# Sensor charge sharing

- A fairly standard plot to investigate charge sharing within the sensor is a so called η distribution.

$$\eta = \frac{Q_{\text{right}}}{Q_{\text{left}} + Q_{\text{right}}}$$

- Where Q_right and Q_left are the charge on the strip relative to the projected hit location from an external tracking device (which in our case is the external telescope)

$$y_{\text{strip}} > y_{\text{projected}} \Rightarrow Q = Q_{\text{right}}$$

$$y_{\text{strip}} \leq y_{\text{projected}} \Rightarrow Q = Q_{\text{left}}$$

- In the case that  η = 1 || 0 then all charge is on the same side relative to the projected hit location
- This is always the case for single strip clusters but can also be the case for multi strip clusters.

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- The η distribution for different types is shown to the right
- Red = Clusters with size 3+
- Green = Clusters with size 2
- Black = Clusters with size 1
- Blue = Sum of all

- Overall the distribution seems to be sensible.
- Naively I would have expected a sharper peak in the center (as I had seen in other plots)
- This might just be an effect of our small strip pitch resulting in significant charge sharing outside of the capacitive coupling.



| Eta_3p | |
|---|---|
| Entries | 8574 |
| Mean | 0.4884 |
| Std Dev | 0.301 |

| Eta_2 | |
|---|---|
| Entries | 35348 |
| Mean | 0.4872 |
| Std Dev | 0.3578 |

| Eta_1 | |
|---|---|
| Entries | 23621 |
| Mean | 0.4731 |
| Std Dev | 0.4993 |

| Eta_total | |
|---|---|
| Entries | 67543 |
| Mean | 0.4824 |
| Std Dev | 0.4071 |