Mitigating CTI from CCD bulk traps – Abstract

The limiting factor for charge transfer efficiency (CTE) in CCDs is charge trapping. After gate/bias voltages and voltage slew rates are tuned, lattice traps are responsible for charge transfer losses during readout. This is an issue for photon starved applications (eg. WFIRST coronagraph) or high precision measurements (eg. HPRV measurements in KPF, NEID and weak lensing studies with Euclid). Data has traditionally been corrected for this after the fact using iterative routines to reassemble images that have signal smeared in the parallel transfer direction. Here, I demonstrate a set of tools to optimize the CCD readout to mitigate charge trapping from the outset. I will show a) efficient and accurate trap characterization and identification, b) simple techniques to give a highly detailed measurement of CTE as a function of temperature, signal size and clock rate and finally c) a new readout scheme to reduce trapped charge loss by over 50% with no penalty in readout time.