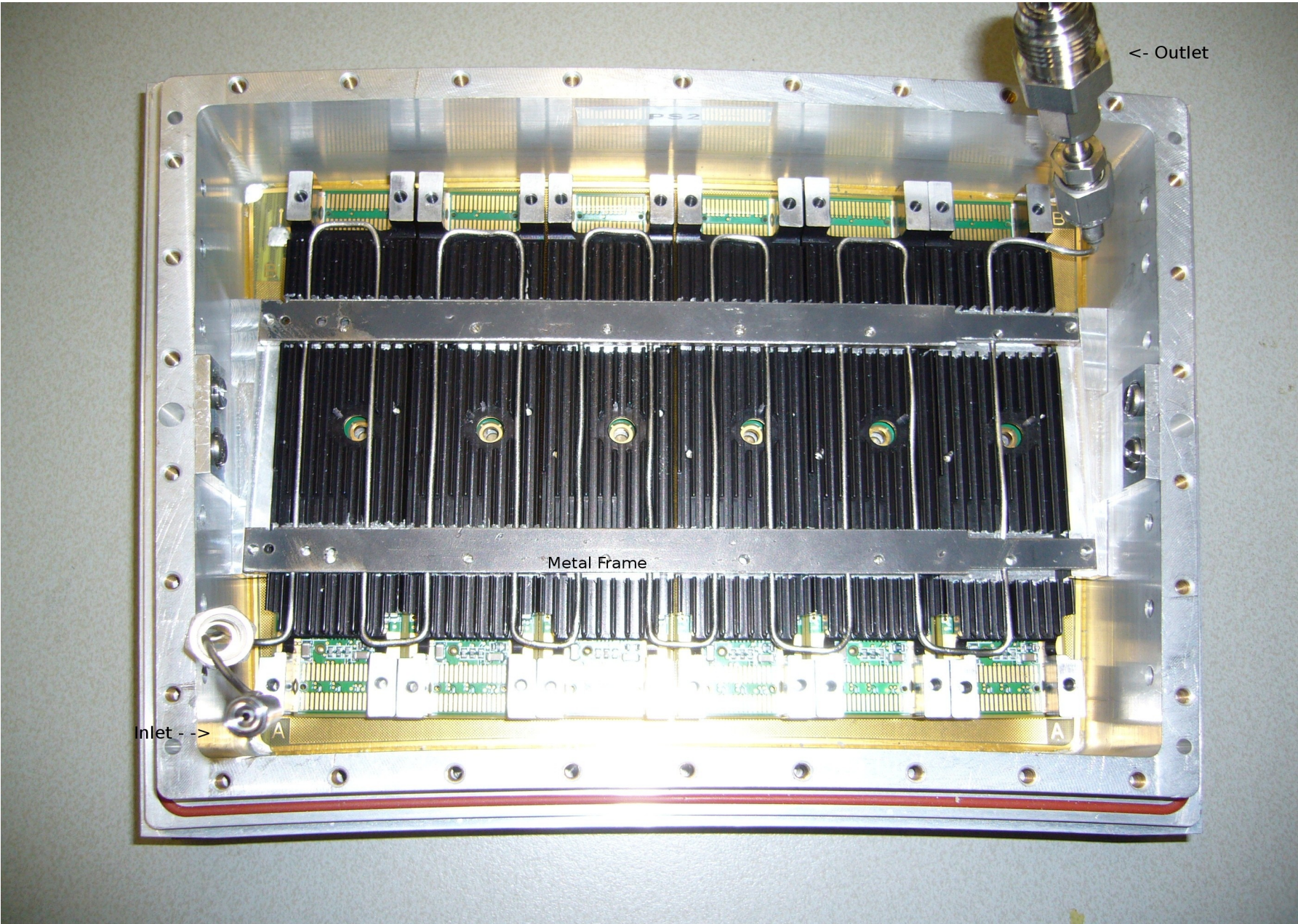
This power consumption rises up temperature of the Module up to 60 degrees

Growth of temperature results in:

- possibility of damage in electronics if left running for hours without cooling
- heating up of pad plan
and hence convection current in TPC gas

Conclusion: 'proper cooling is necessary'

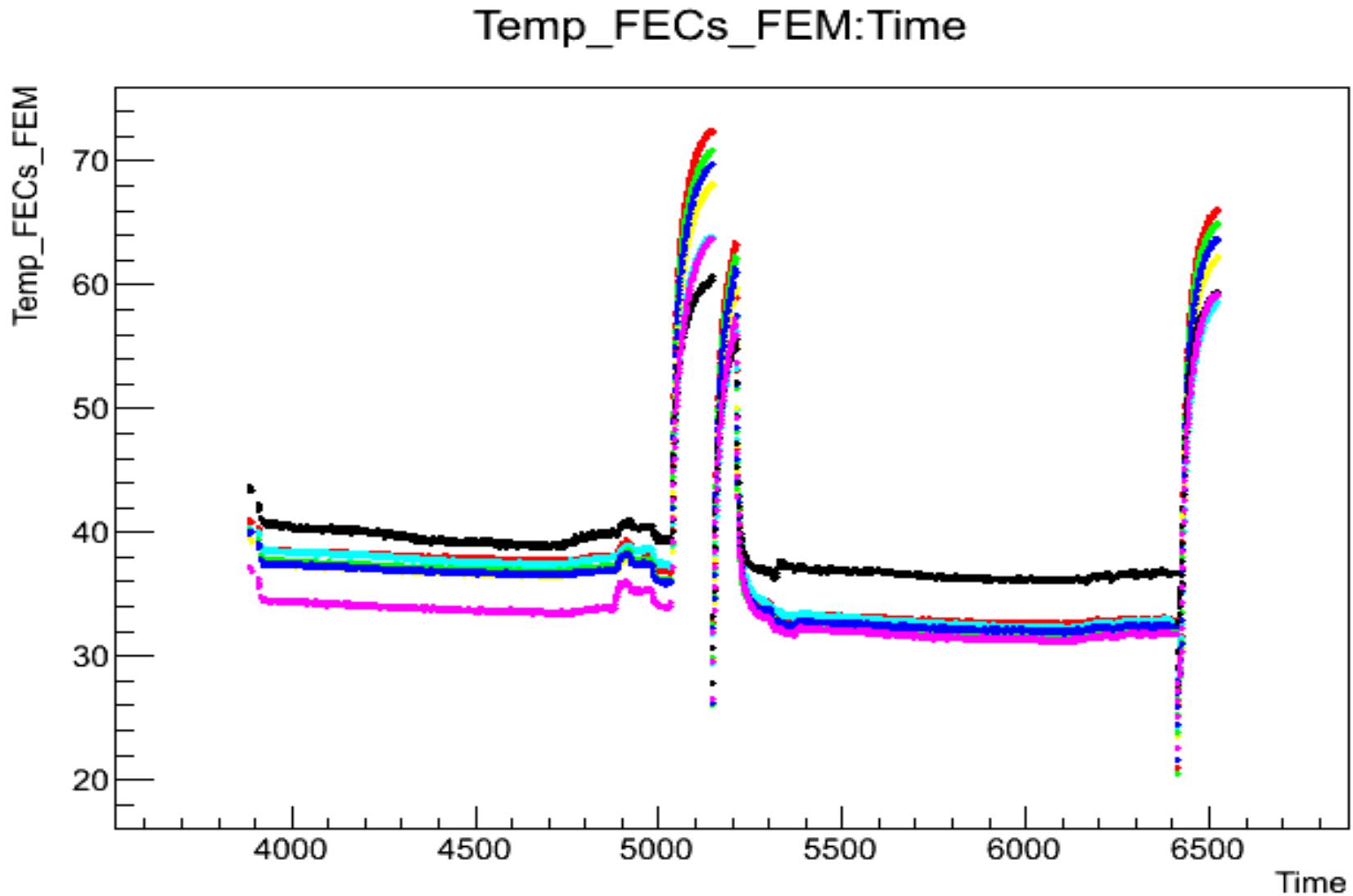
This Cooling circuit inserted inside the Module



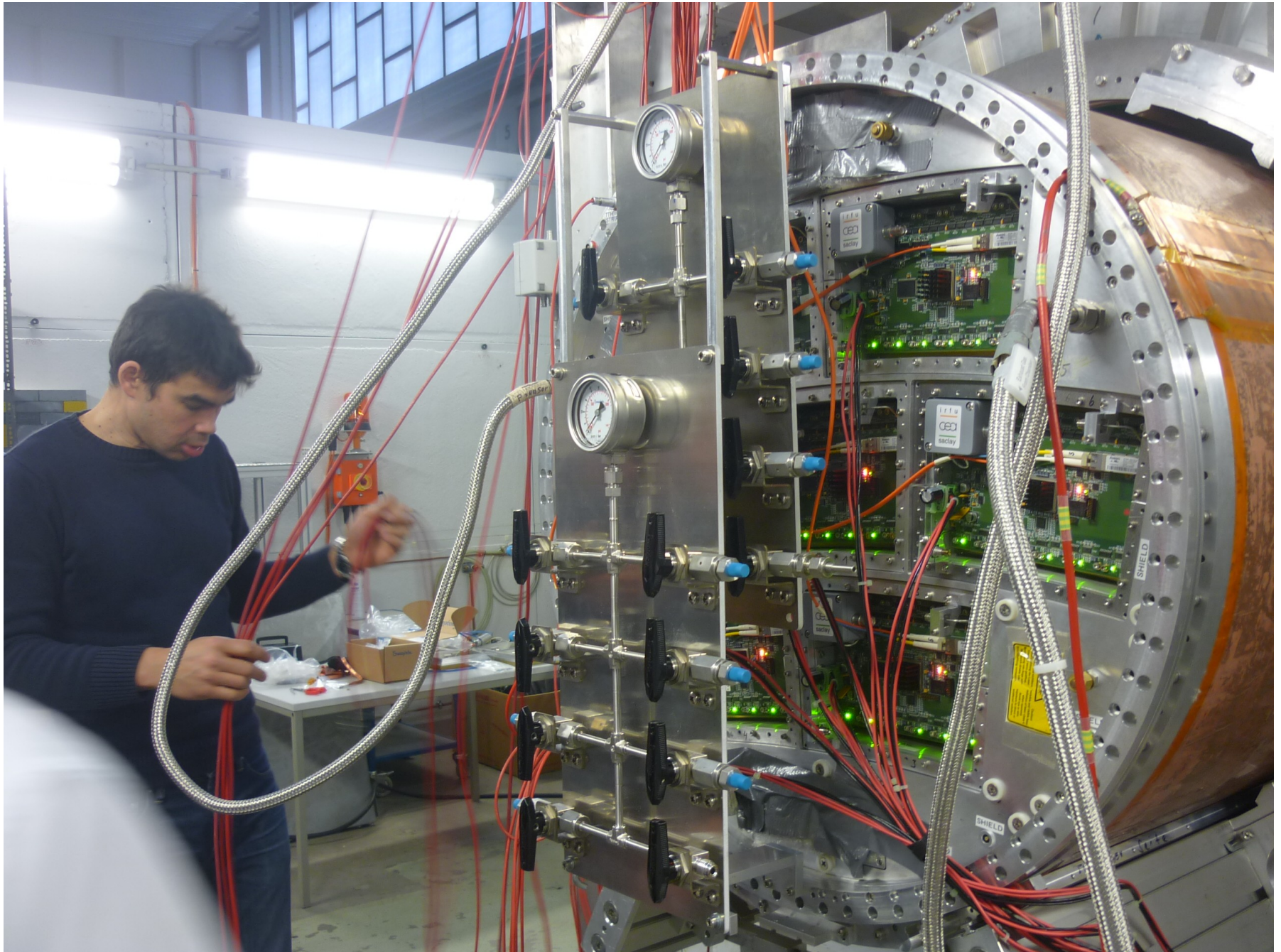
Transportable Refrigeration Apparatus for CO₂ Investigation at NIKHEF



Temperature profile for all the FECs and the FEMI

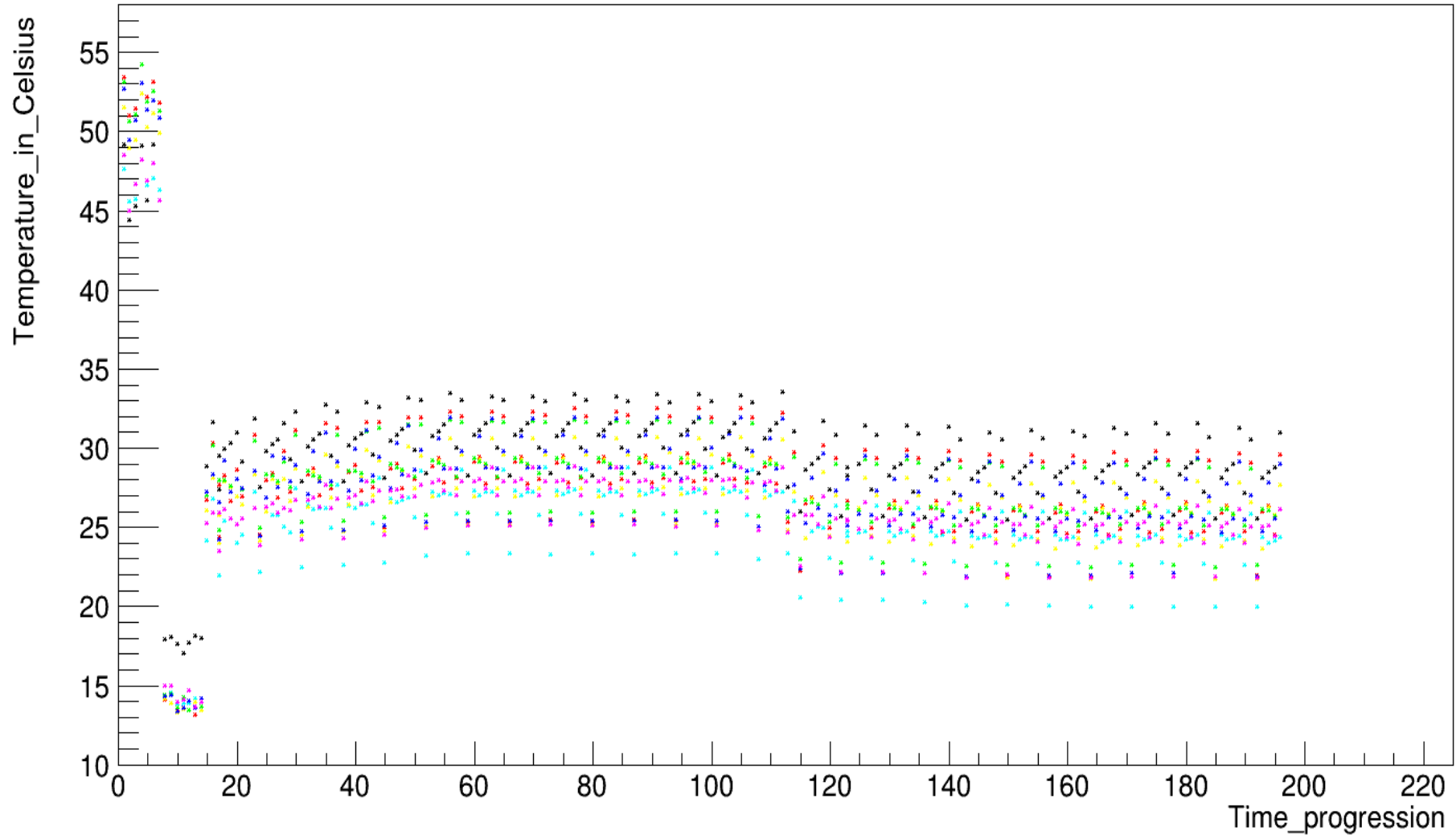


Application of cooling with LP-TPC



Stable temperature during data acquisition

Temperature_in_Celsius:Time_progression

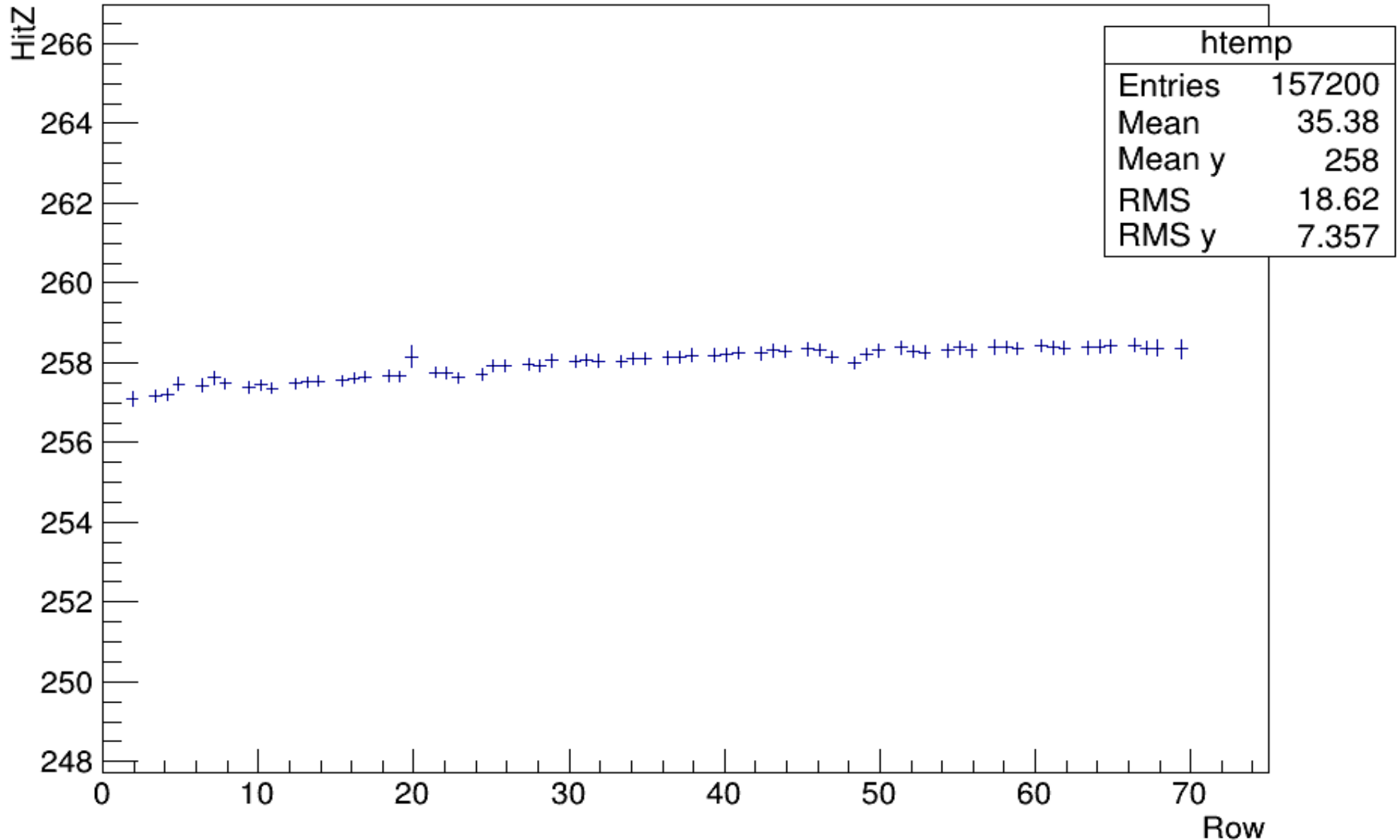


Reconstruction and analysis in 'MarlinTPC' framework

Reconstructed beam

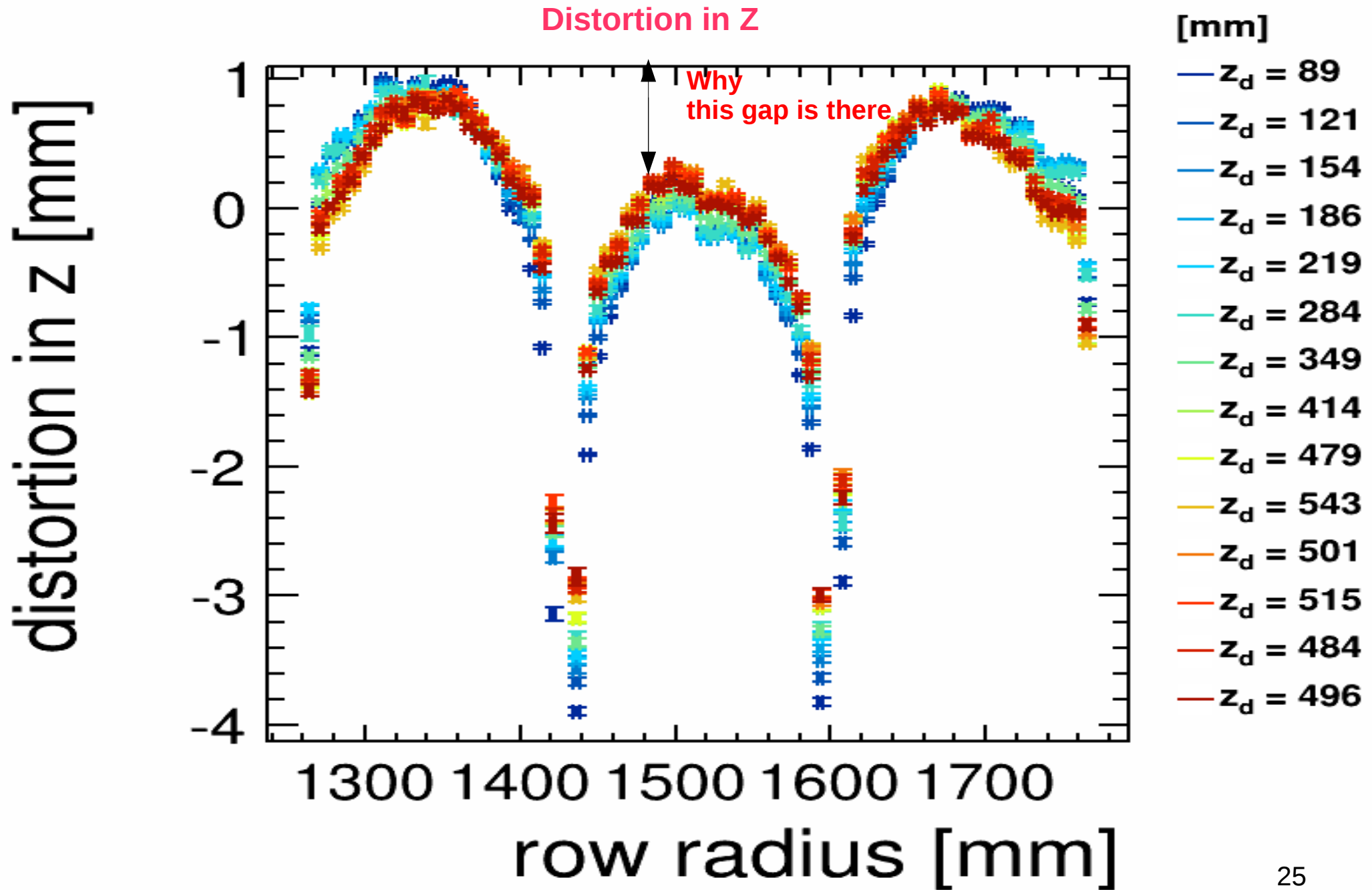
We are using and developing ILCSoft for analysis

HitZ:(Module==0) ? Row : (Module==3) ? 24+Row : 48+Row



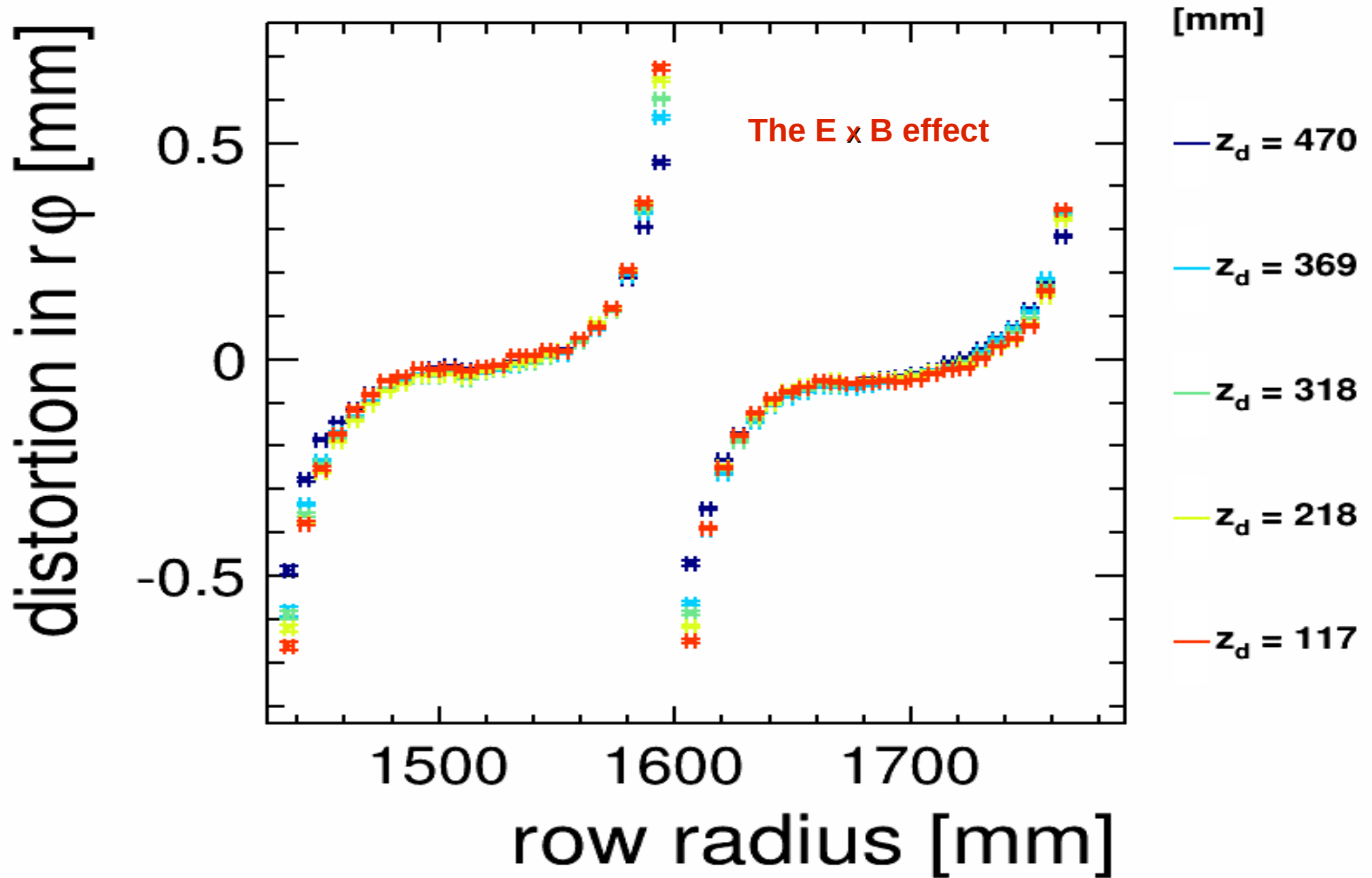
Distortion study

$B = 0T$



Distortion study

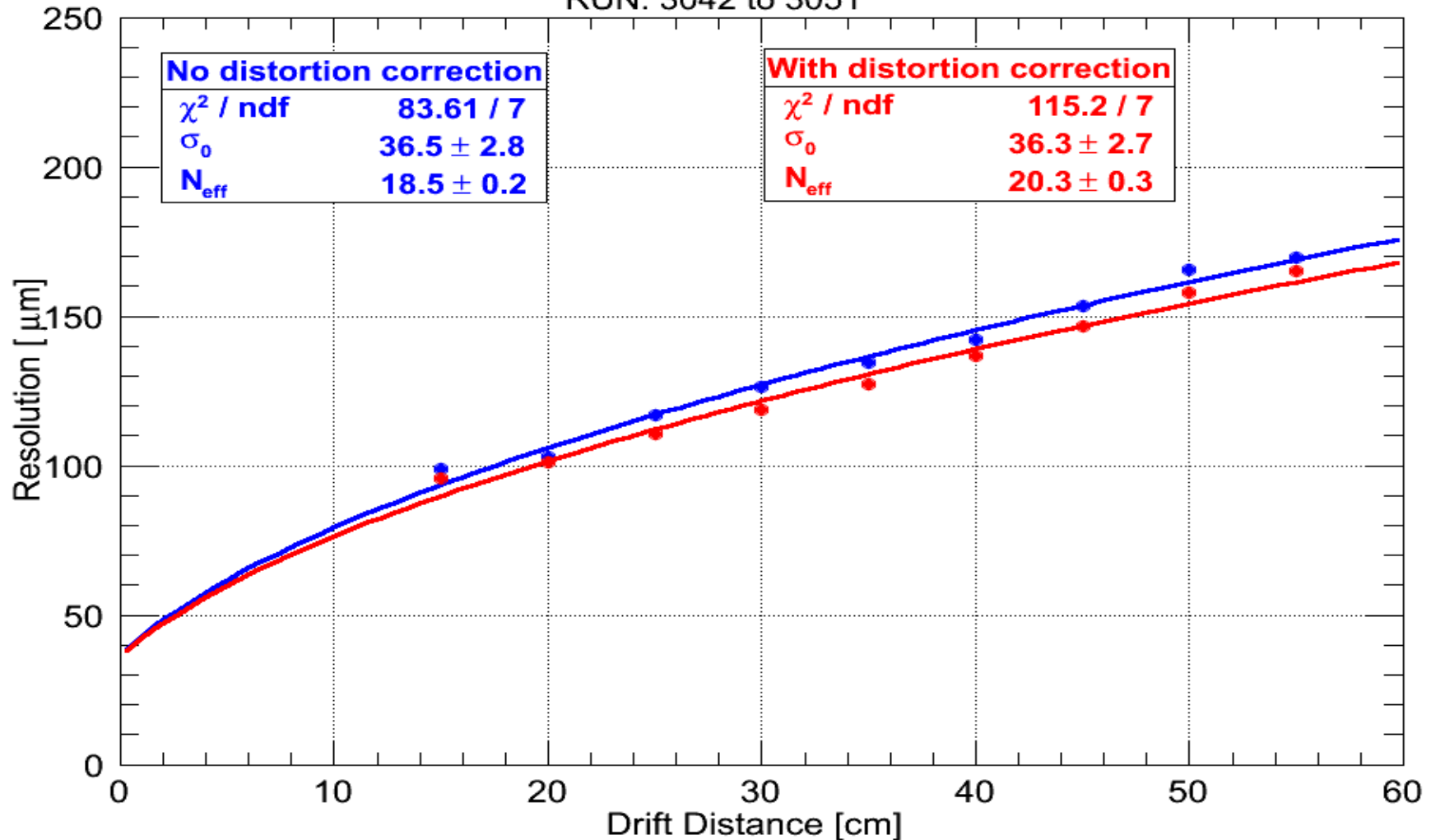
Distortion in r_{ϕ}



Resolution study

Module 3: B = 1 T, E_{Field} = 230 V/cm, Φ = 0°, 100 ns

RUN: 3042 to 3051



Formula for resolution: $\sigma = \sqrt{\sigma_0^2 + \frac{C_d^2 \cdot z}{N_{\text{eff}}}}$ σ_0 : the resolution at Z=0
 N_{eff} : the effective number of electrons

Future plan

- simulation for distortion.
in r_{ϕ} and in Z
- some theoretical study.

Thank You

