Scintillator Light Yield Calculation

- For each picture define an area of interest (AOI) (roughly area of scintillator screen)
- Define a signal area that encompasses beam spot, within AOI
- Calculate the average grey value per pixel in the non-signal area within the AOI (background value)
- Sum the grey values in the signal area, subtracting the background value from each pixel (signal area integral)

- Each datapoint consists of ~1000 pictures
    - Error bars are the standard deviation on the signal area integral distribution

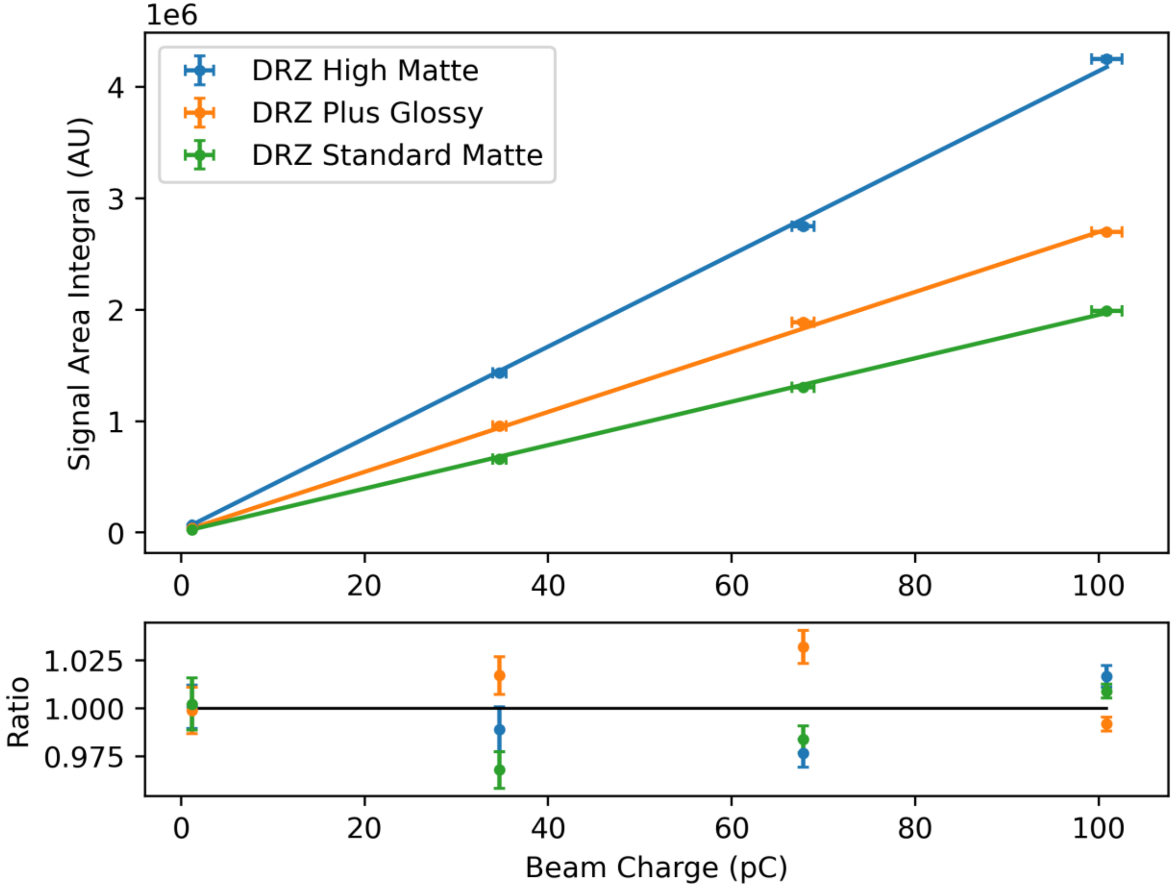
Screen Comparisons

- Relative brightness*:

	Standard	Plus	High
Manufacturer Website	0.8	1	1.45
From Best Fit	0.72	1	1.53

*Dependent on measuring method

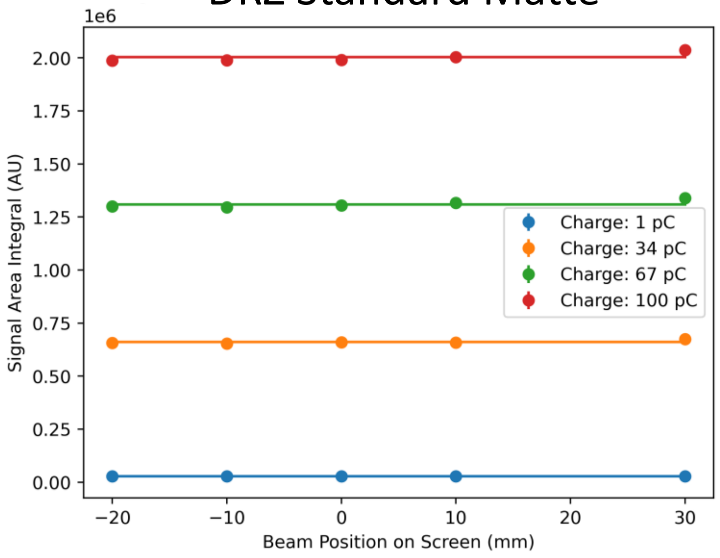
- Error on charge is the σ on the charge measurements from ARES



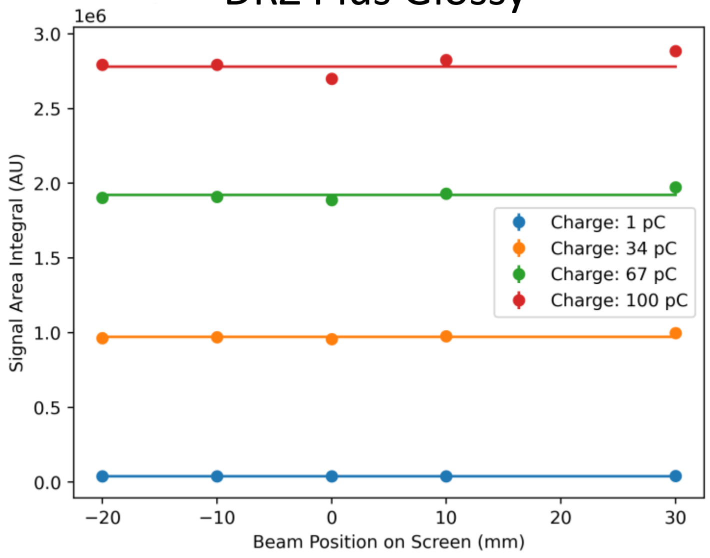
Position Scan

- Screen Dimensions: 100 mm x 100 mm
- Light yield **independent of position** on screen
- Small fluctuations likely due to **fluctuations in charge**
- **Discrepancy** for DZR High Matte at 34 pC **caused by malfunction** of the setup

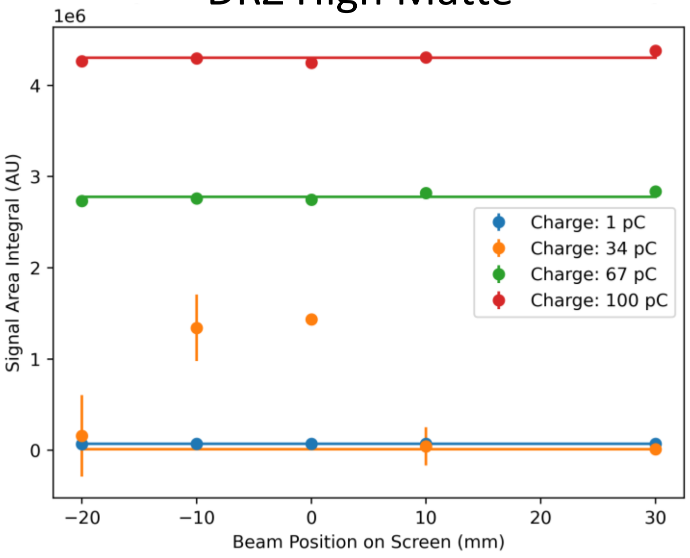
DRZ Standard Matte



DRZ Plus Glossy

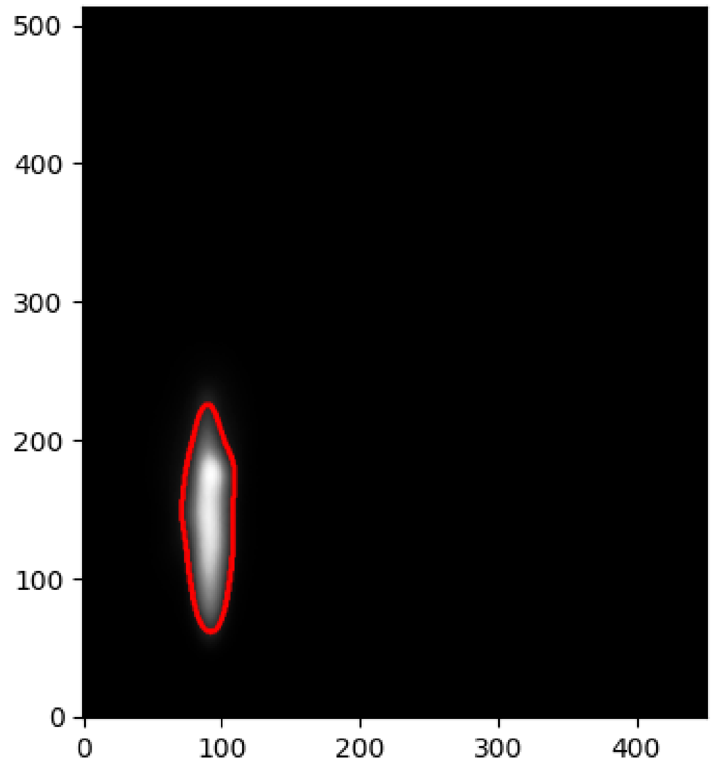


DRZ High Matte



Beam Profile Reconstruction (WIP)

- We want to determine **how much charge enters the straws**
  - Do this by **interpolating the spread of the beam** from the size of the beam spots at the 2 scintillator screens
  - **Difficult** because beam spots have **irregular shapes**
- Using OpenCV we can warp the images as if we're viewing them head-on
- Then use OpenCV edge detection algorithm to determine the outline of the beam at the scintillator screens



Example of an irregularly shaped beam spot. The red contour was found using OpenCV edge detection algorithms