The SDSS plate and Spectroscopy

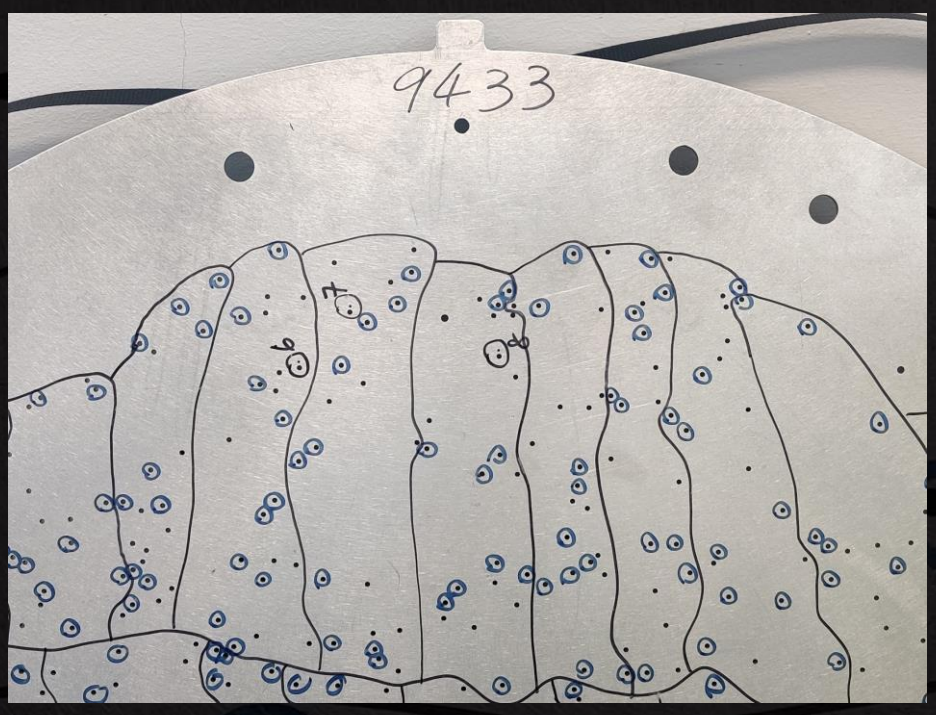

Figure 6 – Showing a close-up view of the top part of the plug-plate.

The SDSS Plug-plate

This aluminium disk is drilled with holes that match the position of a single point of light in the night sky.

These points could be very bright stars, galaxies or large clusters of many stars. Each small hole has a fibre-optic cable plugged into it (which is why it's called a plug-plate), that only receives light from that single source.

The larger holes around the edge of the disk hold it in place. This plate maps of a small circle in the night sky.

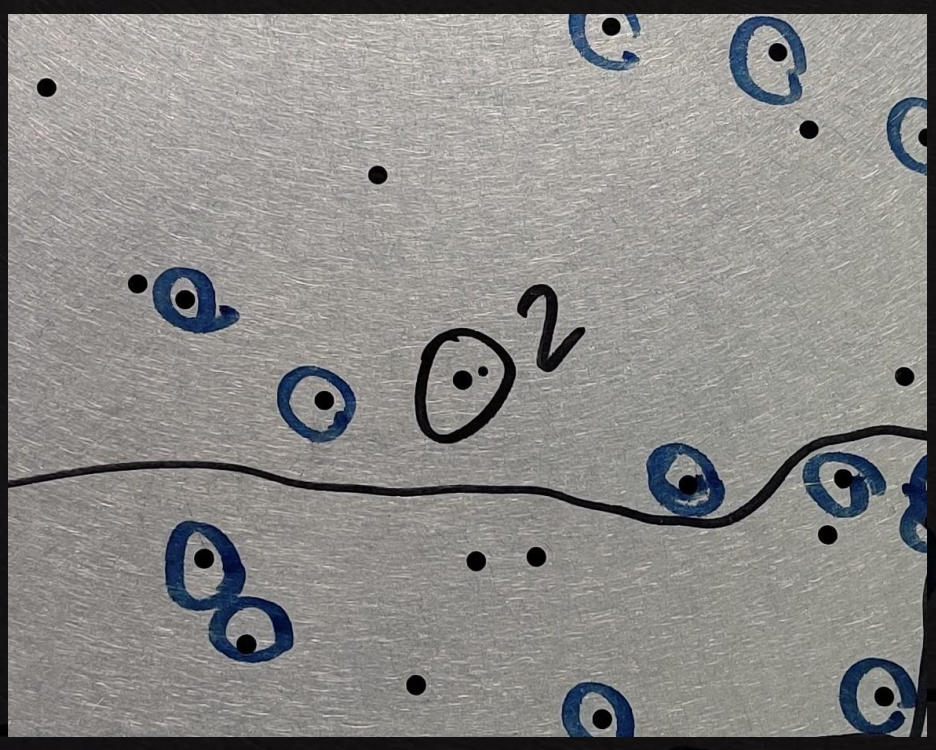

Figure 7 – A guide-object circled in black, and objects of interest in blue.

Markings and positioning

The groups of holes circled in black ink show where fibre bundles should be placed. By allowing many cables to be attached, light can be captured from many sources at once.

The plug-plate is fixed into a ‘Cartridge’ that holds the fibre-optic cables, other equipment and plate at the focal point of the telescope.

The guide-objects (shown in figure 7) are used to keep the telescope pointing in the right direction, since the Earth rotates while capturing the light.

Diffraction and Spectroscopy

‘Diffraction’ happens when a light source is interfered with, so that it splits into all the various colours that it is made up of.

Using 'spectroscopy', we can measure parts from the original light, and compare them to values we expect. This allows us to find out information about the source.

We can use this information to estimate the age, distance and different elements that make up the object.

We do this using the ‘Doppler’ effect, which is similar to what we hear when the sound of an ambulance goes from high to low when it passes by us.

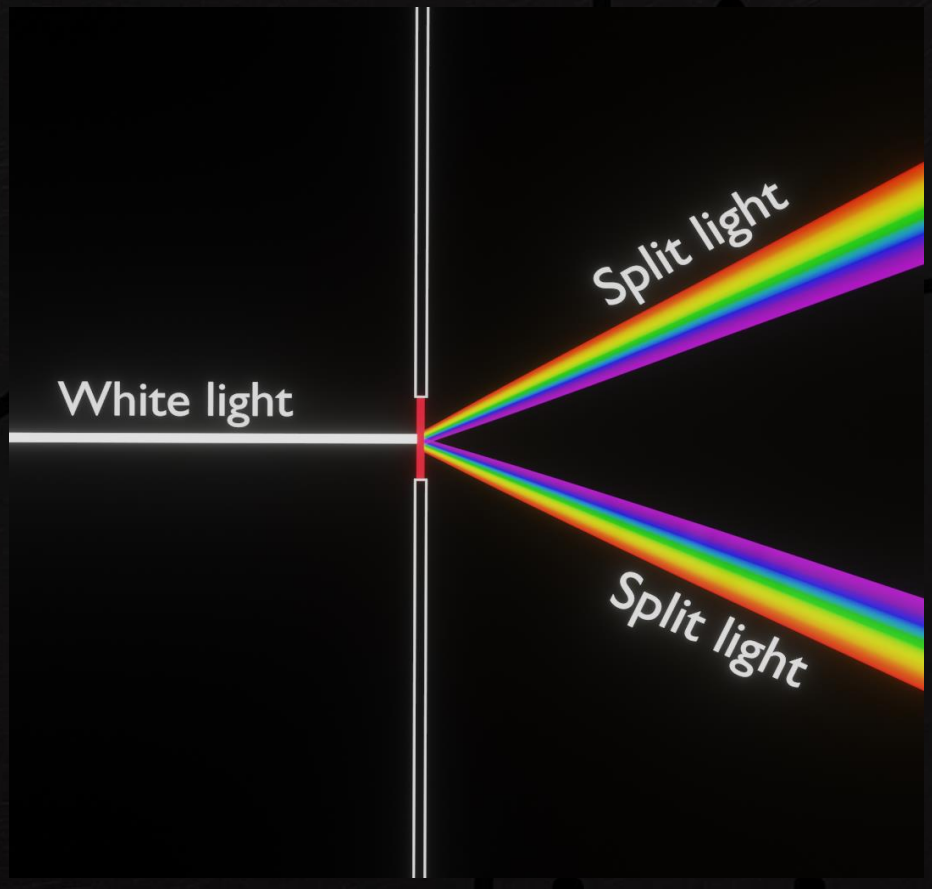

Figure 8 – Shows the effect of splitting light from a source by passing it through a diffraction grating (like how a prism splits light).

Information about SDSS plates gained from ‘Sloan Digital Sky Survey’ website. All images used are original.