Slide 1

- One of the first necessary steps in order to operate the chip is to determine the threshold of charge, at which the pixels of the chip will register an event.

Slide 2

- For that we inject a well-defined amount of charge in a number of pixels, and see if they fire or not.
- We're using only a fraction of the chip which serves as a representation, since masking the entire chip would take really long.
- These are the parameters we used for the measurement, if you've worked with ALPIDE before, you will have seen them somewhere.
- If you remember Felicitas' Presentation a few weeks ago, you might remember that the chip is seperated into 32 regions, so this value means, we are 32 pixels (one per region)
  (Since i mention how this works, people who listen or even worked with alpide before, will know, and those who dont, wont pay it any mind)

Slide 3

- For each charge point, we chose to inject 50 times.
- If we then increase the Amount, at some point the pixel will start firing. This procedure is called an S-Curve scan.
- If there was no electronic noise, this would just be a step-function. But as you can see, there is a little smearing going on. If we now assume that the electronic noise responsible for this smearing is gaussian, the hit probablity can be modeled with gaussian error function

Slide 4

Just read lol

Slide 5

- After a run has completed, we get the distribution of the thresholds of all pixels. We then extract the mean of those thresholds, and repeat the measurement with different settings, to get a reference that helps us to determine how the chip has to be configured for our experiment
- Just to look at a quick reference, In the case of cosmics, we expect an energy deposit of 29 keV in the pixel, which is about 7900 e-h-pairs, so in our analysis, what we'd **like** to see, is that the telescope is 100% efficient.

- (Mention VCASN and ITHR)
- The error comes from the RMS of the standard deviations

Slide 6

- Another scan we did is the noiseoccupancy scan, which gives a selectable number of triggers and returns the number of hits. If the threshold is too low, some pixels will register a hit, due to electronic noise. This is what's called "Fake hit rate"
- Now this a measurement taken at no back bias. The sensitivity limit is 1 over the amount of times triggered, times the number of pixels.
- as you can see the chips fhr deminishes drastically when applying a back bias voltage

Slide 7

- **Why are there points above the Sensitivity limit?** - One reason for that is that our telescope is susceptible for cosmics. These measurements can take a while, and it is not too unlikely that the sensor is hit by a cosmic muon in the meantime. Due to charge-sharing, these muons will be registered in multiple pixels at once, hence the 10-ish hits. - It might look like there are more deviations in this area, but actually the density of data points for this measurement taken was much higher than the previous one.