EQUIPMENT

From filters to scopes – all you need to capture the Sun

▲ View the Sun with a range of kit, including specialist solar telescopes and filtered reflectors

PETE LAWRENCE X 7, PAUL WHITFIELD X 3, PA PHOTOS

WHEN TAKING IMAGES of the Sun it's important to use the right tools for the job. The dangers involved with pointing a telescope at the Sun means that only proper certified equipment should be used.

Solar telescopes come in two varieties – ones that are dedicated for the purpose and ones that have been temporarily adapted for safe solar viewing. A standard, equatorial-driven mount makes a perfect platform for either variety since the Sun's motion across the sky is not significantly different to that of the stars.

White out

White-light imaging involves removing most of the harmful light that could reach your camera sensor. There are various ways to do this including projection using a 'Herschel Wedge', or by fitting a white-light filter over the front of your scope. Projection and Herschel Wedges are discussed in 'Masterclass 1' (see page 72), but both are limited for use with refractors. The more flexible option is to use a white-light filter such as Baader AstroSolar Film. This type of filter is easy to make (see page 69), and can be used with all telescope types. Never use cheap solar filters that fit onto eyepieces.

A white-light filter will show sunspot groups that will appear and rotate across the disc over the course of a couple of weeks. For the really dramatic views, you'll need to use a narrowband filter that lets only a specific wavelength of light through, such as hydrogen-alpha or Calcium K. These filters are more expensive than white-light filters and can only be used for solar work. Don't confuse deep-sky hydrogen-alpha filters with solar ones – deep-sky filters should never be used for imaging the Sun.

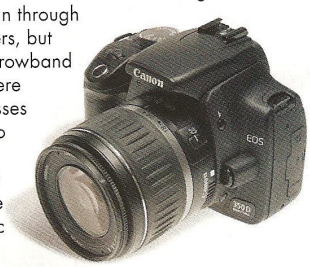
The cheapest hydrogen-alpha scopes are the Coronado PST and Lunt LS-35. They record all manner of exotic phenomena including solar prominences (see page 70). Both instruments have small apertures,

TECH TALK

Cameras for solar imaging

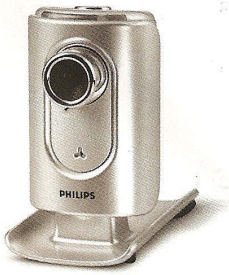
DSLR

DSLR cameras are well-suited for taking shots of the Sun through white-light filters, but less so for narrowband filter shots where special processes are required to extract detail. Single images are also prone to atmospheric distortion.



WEBCAMS

The effects of atmospheric seeing can be reduced by using webcams. These work very well for white-light filtered imaging but the Bayer matrix colour filters fitted to a webcam's sensor will reduce its sensitivity when using narrowband filters.



HIGH FRAME-RATE CAMERAS

Like other Solar System targets, a monochrome high-frame-rate camera will produce the best results, especially when used with narrowband filter systems. The high frame-rates these cameras can achieve is ideal for reducing seeing effects.

COOLED CCD CAMERAS

A monochrome, cooled, astronomical CCD camera can work well with narrowband-filtered images. The best technique is to take lots of short-exposure images and stack them together using a registration and stacking program such as RegiStax.