

## AN EBS-MODE CCD FOR LOW LIGHT LEVEL IMAGING APPLICATIONS

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### ABSTRACT

Three phase 100 bit linear CCD's with a doped polysilicon gate structure have been thinned to 10  $\mu\text{m}$  and operated in the EBS mode in intensifier tubes. Charge gains of greater than 1000 at 6 kV accelerating potential have been observed. This has been achieved by the incorporation of a back surface layer on the thinned silicon area to produce a low surface recombination velocity and consequently improve the spectral responsivity.

Dark current and charge transfer inefficiency are unaffected by the thinning procedure. Optical inputs to the back surface have been used to measure the spectral response which, in comparison with theoretically predicted responses, indicates that a low recombination velocity has been achieved. The MTF at the Nyquist limit was 67% comparable with that for front face imaging. Images produced using a mechanical scan also demonstrated a resolution comparable to front face imaging.

Previous work has shown that unthinned linear devices are compatible with normal tube baking and photocathode processing. This has also been demonstrated by the thin devices mounted in intensifier tubes. No change in dark current and transfer inefficiency has been observed during processing and operation. Experiments are also being carried out with an area array of a three level polysilicon structure utilising a frame-transfer mode of operation.

In summary, thinned CCD's have been operated with electron input into the back surface and have demonstrated their capabilities as a low light level imager.

FULL PAPER TO BE FOUND IN SECTION A

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