

Cluster charge distribution for 2019 bias scans

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U.S. DEPARTMENT OF
ENERGY

Stanford
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ACCELERATOR
LABORATORY

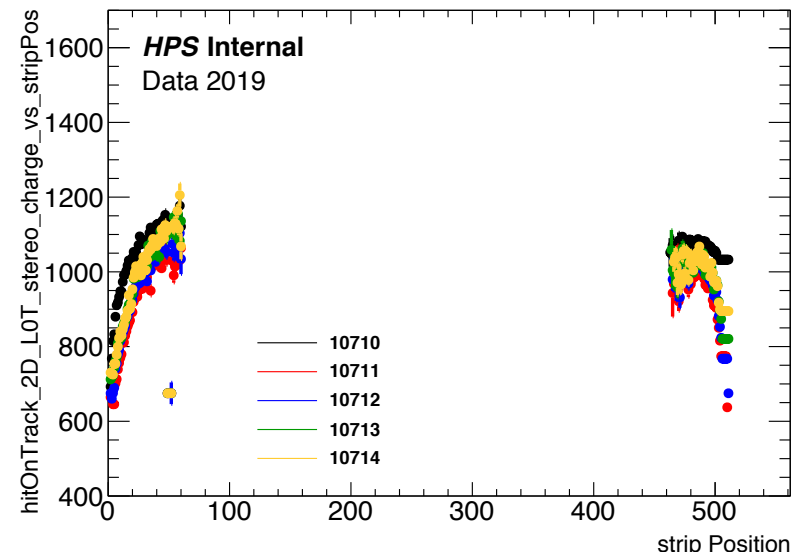
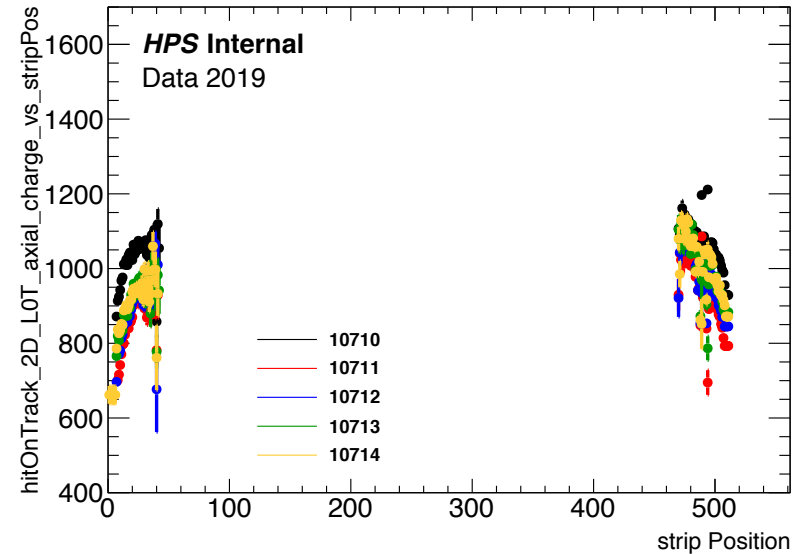
- Cluster charge distributions vs strip number for 2019 1071X bias scans
- Clusters on tracks -> raw hit content -> 2D cluster charges vs cluster position in strip number
 - Check this talk for more details: [Tracking Meeting 16-09](#)
 - No selection on tracks, no correction for track incident angle
 - Landau convoluted with gaussian for MPV extraction. Fit range:
300 - 8000 for L0-1
700 - 8000 for L2+

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

Cluster charges distribution for L0 Top

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

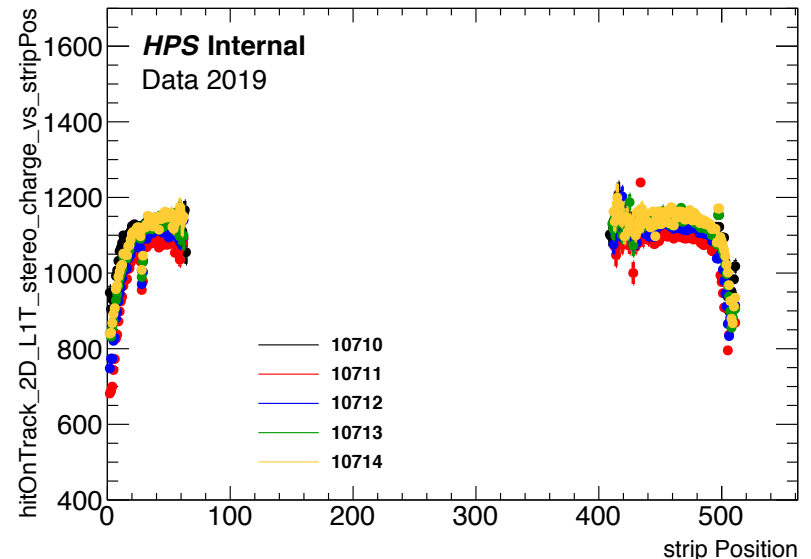
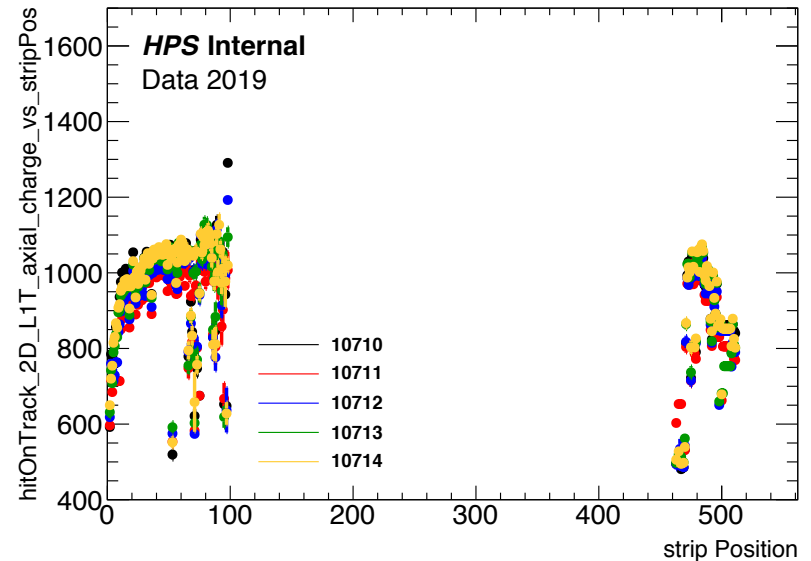
- Very small difference in charge collection efficiency at 60 V wrt 70 V
- Occupancy effect visible and more pronounced in axial sensor
- Similar for top



Cluster charges distribution for L1 Top

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

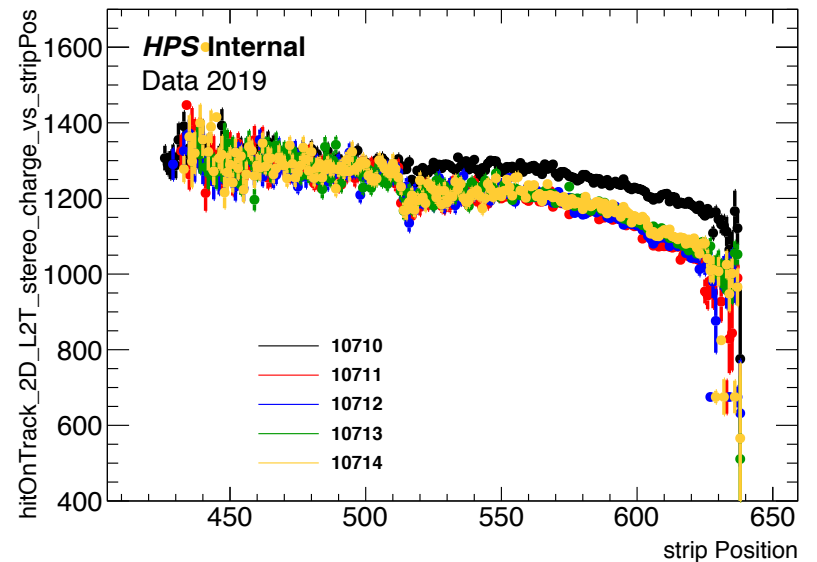
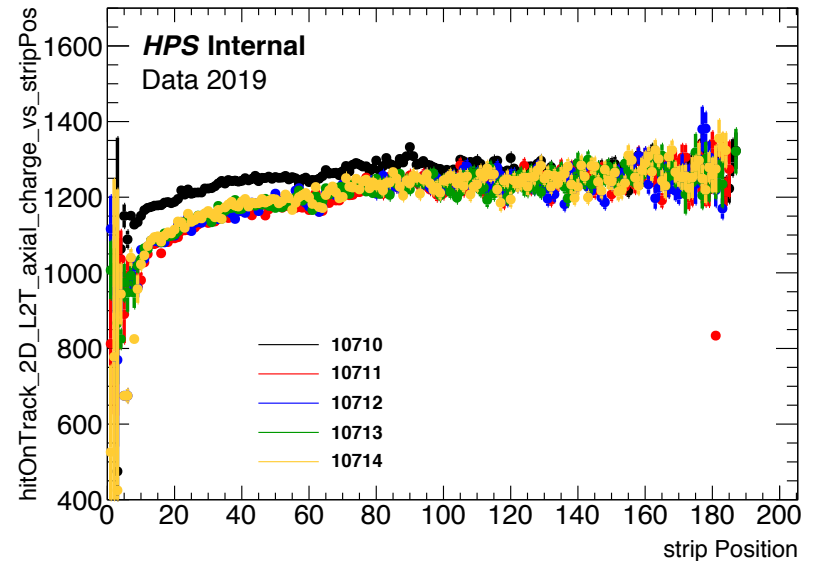
- Very small difference in charge collection efficiency at 60 V wrt 70 V
- Occupancy effect not very visible in L1
- L1 Top, high strip numbers in bad readout status



Cluster charges distribution for L2 Top

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

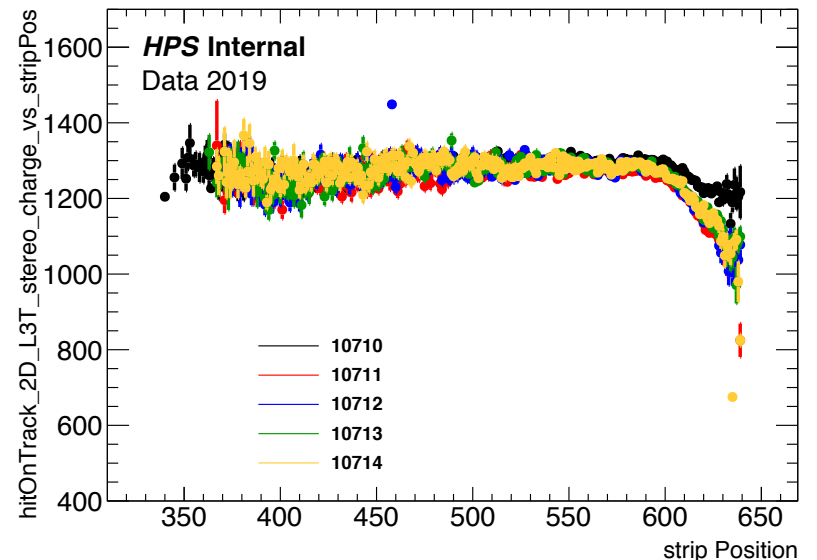
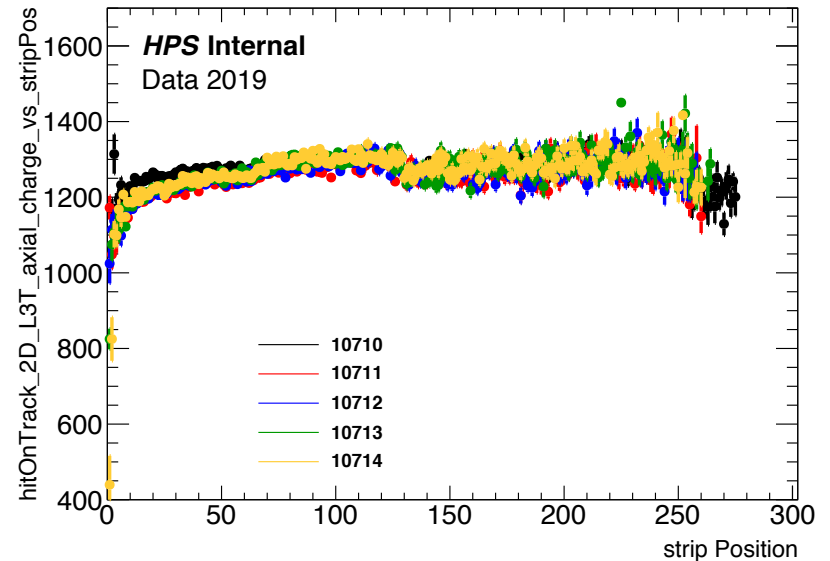
- Very small difference in charge collection efficiency at 240 V wrt 320V
- Occupancy effect evident closer to the beam



Cluster charges distribution for L3 Top

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

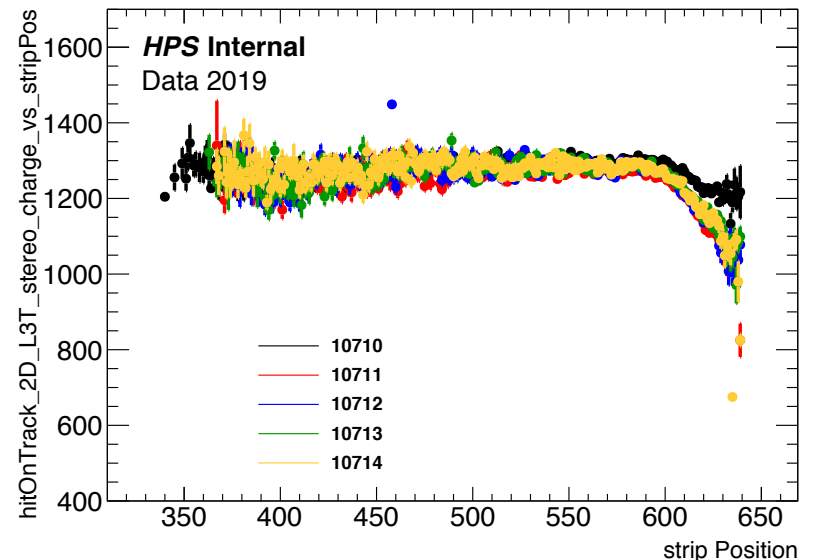
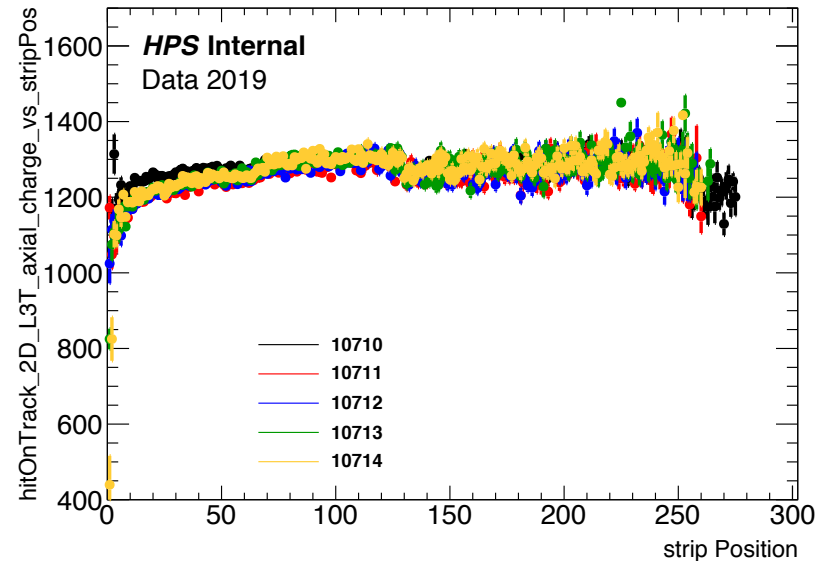
- Very small difference in charge collection efficiency at 240 V wrt 320V
- Occupancy effect evident only in strips very close to the beam



Cluster charges distribution for L3 Top

Run	Lumi	L0/1 V	L2/3 V
10710	120A 8um	60	240
17011	120A 20um	40	180
17012	120A 20um	50	240
17013	120A 20um	60	320
17014	120A 20um	70	240

- Very small difference in charge collection efficiency at 240 V wrt 320V
- Occupancy effect evident only in strips very close to the beam

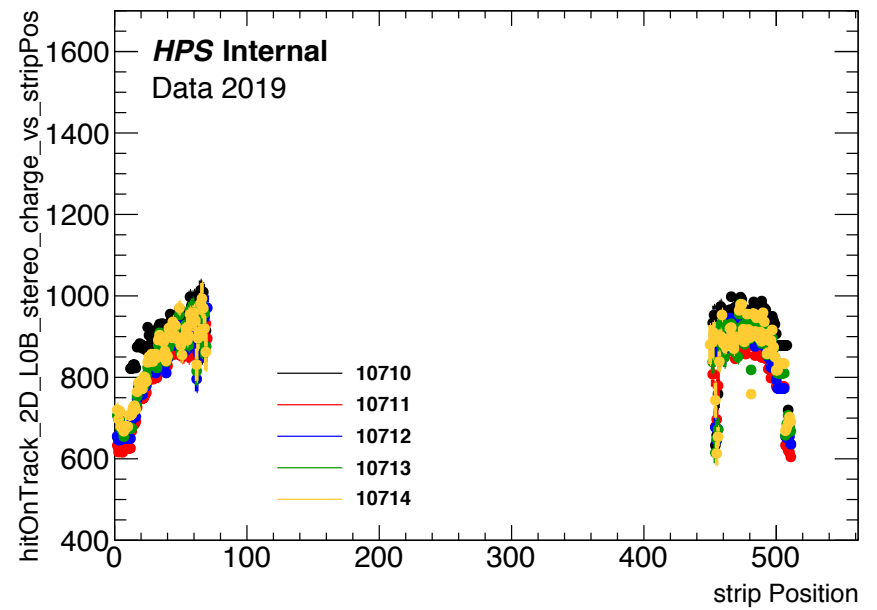
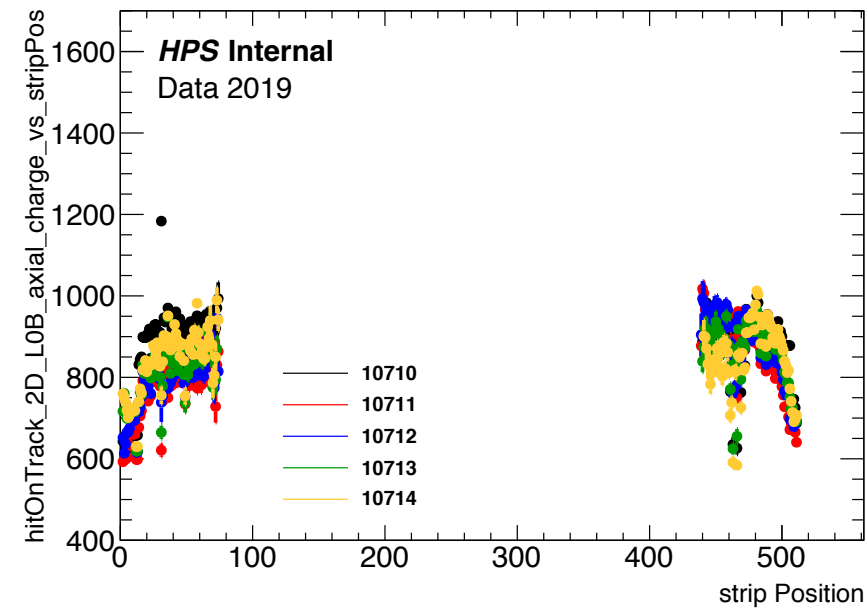


Conclusions

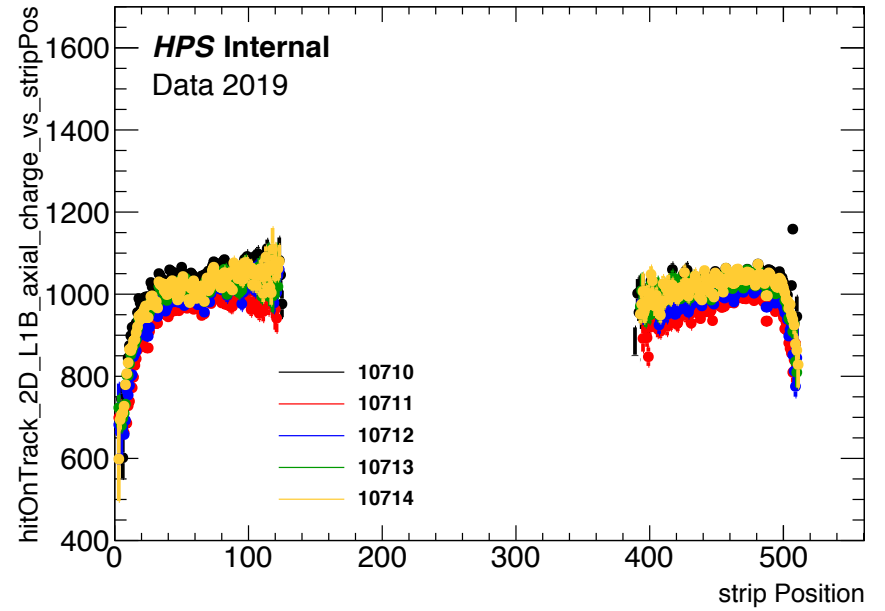
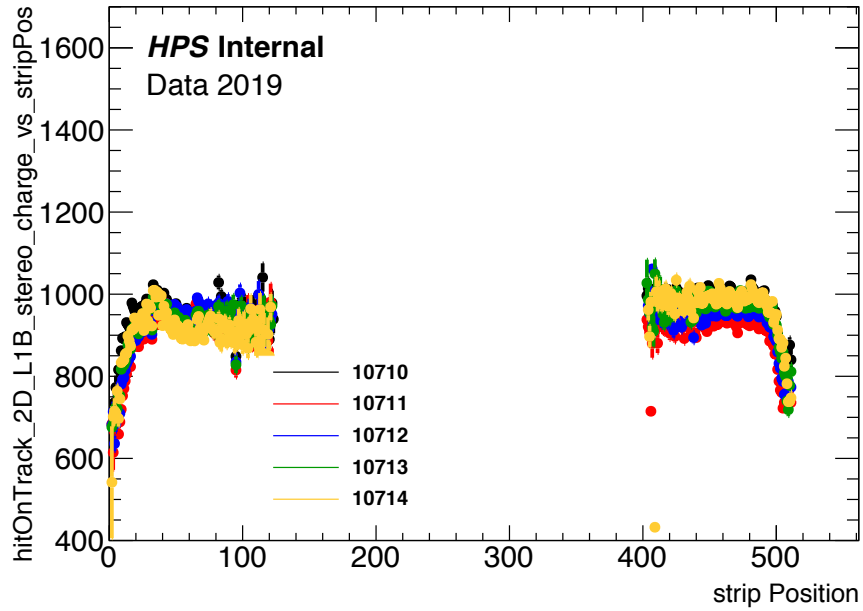
- From the plots shown there is no evident indication that sensors are un-depleted at nominal working points in the data collected in the bias scan
- Clear effect on charge efficiency collection due to occupancy change: larger occupancy leads to lower MPV in the collected charge distribution.
 - Effect hasn't been studied in detail in these checks.

Backup

L0 Bottom



L1 Bottom



L5 Bottom

