

The CCD and Spectroscopy arrays

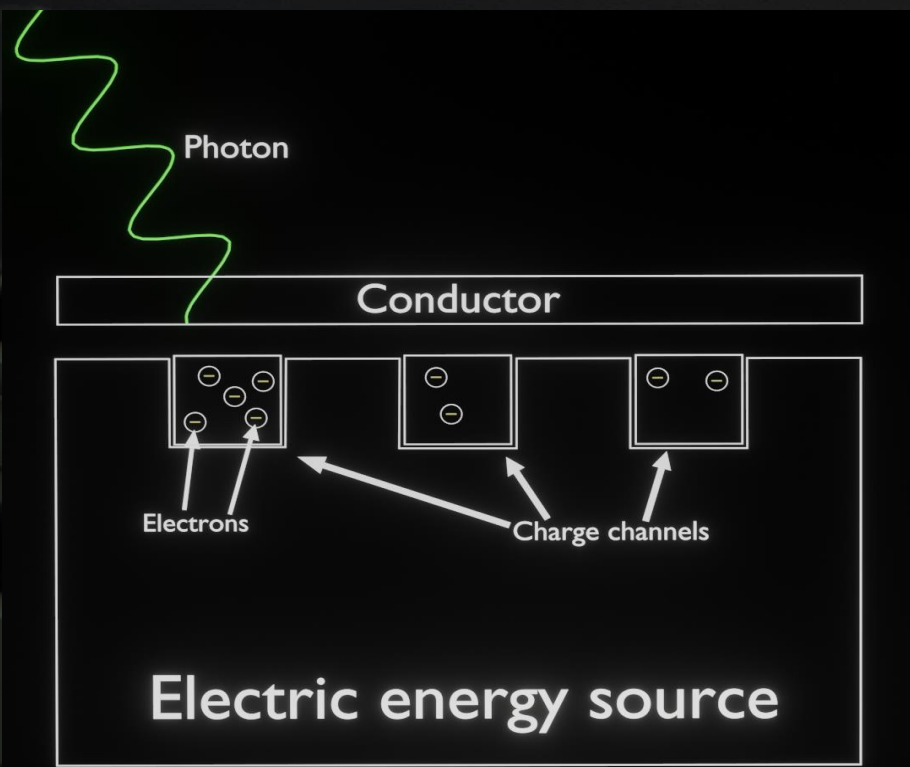


Figure 3 – A simplified side-view of a CCD circuit.

Charge-Coupled Devices (CCDs) (Figure 3)

These are activated by light particles (photons) reaching their surface and causing electric charge to form at that point.

This charge has larger or smaller values based on the brightness of the light reaching it, the higher the brightness, the larger the charge.

The areas of different brightness from parts of the sky allow us to make a final digital image based on the charge values on many different CCDs (called an array).

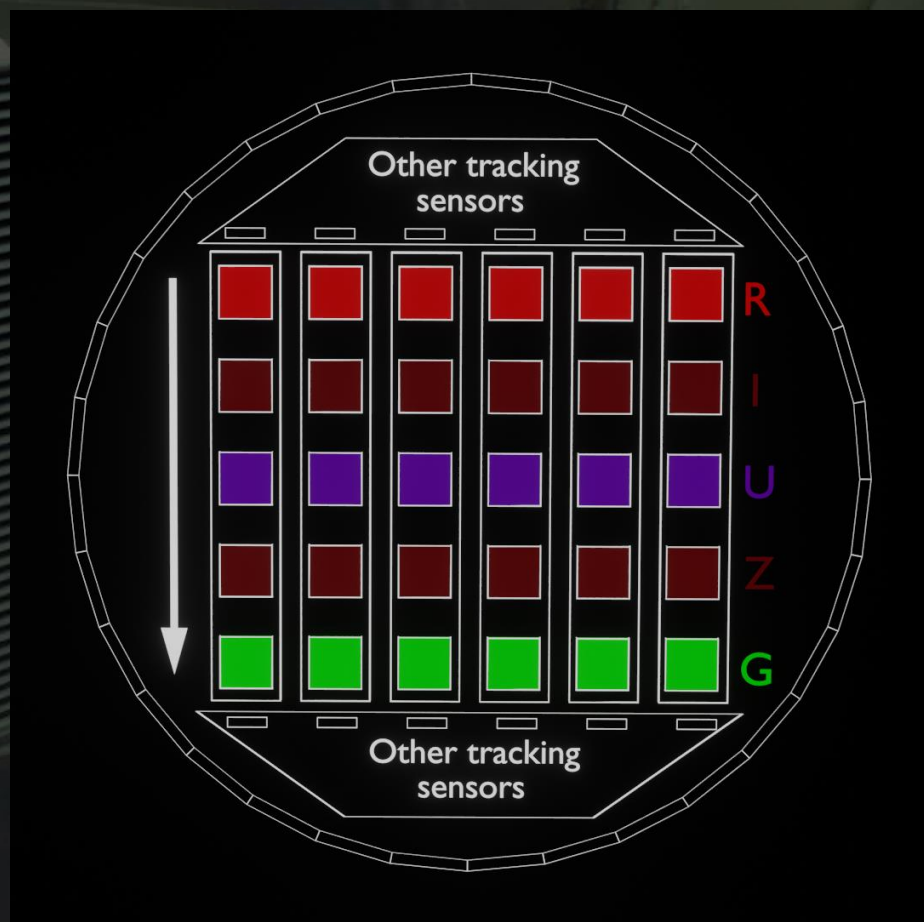


Figure 4 – The arrangement of the CCD array and filters for the SDSS telescope.

'Sloan Digital Sky Survey' array (Figure 4)

The CCDs used in the SDSS telescope are like those found in any mobile phone camera. They have filters placed above them to only allow some wavelengths to pass through.

They are arranged in 5 coloured rows of 6 sensors, 30 in total; and each has a resolution of 2048x2048 pixels.

Images are captured row-by-row; **R, I, U, Z, G**.

More sensors and circuits are placed above and below the array of CCDs. This is to maintain the focus and tracking of the sky area being viewed.

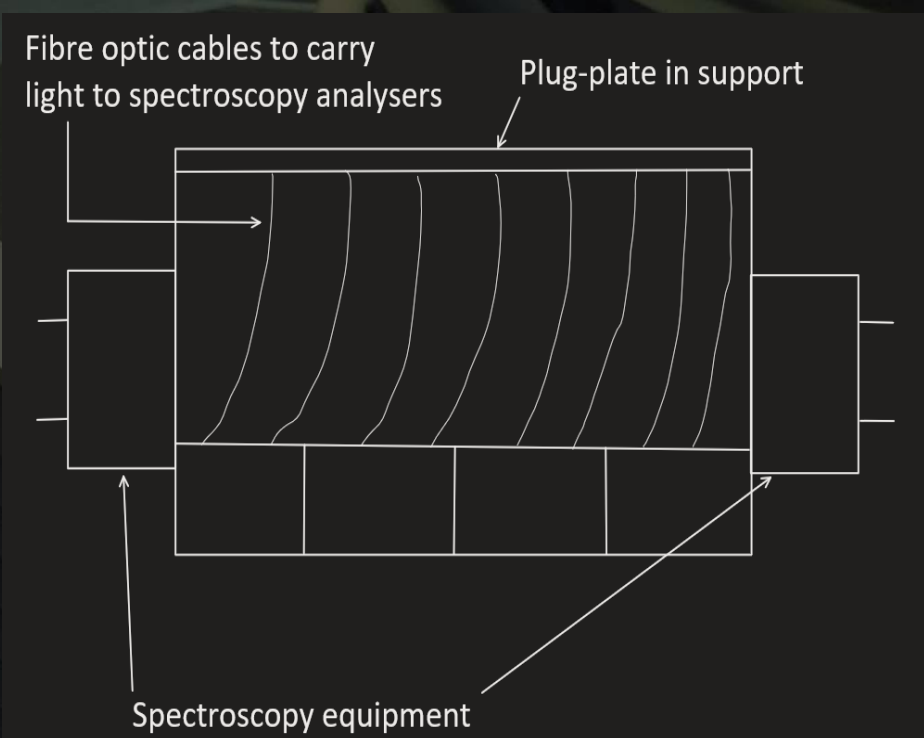


Figure 5 – A simplified side view of the spectroscopy cartridge that holds the plug-plate.

Spectroscopy Cartridge (Figure 5)

The CCD array can be replaced by a support that holds the equipment to carry out 'Spectroscopy', along with the optical fibres and the metal plug-plate that they're fixed into.

Light enters the fibres from individual points of light in the part of the sky being observed, which is aligned with each hole in the plate.

The light is then sent through the analyser where we can study it. This lets us find out, calculate and understand many interesting things about the distant objects.