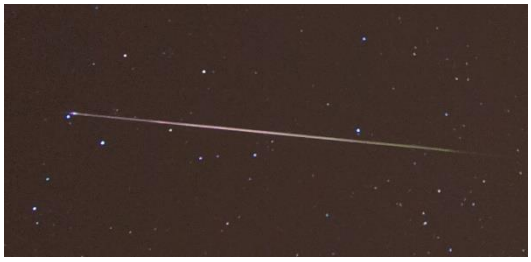
Photographing meteors from a suburban back garden

My first successful attempt at photographing meteors was in 2013. The image frame below shows a Perseid meteor and was one of 701 20sec frames taken between 23:49 on 12 August and 04:32 on 13 August 2013. I used a Canon EOS 500D and 10-22mm lens set at 12mm.

The trail shown here on the left is coloured green, then yellow, red and finishing with purple when the meteor explodes on the left hand side of the frame.

Below is an enlarged view of the same image which shows off the meteor trail's range of colours better.



To the left is a photo of the equipment I used, during the night of 17/18 November 2018, to image Leonid meteors. I was then using a Fuji X-T2 with 16-50mm lens set at 16mm.

I try to choose a night in which the moon is out of the sky for most of the time and which coincides with a known meteor shower. The next reliable shower with high peak rates is the Perseids. This shower peaks on the night of August 12/13th each year, though a night or so beforehand can be fruitful too. The Perseids are bits of the comet called 'Swift-Tuttle'. They feature fast meteors with often bright trails. The moon's presence after midnight this year will have some impact on visibility and the usual observed rate of 60-70 meteors per hour may be difficult.

I use a wide angle lens to capture a good area of sky and set the lens at its widest aperture to minimise exposure time and prevent 'washing out' the sky from light pollution. I keep the camera in portrait mode so as to include terrestrial foreground interest and provide scale. The camera is pointed at an altitude of around 60° at a point 40°- 60° away from the meteor shower radiant. (The point in the sky from which the meteors appear to emanate - for the Perseids this is the constellation Perseus). Too close to the radiant gives very short trails; too far from the radiant and part of the trail may fall outside the frame. Meteor rates and trail brightness usually improve after local midnight as the Earth turns into the meteoroid stream head on – rather like driving west into a strong westerly rain storm.

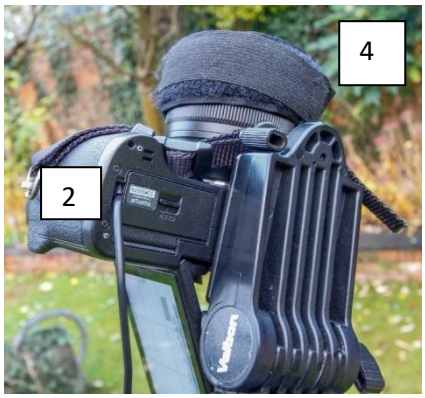
With my set-up I can leave the equipment out all night and go to bed, getting up before dawn to disassemble equipment. I do have to trust the forecast if it states no precipitation that night. I use a heavy (25kg) 120 amp.hour leisure battery which acts in two ways: it stabilizes the tripod via a bungee cord and it runs a small heated dew strap which is wound round the camera lens to keep it dry and free of dew. I find that a portable power bank will power the camera, via a dummy battery power adapter, for more than enough hours to fill a 32GB card with RAW images.

I also use an intervalometer but only as a means of remotely operating the shutter using its locking button. The camera's T-setting is used to continuously take 20 sec shots. (If exposures were in excess of 30 secs I would need the intervalometer's other functions). I have found that after 20 secs exposure the effect of light pollution becomes too pronounced; also stars tend to trail as the earth moves. Star trailing is less pronounced with a shorter focal length lens and when the camera is pointing north. Look at any image of star trails around the North Star to see this.

I take about 20 to 30 'dark frames' immediately after my meteor recording has ended. I do this instead of using the camera's long-exposure noise reduction setting which reduces noise and eliminates hot pixels but in doing so doubles the exposure time. A five hour session would therefore result in a record of only half that time.

Here is a shot of a Leonid meteor (appearing to originate in the constellation of Leo) taken at 03:15 on 18 November 2018 with my Fuji X-T2. The resolution has improved and noise has reduced over my early Canon's shots.

The photos below show the power bank [1] which provides continuous power to the camera (I use an ExPro EX-87106) which feeds the dummy battery power adapter. This dummy battery is placed within the camera's battery compartment [2]. I use a CP-W126 DC Coupler Dummy Battery but these adapters are available for other makes of camera too eg. Canon. The dew controller [3] (I use a Rother Valley Optics 4 Channel Dew Controller) feeds the dew strap wrapped round the camera lens [4] The dew controller is powered by the 12 volt battery. The intervalometer is shown at [5]. I use a Neewer EZa-C1 which is cheaper than the camera manufacturers' models.



The image below is a composite of star trails and Perseid meteors created in free software called StarStax. It is based on 701 frames taken between 23:49 on 12 August and 04:32 on 13 August 2013 with a Canon EOS 500D and 10-22mm lens set at 12mm. The camera was facing north and the image laterally centred on Polaris which shows as the short bright trail at the centre of the circles. Apart from providing an attractive image, star trails show the colours of stars better than single points of light. Defocussing stars is another way to see their colour.

There are a number of meteors in this image, mostly moving right to left. The constellation Perseus is situated on the right hand side of the frame and between 12/13 August most meteors appear to emanate from this area of the sky. The different angles made by the meteors arises from the changing position of the shower radiant which has risen from lower right to upper right over the five hours of exposures. The glow at lower right is the dawn. Here is a link to the high resolution image which better shows the fainter meteors (Zoom in by clicking on the image in Flickr)