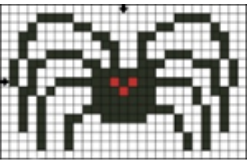


Arachnid

PTC Scans:

JMS/AB

Adrian Bevan (a.j.bevan@qmul.ac.uk)

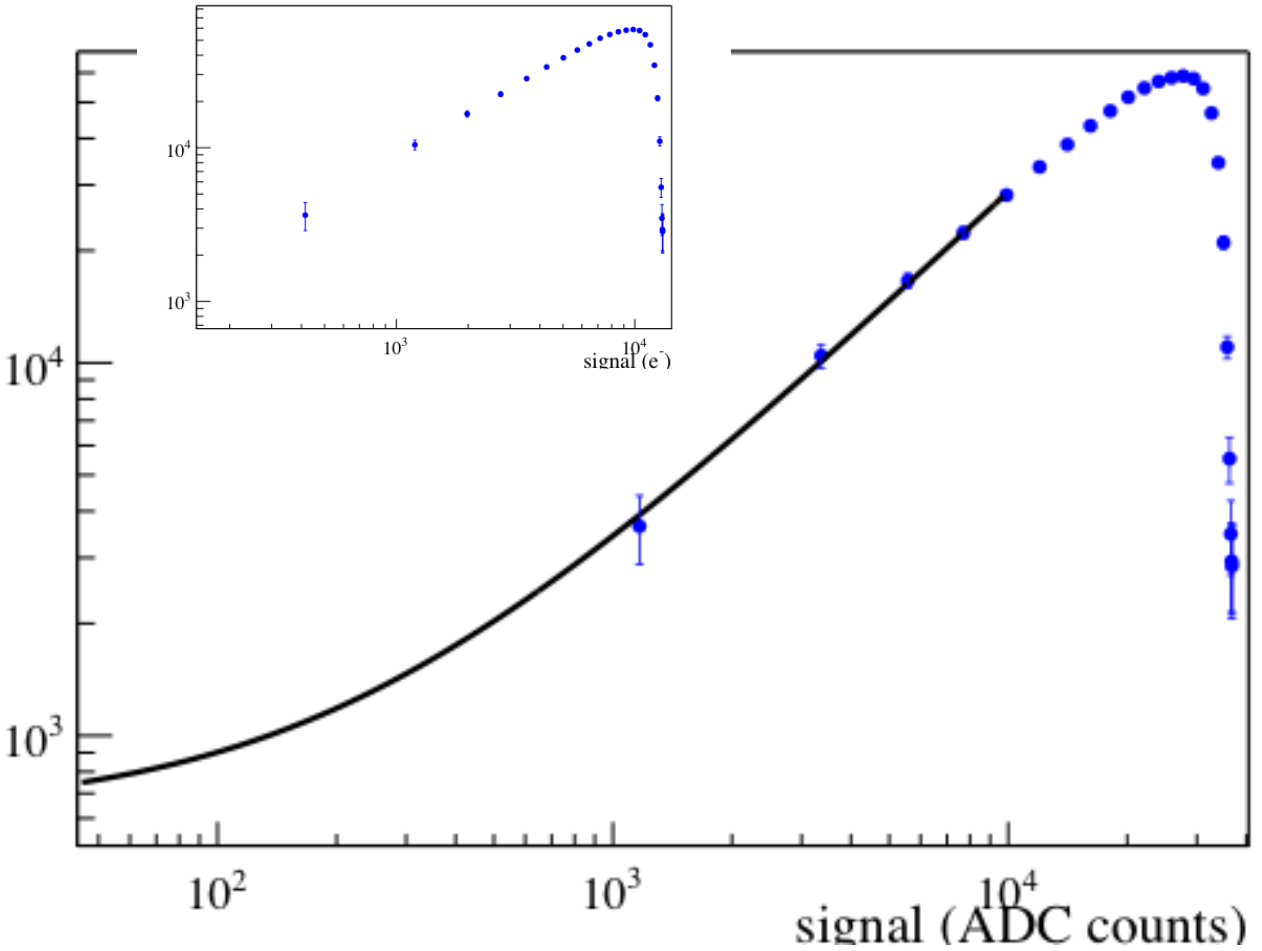
- following on from the last presentation made before the IOP.
  - Changes: Look at the ensemble of results from an array of reference pixels.
  - Veto the edge 2 rows/columns of pixels
  - Fit explicitly for the four noise components (using F_F=0.1).

$$\begin{aligned}\sigma^2_{TOTAL} &= \sigma^2_{READ} + \sigma^2_{FANO} + \sigma^2_{SHOT} + \sigma^2_{FPN} \\ &= const + \eta_i(F_F + S) + P^2_N S^2\end{aligned}$$

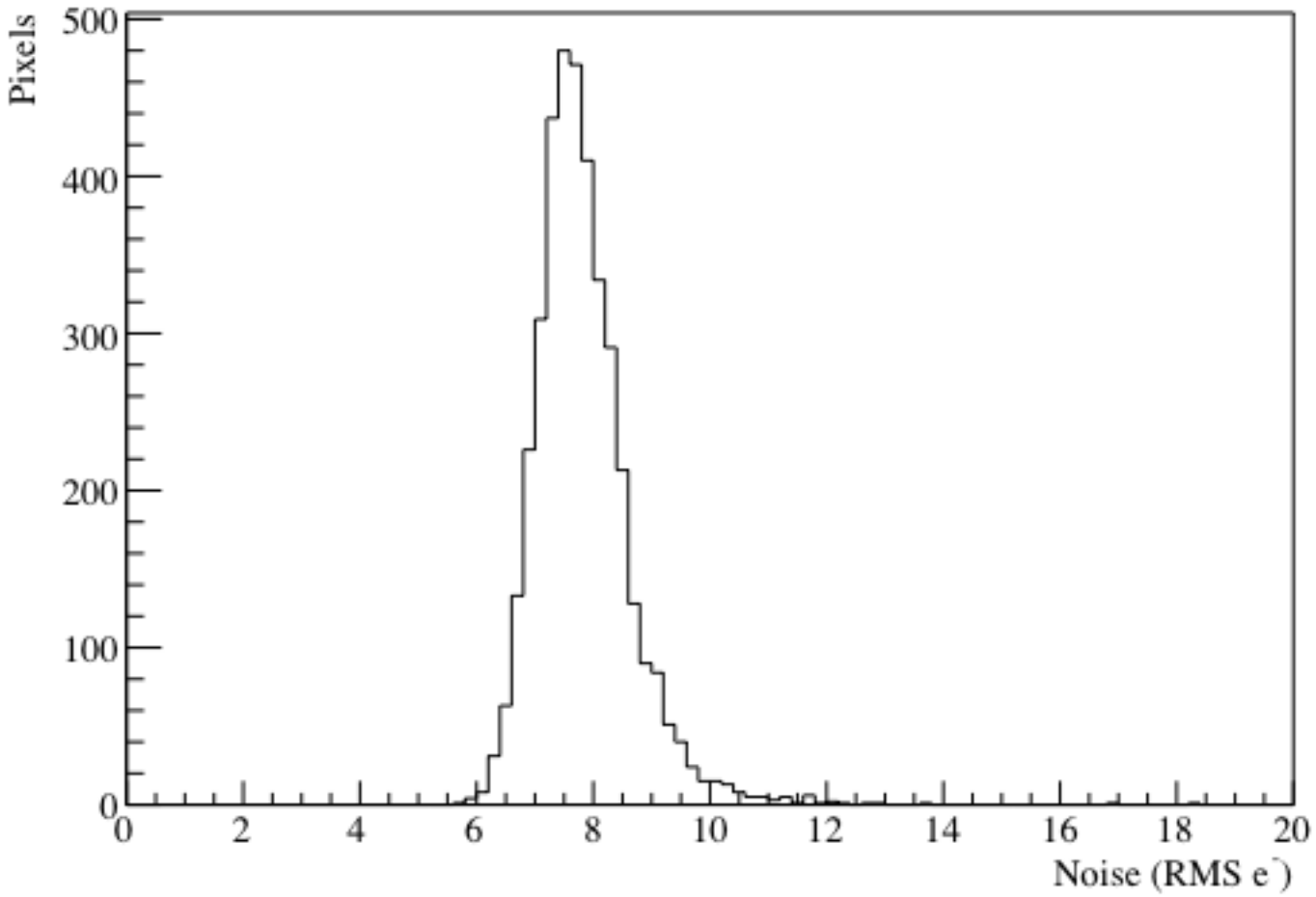
  - Interested in the read noise contribution, and in the quantum yield gain η_i.

High Res / Low VT (sensor 8)

- Read noise = 8.9 +/- 0.4 (e- /DN)
- $\eta_i = 2.5$

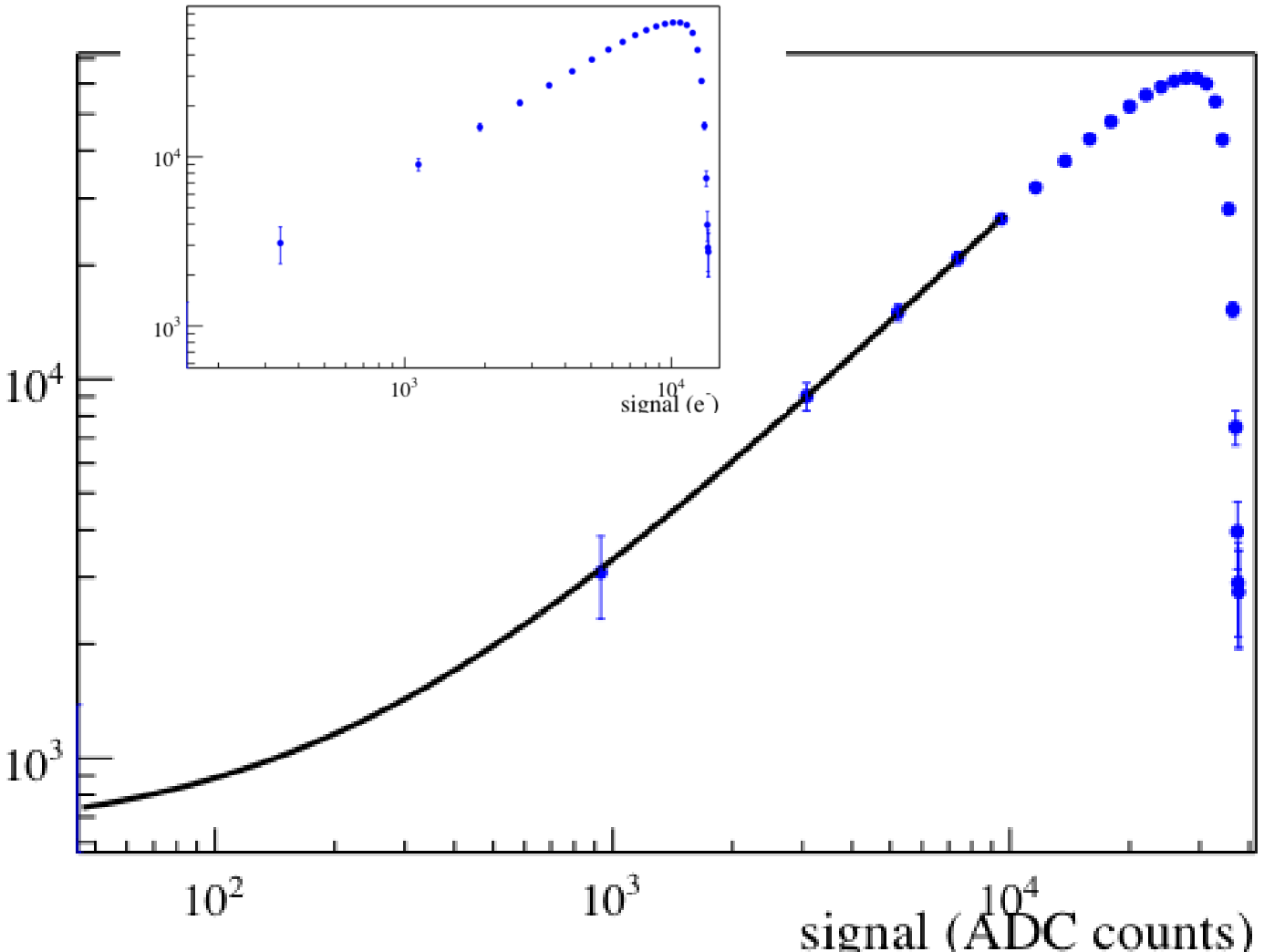


High Res / Low VT (sensor 8)

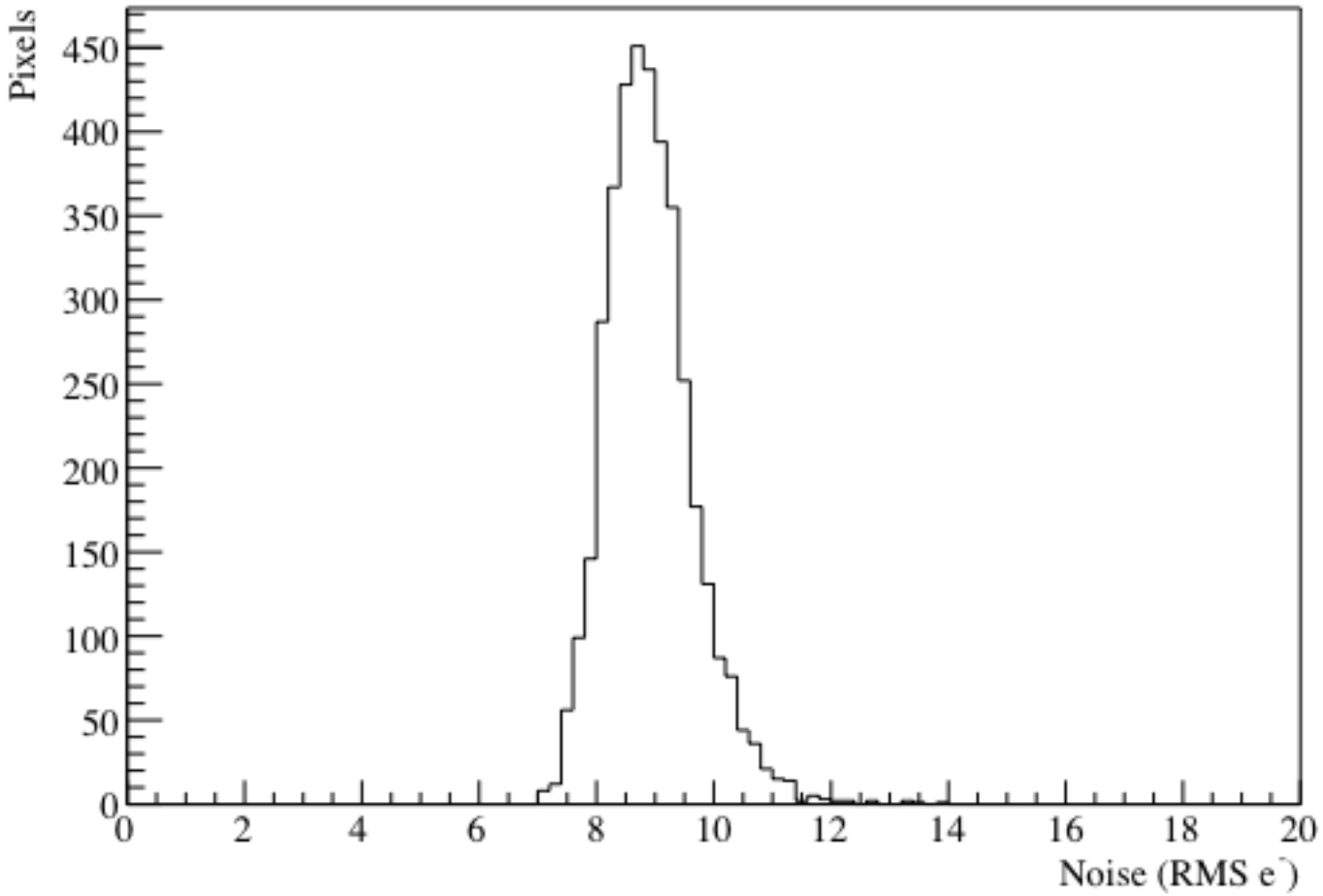


Low Res / Low VT (sensor 9)

- Read noise = 9.1 +/- 0.4 (e- /DN)
- η_i = 2.7

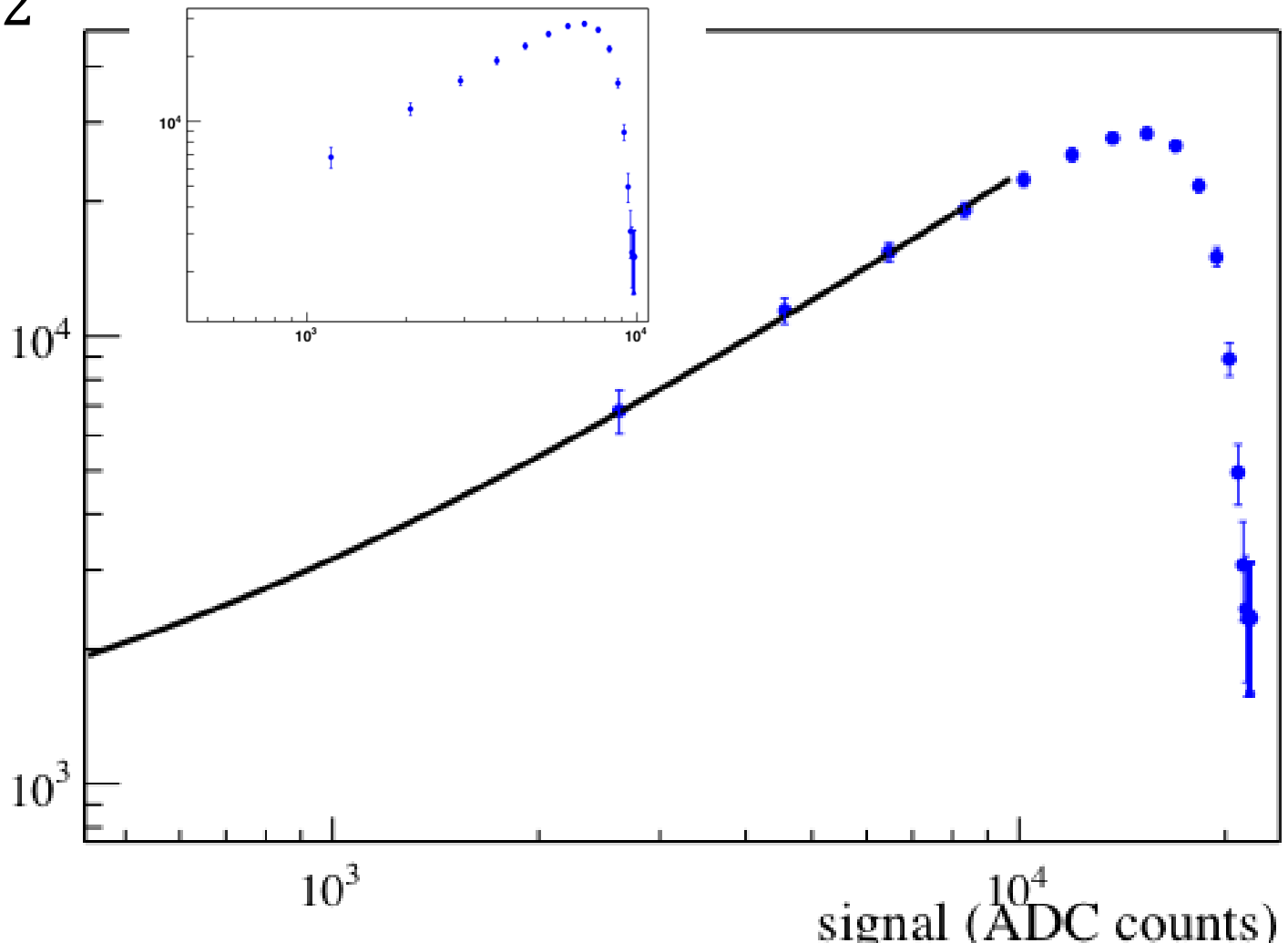


Low Res / Low VT (sensor 9)

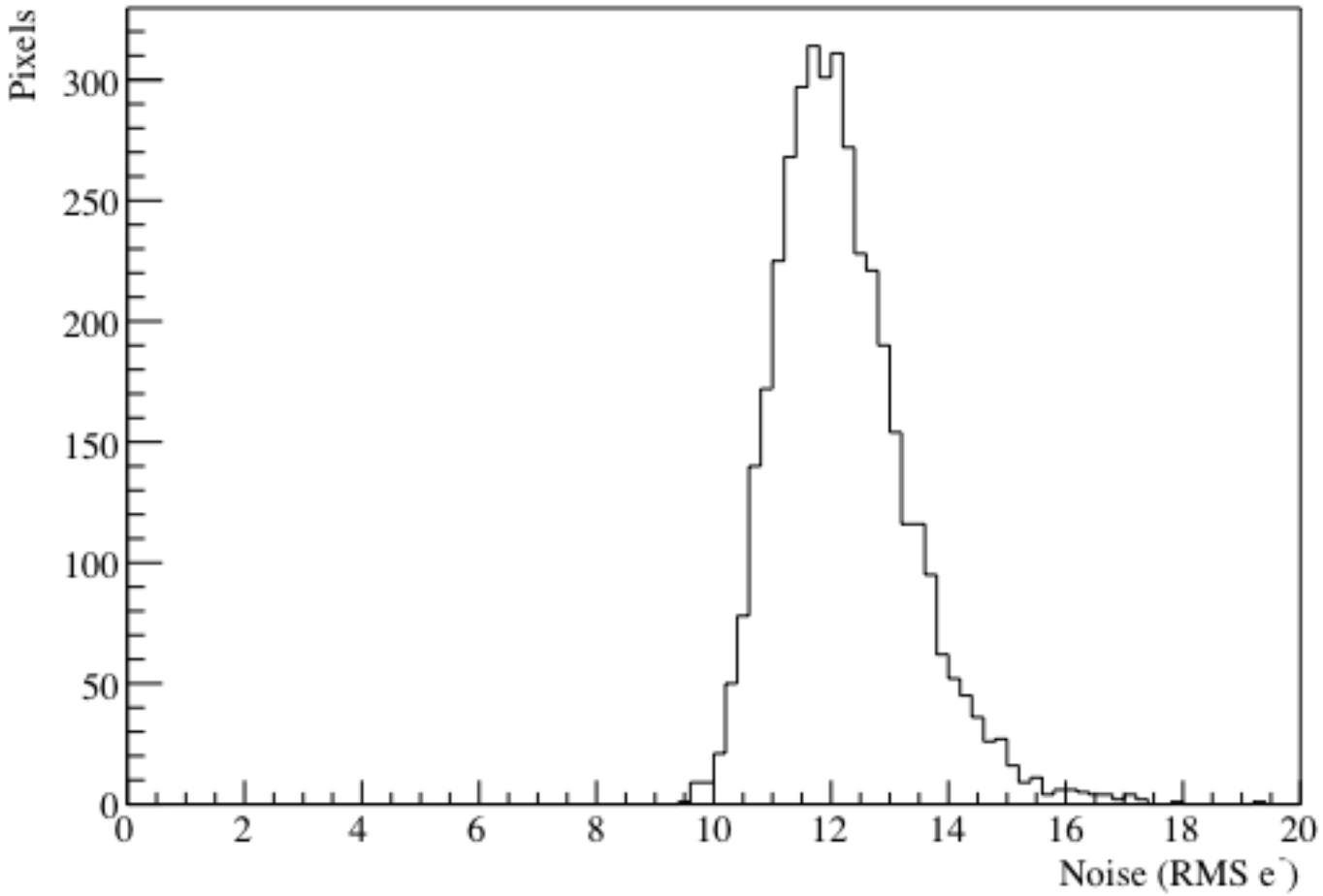


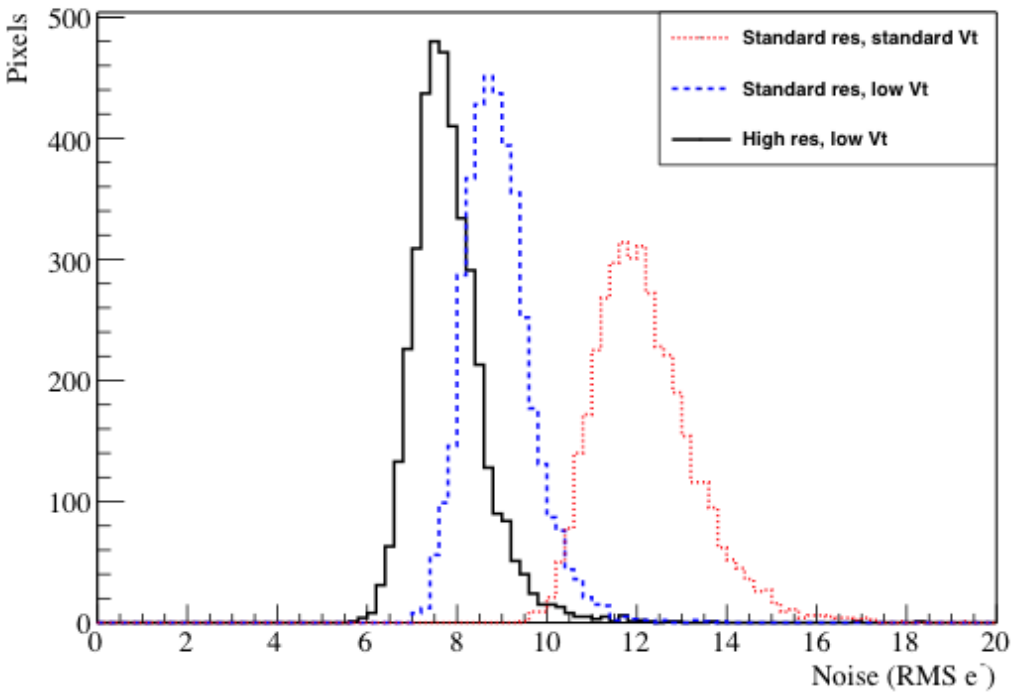
Std Res / Std VT (sensor 17)

- Read noise = 14.0 +/- 0.5 (e- /DN)
- $\eta_i = 2.2$



Std Res / Std VT (sensor 17)





These results

Sensor (res / Vt implant)	Noise (RMS e^-)
17 (std / std)	12.1
9 (std / low)	8.9
8 (hi / low)	7.8

c.f. James @ IoP 2013

Sensor (res / Vt implant)	Noise (RMS e^-)
17 (std / std)	12
9 (std / low)	9.8
8 (hi / low)	8.1

- The difference between these numbers and those obtained by James needs to be understood. Expect this to boil down to fitting $\sigma^2_{TOT,}$ vs only fitting a linear distribution.
- Assumes James' plots are for the zero signal reference point of the PTC scan.

Lab Tests

- PTC scans performed for the three different types of sensor
- Increase the intensity of illumination and plot the signal vs noise
- Comparison made for the reference pixels