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Calibration Techniques for CCDs in the Presence of the Brighter Fatter Effect

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It has become increasingly clear in recent years that dynamic charge collection effects (notably the "brighter-fatter" effect) are evident and of interest in thick CCDs. Apart from the implications of these effects on shape measurement of point sources, and the unclear sensitivity of their dependence on factors such as incident wavelength and device operating voltage, it is also somewhat troublesome to perform standard calibration of parameters such as gain and electrical crosstalk on devices with significant brighter-fatter contributions. For example: correlations introduced due to the brighter fatter effect are hard to distinguish from those due to electrical crosstalk, or even serial charge transfer inefficiency.

After a brief review of existing and previous work about how the brighter-fatter effect is coupled to measurements of other, more familiar parameters, a discussion will be presented about the currently known extent of the inter- dependence between the brighter-fatter effect and the parameters of gain, crosstalk, noise and charge transfer inefficiency and how these can be mitigated in post-hoc data analysis. Finally, some new measurement techniques involving more specialist operation of the CCD during data acquisition will be discussed, which aim to extract performance parameters whilst exclusing the brighter-fatter effect.

Author: Dr WEATHERILL, Daniel (University of Oxford)

Co-authors: SHIPSEY, Ian (University of Oxford (GB)); ARNDT, Kirk (University of Oxford (GB))

Presenter: Dr WEATHERILL, Daniel (University of Oxford)

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