

Novel Camera Architectures for Localisation Microscopy.

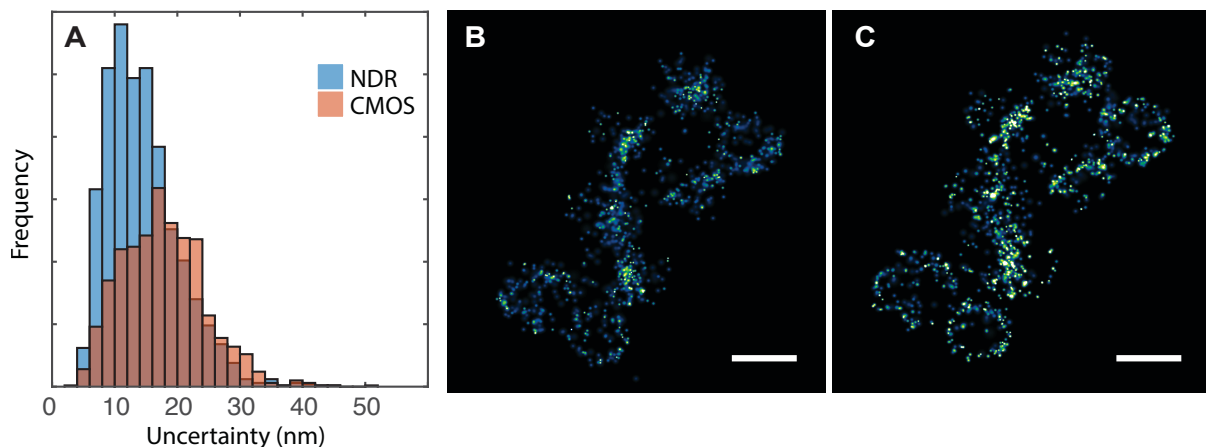
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The fitting precision in localisation microscopy is highly dependent on the signal to noise ratio[1]. To increase the quality of the image it is therefore important to increase the signal to noise ratio of the measurements. We present an imaging system for localisation microscopy based on non-destructive readout camera technology that can increase the signal to noise ratio of localisation based microscopy. This approach allows for much higher frame rates through subsampling a traditional camera frame. By matching the effective exposure to both the start time and duration of a single molecule we diminish the effects of read noise and temporal noise. We demonstrate the application of this novel method to localisation microscopy and show both an increase in the attainable signal to noise ratio of data collection and an increase in the number of detected events.



A, histogram of the localisation precision for NDR and CMOS data, calculated from the signal to noise ratio of the data. **B** and **C** show reconstructed STORM images for the CMOS and NDR data respectively. The colour represents the signal to noise ratio with green being higher and blue being lower, the scale bar represents 1 micron.

[1] Thompson, R. E., Larson, D. R. & Webb, W. W. Precise Nanometer Localization Analysis for Individual Fluorescent Probes. *Biophys J* 82, 2775–2783 (2002).