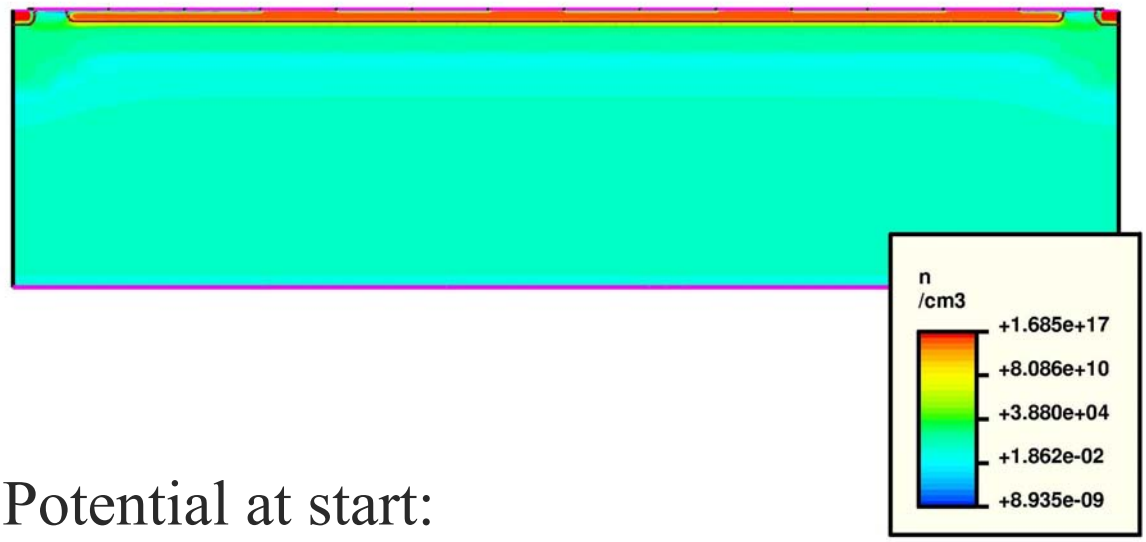
Simulations of Radiation Damage in CCDs – First Steps

- Aim:
  - Simulate transport of charge through CCD.
  - Look at effects of radiation damage, low operating temperature, high speed readout…
- Programme:
  - Build (small) model CCD.
  - For sake of speed minimum level of detail needed for gates etc.
  - Study behaviour with MIP.
  - Look at effects of adding various types of traps, changing operating temperature, readout speed, etc.

Model CCD

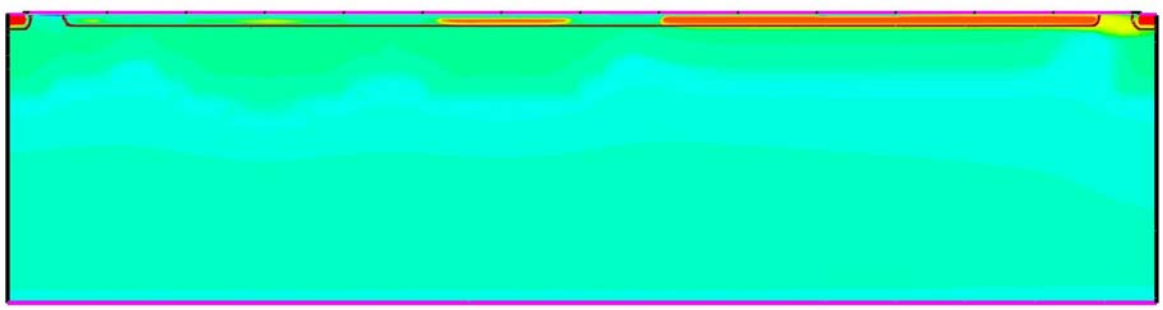
- CCD consists of four 20 μm pixels, 3-phase.
- Start with buried channel flooded with electrons:

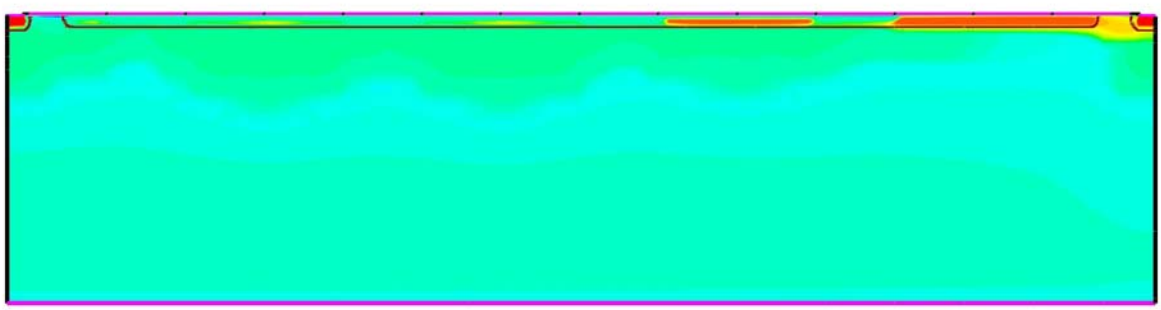


- Potential at start:

CCD Readout

- Drive charge through CCD.





CCD Readout

- Potentials.
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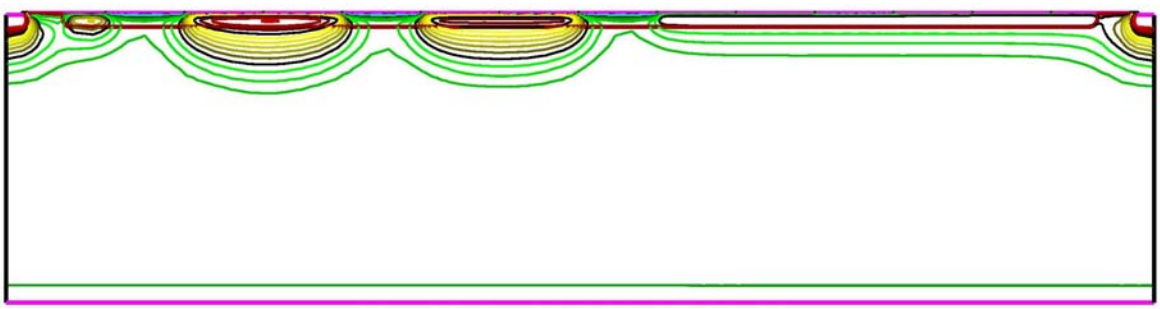
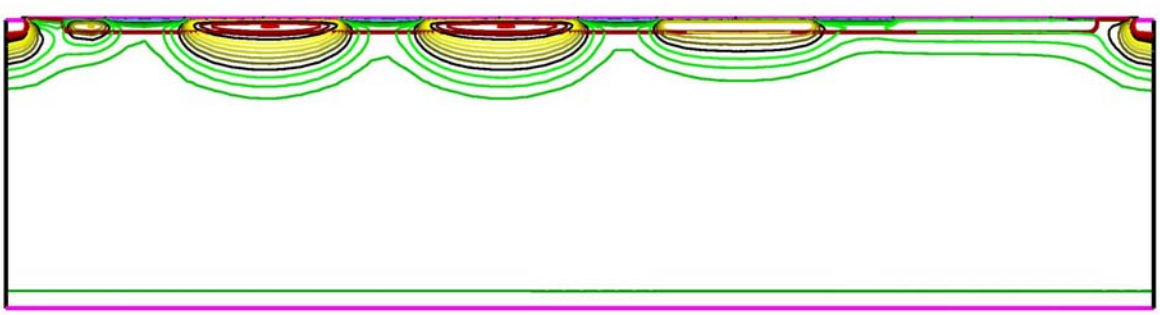
- 
- 

Test Rig

- Up and running again with fibre core from 25 μm → 8 μm.
- Optics set up with CCD with 12 x 9 μm^2 pixels.
- Focussed, reflected spot on CCD, $\sigma \approx 12\,\mu m$.