SVD aDefectFinder

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Introduction

- SVD aDefectFinder is a package to analyze the full local run data.

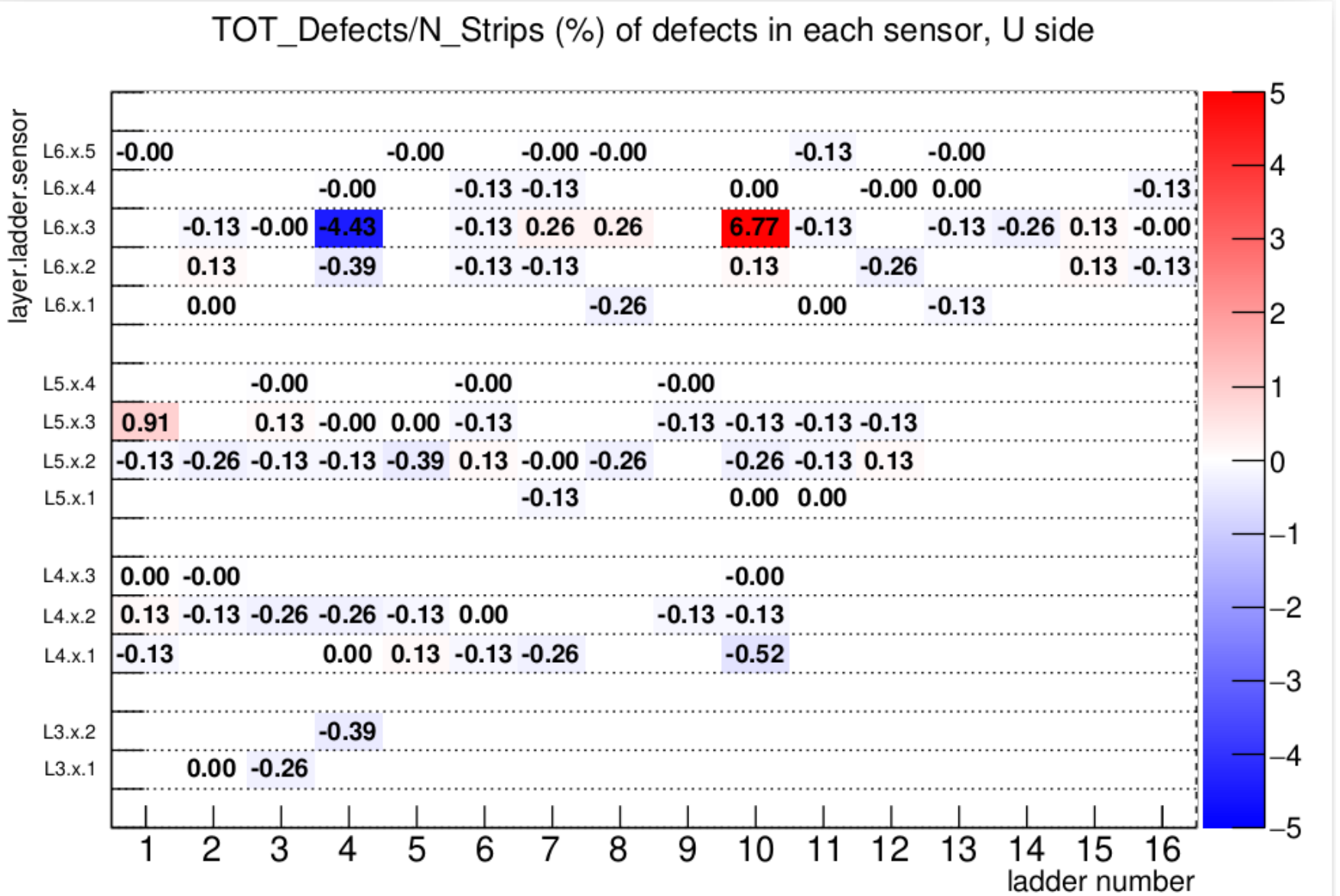
- It identify the following defects.
  - Short
  - Open
  - Pinhole
  - Noisy strip

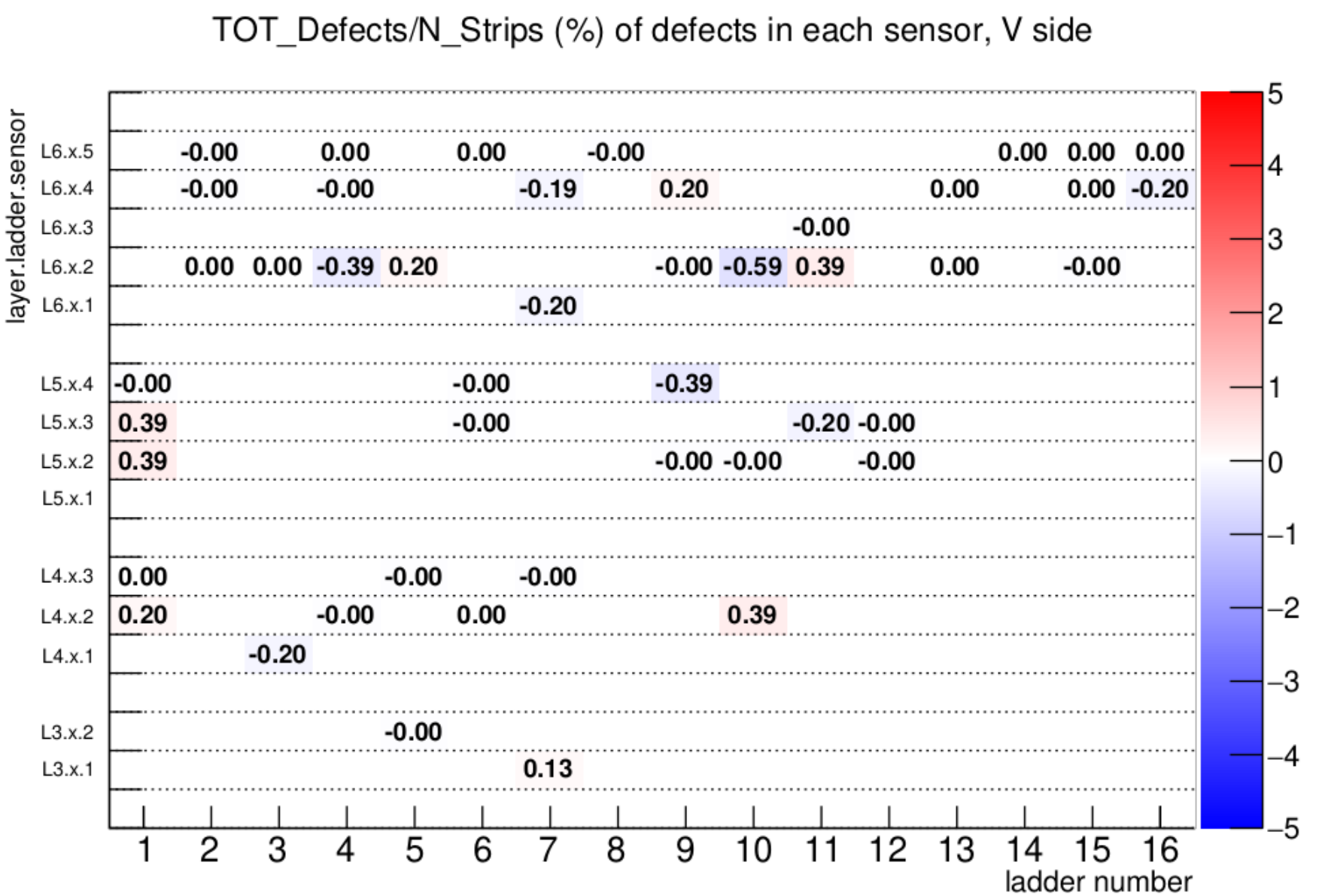
- In this study the test is performed on the local run data from 21/02/2024 and compared with the analyzed data from 2/06/2023

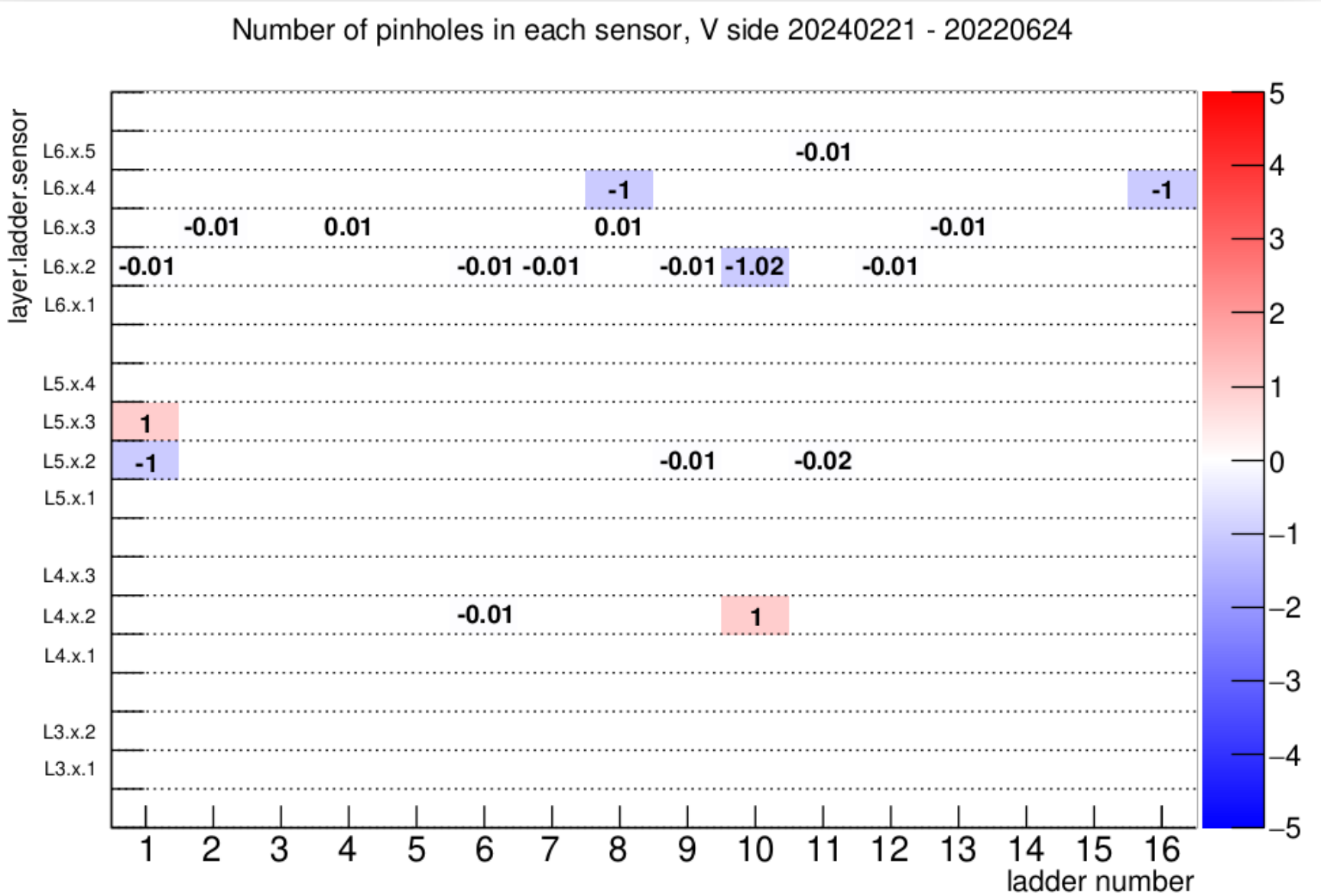
Classification criteria

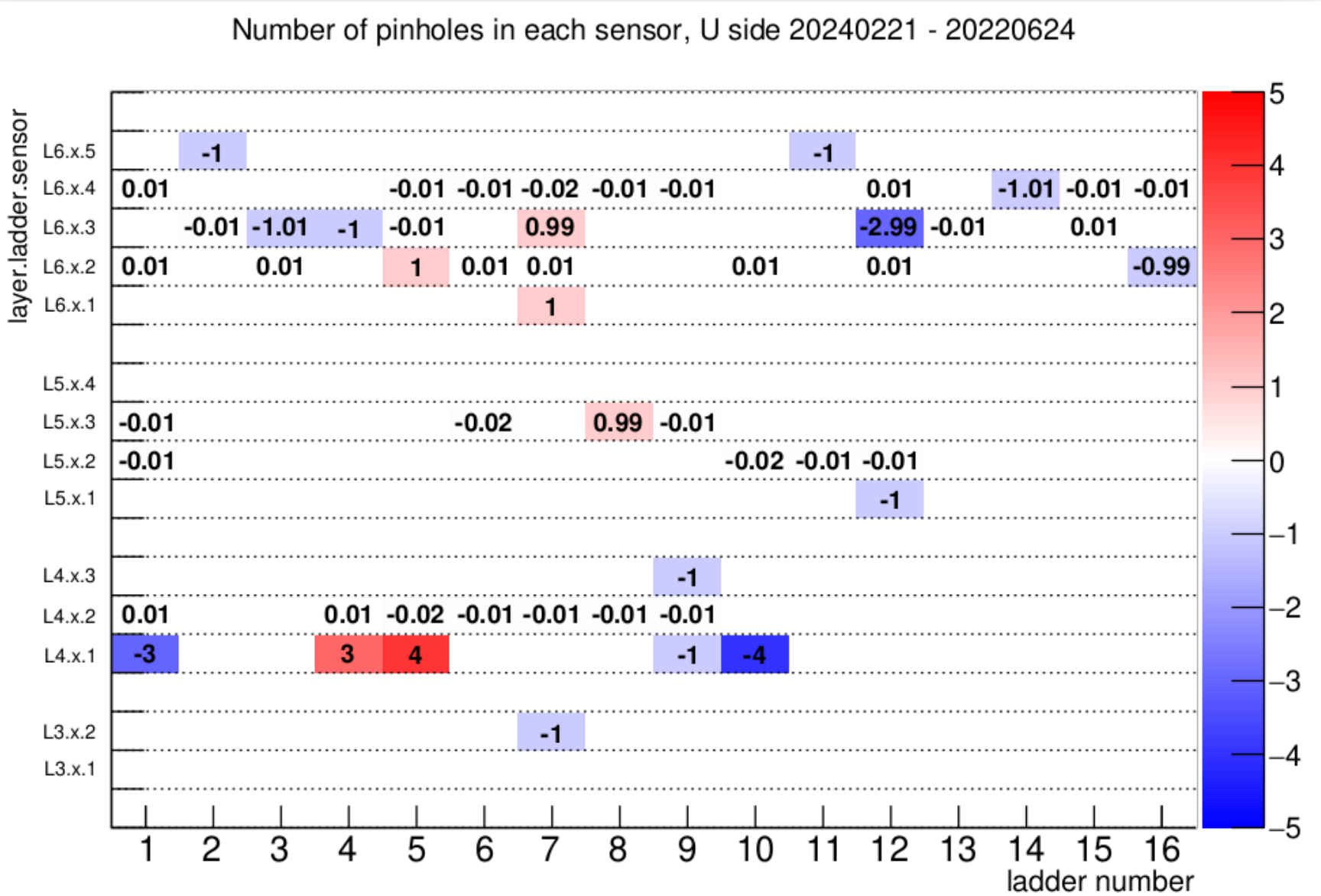
[P-side selection criteria]	[P-side classification criteria]
Noise > 8	Pinhole: 1) abs(average_R - max_C) > 20.0
CalAmp < 60 || CalAmp > 130	2) abs(average_L - max_C) > 20.0
CalTmax < 30 || CalTmax > 80	normal: 1) and 2)
ParticleResponse < 0.50	Short: average(Mean) < 50.0
is-a-pinhole criteria	Open: - Noise > 25 && Noise > 8 for the adjacent strips
	- CalTmax < Mean(CalTmax)_chip - 3*RMS(CalTmax)_chip

[N-side selection criteria]	[N-side classification criteria]
Noise > 8	Pinholes: 1) abs(average_R - max_C) > 20.0
CalAmp < 60 || CalAmp > 130	2) abs(average_L - max_C) > 20.0
CalTmax < 30 || CalTmax > 80	normal: 1) and 2)
ParticleResponse < 0.50	Short: average(Mean) < 50.0
is-a-pinhole criteria	Open: - Noise > 25 && Noise > 8 for the adjacent strips
	- CalTmax < Mean(CalTmax)_chip - 3*RMS(CalTmax)_chip


TOT_Defects/N_Strips (%) of defects in each sensor, U side
layer.ladder.sensor
L6.x.5 -0.00 -0.00 -0.00 -0.00 -0.13 -0.00
L6.x.4 -0.00 -0.13 -0.13 0.00 -0.00 0.00 -0.13
L6.x.3 -0.13 -0.00 -4.43 -0.13 0.26 0.26 6.77 -0.13 -0.13 -0.26 0.13 -0.00
L6.x.2 0.13 -0.39 -0.13 -0.13 0.13 -0.26 0.13 -0.13
L6.x.1 0.00 -0.26 0.00 -0.13
L5.x.4 -0.00 -0.00 -0.00
L5.x.3 0.91 0.13 -0.00 0.00 -0.13 -0.13 -0.13 -0.13 -0.13
L5.x.2 -0.13 -0.26 -0.13 -0.13 -0.39 0.13 -0.00 -0.26 -0.26 -0.13 0.13
L5.x.1 -0.13 0.00 0.00
L4.x.3 0.00 -0.00 -0.00
L4.x.2 0.13 -0.13 -0.26 -0.26 -0.13 0.00 -0.13 -0.13
L4.x.1 -0.13 0.00 0.13 -0.13 -0.26 -0.52
L3.x.2 -0.39
L3.x.1 0.00 -0.26
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ladder number
5 4 3 2 1 0 −1 −2 −3 −4 −5


TOT_Defects/N_Strips (%) of defects in each sensor, V side
layer.ladder.sensor
L6.x.5 -0.00 0.00 0.00 -0.00 0.00 0.00 0.00
L6.x.4 -0.00 -0.00 -0.19 0.20 0.00 0.00 -0.20
L6.x.3 -0.00
L6.x.2 0.00 0.00 -0.39 0.20 -0.00 -0.59 0.39 0.00 -0.00
L6.x.1 -0.20
L5.x.4 -0.00 -0.00 -0.39
L5.x.3 0.39 -0.00 -0.20 -0.00
L5.x.2 0.39 -0.00 -0.00 -0.00
L5.x.1
L4.x.3 0.00 -0.00 -0.00
L4.x.2 0.20 -0.00 0.00 0.39
L4.x.1 -0.20
L3.x.2 -0.00
L3.x.1 0.13
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ladder number
5 4 3 2 1 0 −1 −2 −3 −4 −5


Number of pinholes in each sensor, V side 20240221 - 20220624
layer.ladder.sensor
L6.x.5
L6.x.4
L6.x.3
L6.x.2
L6.x.1
L5.x.4
L5.x.3
L5.x.2
L5.x.1
L4.x.3
L4.x.2
L4.x.1
L3.x.2
L3.x.1
-0.01
-1
-1
-0.01
0.01
0.01
-0.01
-0.01
-0.01 -0.01
-0.01
-1.02
-0.01
1
-1
-0.01
-0.02
-0.01
1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ladder number
5
4
3
2
1
0
−1
−2
−3
−4
−5


Number of pinholes in each sensor, U side 20240221 - 20220624
layer.ladder.sensor
L6.x.5
L6.x.4
L6.x.3
L6.x.2
L6.x.1
L5.x.4
L5.x.3
L5.x.2
L5.x.1
L4.x.3
L4.x.2
L4.x.1
L3.x.2
L3.x.1
-1 -1
0.01 -0.01 -0.01 -0.02 -0.01 -0.01 0.01 -1.01 -0.01 -0.01
-0.01 -1.01 -1 -0.01 0.99 -2.99 -0.01 0.01
0.01 0.01 1 0.01 0.01 0.01 0.01 -0.99
1
-0.01 -0.02 0.99 -0.01
-0.01 -0.02 -0.01 -0.01
-1
-1
0.01 0.01 -0.02 -0.01 -0.01 -0.01 -0.01 -0.01
-3 3 4 -1 -4
-1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ladder number
5 4 3 2 1 0 −1 −2 −3 −4 −5

Comparison

- After identifying the pinholes, checked the details in the pdf files generated.
- As per details in the summary files, two fake pinholes were mentioned.
- While others were also reported in the individual pdf summary files.
- Also compared with the pdf’s of the previous calibration (02/06/2023) and there were 5/23 pdf with exactly same number of pinholes in the P and N sides while others were having different number of pinholes in the P and N sides.

Pdf files summary examples

L3.7.2

P-side

number of defects = 1 / 768 (0.13%)

p_Noisy = 0 (0.00%)

p_Open = 0 (0.00%)

p_Short = 1 (0.13%)

p_Pinhole = 0 (0.00%)

p_Particle_Resp = 0 (0.00%)

N-side

number of defects = 1 / 768 (0.13%)

n_Noisy = 0 (0.00%)

n_Open = 0 (0.00%)

n_Short = 0 (0.00%)

n_Pinhole = 1 (0.13%)

n_Particle_Resp = 0 (0.00%)

L6.10.2

P-side

number of defects = 13 / 768 (1.69%)

p_Noisy = 7 (0.91%)

p_Open = 1 (0.13%)

p_Short = 0 (0.00%)

p_Pinhole = 5 (0.65%)

p_Particle_Resp = 0 (0.00%)

N-side

number of defects = 6 / 512 (1.17%)

n_Noisy = 1 (0.20%)

n_Open = 5 (0.98%)

n_Short = 0 (0.00%)

n_Pinhole = 0 (0.00%)

n_Particle_Resp = 0 (0.00%)

Summary

- Understood all the procedure and tested on two different data.
- Still a lot to understand in analysis of the data produced after the tests (As per initial investigation 23 pinholes are found which seems quite a big number).
- Planning to present it in the next SVD meeting.

Backup

List of the defective strips