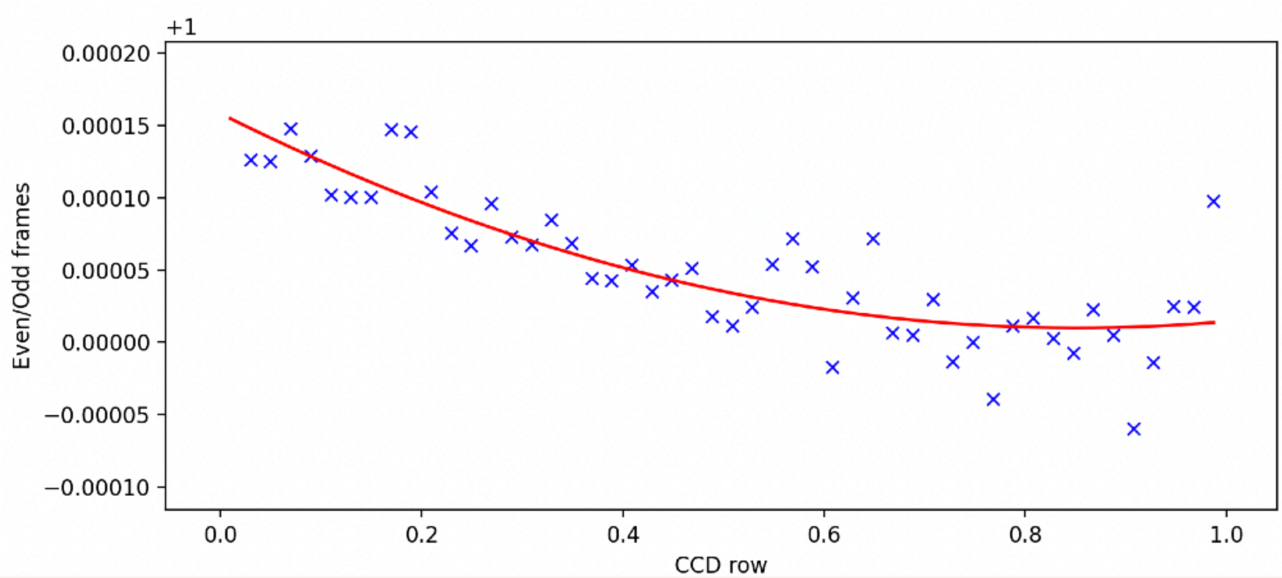
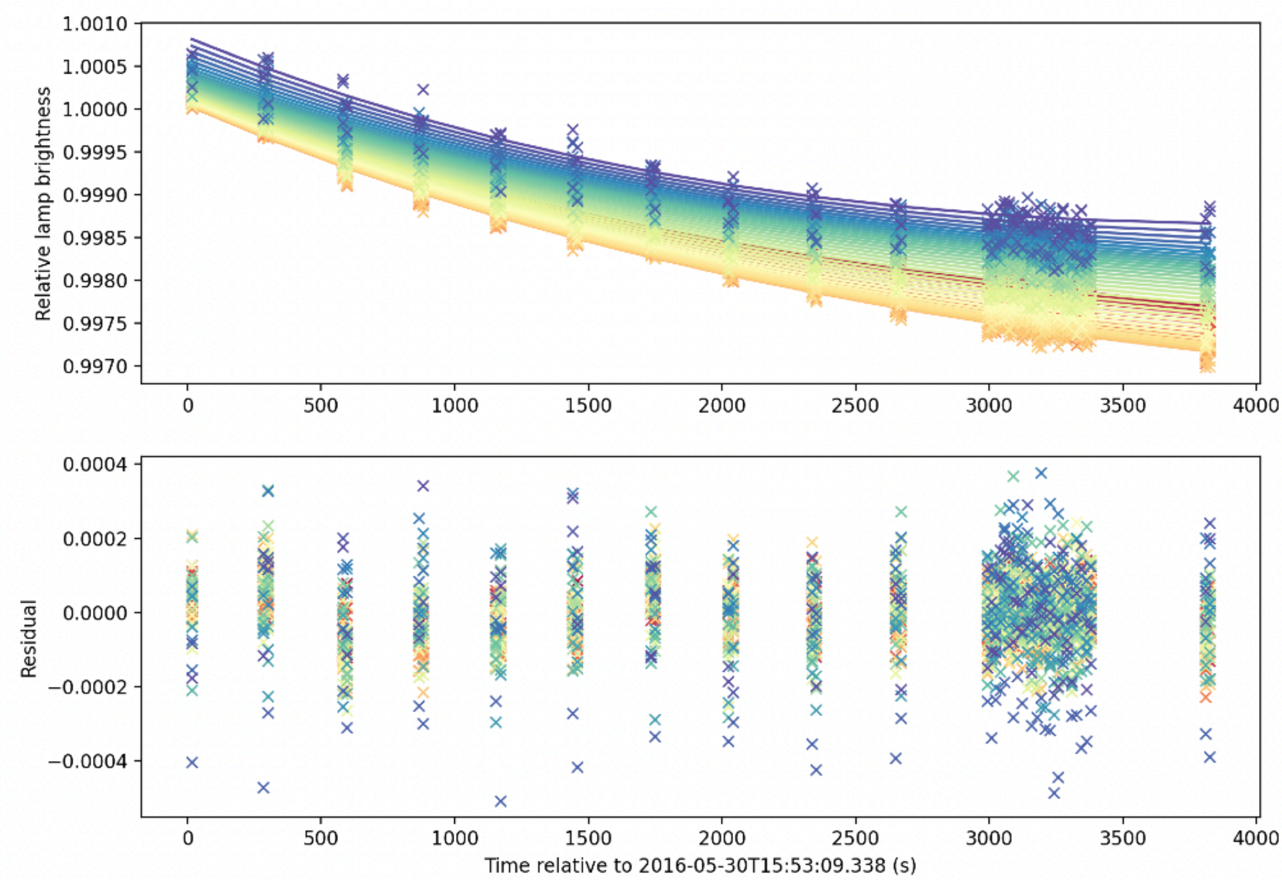


Ratio of Even/Odd image counts as a function of CCD row (same direction as the shutter). There is a slight difference in the count rate depending which direction the shutter is moving. Odd images are corrected for this ratio (using the red curve, a quadratic fit).

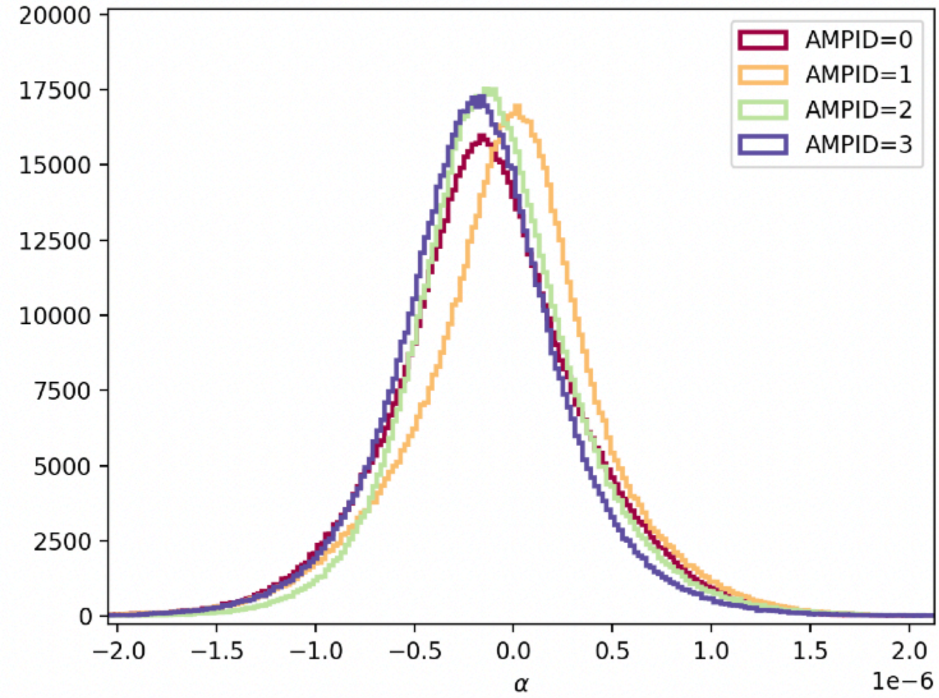


Lamp decay, color-coded by CCD row (predominantly the spectral coordinate), based on a series of 4s frames taken over the course of ~1 hour. The lamp brightness decays over time, and this depends on the CCD row (i.e. the spectral shape). All frames are corrected to show the same expected illumination as the first 4s exposure - the model fit is a 2D polynomial and an exponential decay. The bottom panel shows the residual (this illumination decay is corrected to within ~0.02%).

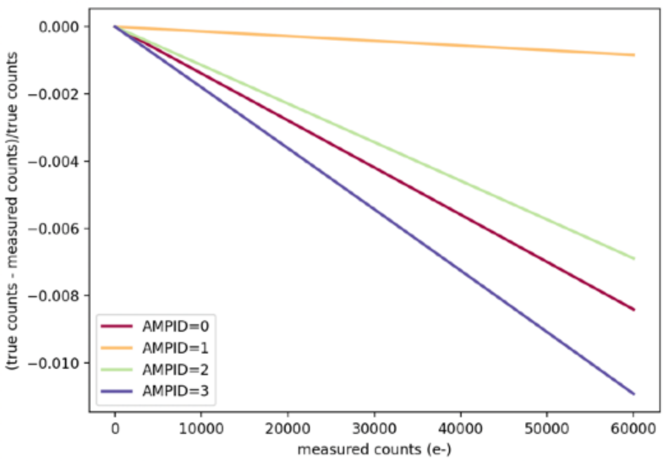
To determine the nonlinearity, I fit the following function form to each detector pixel:

$$C_T = C_M \times (1 + \alpha\, C_M)$$

Where α parameterises the deviation from linear. As the true counts (C_T) tend to zero, so too does the measured counts (C_M). The distribution of α values for each amplifier is shown below:



To give some context, the plot below shows $(C_T - C_M)/C_T$ based on the median value of α in the distribution above. This shows that the assumption of linear holds to within 0.5% for all amplifiers if the counts are < 30 ke-. For a measured count rate of 5ke-, the nonlinearity is <0.1%, so for most KCWI observations, this is not an important correction.



The right panel shows what happens when we ignore the 4s and 8s exposures for AMPID=0 & 1. AMPID=1 appears to have some issues that are not currently accounted for - all other amplifiers are relatively stable. This might be due to the decay correction, and could benefit from using a slightly lower exposure time for mapping the lamp decay over time.