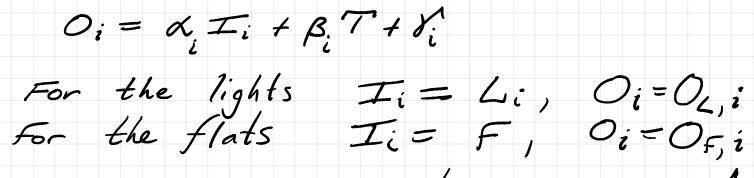
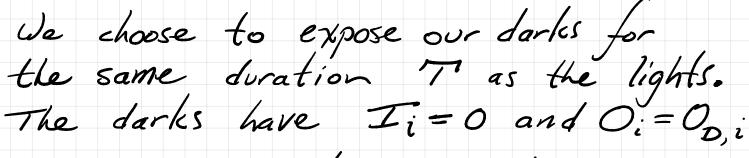
A Non-Standard but Cleaner Approach to

Image Calibration

We presume that pixel i has the following response:



T is the exposure duration. ai, Bi, and i are unknown, pixel-dependent constants. F is also unknown, but its important feature is that it is pixel-independent.



Because the darks have the same T, if we subtract, the BiT and the Si terms disappear, and we learn

 $\mathcal{O}_{L,i} - \mathcal{O}_{D,i} = \alpha_i I_i$ 

For our biases, we choose the same exposure time as the flats. This time is usually quite short relative to T. for example, the flats and darks might have 7=30s. Our darks and biases typically have exposure duration t=1s.  $O_{F,i} = \alpha_i F + \beta_i t + \delta_i$  $O_{B,i} = \beta_i t + \delta_i$ We subtract and learn  $O_{F_i} - O_{B_i} = \alpha_i F$ Now we divide and learn  $\frac{O_{L,i} - O_{D,i}}{O_{F,i} - O_{B,i}} = \frac{\alpha_i I_i}{\alpha_i F} = \frac{I_i}{F}$ we call the LHS the calibrated light:"  $C_{i} \equiv \frac{O_{Li} - O_{D,i}}{O_{F,i} - O_{B,i}}$ what good is it? It still has the unknown Finit. Later in the analysis, we will compare the target star with reference stars.  $\frac{C_{i}}{C_{i}} = \frac{T_{i}}{T_{i}} (F = \frac{T_{i}}{T_{i}} = \frac{Meed ratios}{drop out} (F)$