

## ASTROPHOTOGRAPHY

I would stress that this isn't an aspect of photography that I've done much work in but have a basic understanding of how to go about it.

You generally see three sorts of astrophotography:

- a) All stars sharp, this looks particularly good with shots of the Milky Way
- b) Star trails, specifically with camera pointing at the North Star (Polaris) so that the trails form complete circles around it, if you want to find the North Star, it is the last star in the tail of Ursa Minor (or you can use a phone app to find it for you)
- c) Deep space images of other galaxies – this requires specialised gear (telescope and a star tracker tripod mount) so I won't refer to it in these notes

In all cases it is better to have no moon or less than a quarter moon, and make sure that is isn't in your frame.

For **SHARP STARS** (a) I would suggest starting with the following settings:

- Lens: focal length as short as you've got (wide angle to encompass as much of the sky as possible)
- All exposure settings on manual
- Shutter speed: 10 to 25 seconds (see notes on the 500 Rule below)
- Aperture: f2.8 or wider if the lens goes that wide, otherwise as wide as it can go
- ISO: 400 to 3200 – experiment with this to get the exposure looking right
- Focus: manual, set to infinity
- Shoot in RAW
- Use a tripod
- Either use a shutter release cable or other remote means of firing the shutter (some cameras will link to your phone) or use the timer on the camera (at least 2 or 3sec)
- Shoot a lot at different settings, I find that the images look different on a big screen when processing them from what you see on the camera's LCD screen
- Make sure that noise reduction is turned off on your camera, the camera applying NR will take the same length of time as the exposure, which gets very frustrating on long exposures and will only affect the JPEG.

**500 Rule** – this recommends that to get a shutter speed that keeps the stars as points of light (as opposed to streaks) divide the full frame equivalent of the lens's focal length into 500. So if you are using a Canon or Nikon with a cropped sensor the crop factor will be 1.6 or 1.5 respectively, so if your lens has a 16mm focal length the full frame equivalent will be  $16 \times 1.6$  (or  $1.5$ ) = 25.6mm (or 24mm), divide that into 500 gives a shutter speed of about 20sec. Don't forget that if you are using a zoom lens and zoom in then as you increase the focal length you will need to reduce the exposure time accordingly and compensate for that with a higher ISO.

High ISO will result in increased noise, which can be confused with stars; there are clever processing techniques to overcome this using multiple images but I haven't got my head round those yet so will have to wait for another day.

If you want the foreground to be anything other than a blacked out silhouette then you will need to expose that separately. You could use light painting or flash as part of the same exposure that you are using for the stars or you could take a separate image with a much longer exposure time and then merge the two in post processing.

This blog [7 Astrophotography Tips \(And Camera Settings\) To Put Into Action \(astrobackyard.com\)](http://astrobackyard.com) gives more detail

To get **STAR TRAILS** (b) requires long exposures and can be done one of two ways:

- a) a single very long exposure – 60 to 90mins or
- b) numerous shorter exposures – 20 to 30sec over a 60 to 90min period – which can then be stacked in post processing

All other settings are the same as for sharp stars (a) as described above except you might need lower ISO settings

For more detailed explanation of techniques see [How To Photograph Star Trails - The Ultimate Guide To Star Trail Photography \(lightstalking.com\)](http://lightstalking.com)