

Meteor Shower DSLR Imaging

2018 Dec 05 by Malcolm Park and Rick Wagner

Meteor showers are the kind of target for just about anyone to try photographing, given that the right equipment is on hand.

The Geminids (Dec 13/14) is one of the most reliable meteor showers and you will capture some meteors, guaranteed. Quadrantids (Jan 3/4) are not as frequent, you must take more frames to catch them.

Meteors are best shot with the following equipment:

- Camera with fully manual controls. This typically means DSLR.
- Wide angle lens in the 14-24mm* range. The wider the better. The faster, the better.
- Sufficient memory for all of your exposures.
- Solid tripod with ball-head.
- Battery Pack or AC power supply to power dew heater and camera.

Optional equipment: Tracking mount, slightly longer focal length lens, intervalometer, dew heater to prevent dew and or frost from forming on the lens, "Rainsleeve" plastic camera cover to keep moisture out of the camera body.

Settings:

Shoot in RAW and JPG, or just RAW. Small RAW is fine.

Turn "auto-anything" in the camera to off but especially set White Balance to Daylight. (shooting RAW, you can always edit this in post processing but it's easiest to do it in camera.) In particular turn off any sort of in-camera long-exposure noise reduction – it will cause your camera to take a dark exposure between every frame breaking up your time-lapse.

Set focus to manual control. Set focus to infinity if you know where that is on your lens. If not, use live-view x10 magnification on a bright star to focus. If you set focus to infinity manually, and take a test shot, and the shot is blurry, you have forgotten to set the focus control to manual. Once set, focus will not move unless it's still on auto.

Set camera to Manual Shooting Mode, generally set your f/stop to the lowest number available. If using a superfast (f/1.4 or the like) you may want to close the lens down one stop (f/2.0 for example) for sharper stars.

Set ISO to the highest value your camera can shoot without too noisy an image. For me, I usually shoot at ISO 3200

To avoid the stars trailing in your exposures set your exposure time based on the rule of 500. Let's say you're taking a shot with a 24mm lens on a full frame camera. $500 / 24 = 21$ seconds, which you can round to 20 seconds. You can see why a fast lens and good high ISO/low noise cameras do well here.

For Nikon cameras: Set intervalometer as follows: Assuming you set your camera to 20s exposures. Set intervalometer to start with no delay, using 0s exposures, for 23 second intervals for an infinite number of shots. 0s exposures tells the intervalometer to use the exposure time from the camera settings. 3s between 20s shots allows the camera to write each shot to the memory card without using its buffer.

Too short a delay here, and the buffer eventually fills and the camera pauses causing you to lose valuable imaging time and ruining a time-lapse sequence with gaps.

For Canon cameras: you can use an external intervalometer – set the camera on Bulb mode, set a 1s gap between exposures, and set the desired exposure duration. Or you can use a cable release, set your desired shutter speed, set the shutter mode to continuous shooting and lock the cable release/shutter.

Other camera brands: check your owner's manual for long-exposure continuous shooting instructions.

Once the camera is running, leave it alone, do not touch it until either the battery has died or the night is over, whichever comes first. Otherwise, you will introduce jiggles and gaps to your time-lapse playback.

You can leave the camera running as long as you like, but I would suggest at least 30 minutes or until the battery has died. The longer you shoot, the more meteors you will get.

DOUBLE CHECK ALL YOUR SETTINGS BEFORE STARTING EXPOSURES. CHARGE YOUR BATTERIES IN ADVANCE.

TRIPLE CHECK AGAIN TO BE SURE. CHECK YOUR FOCUS – IT'S EASY TO ACCIDENTALLY BRUSH THE LENS AND CHANGE FOCUS.

Framing:

The first consideration is what lens are you using. If it's a wide-angle lens, anything 24mm* or wider then I would shoot as a landscape. Shoot level to the horizon, with some horizon in the shot for perspective but mostly sky. The next decision is what direction to point your camera. Are you in light polluted sky? I would frame such that the least amount of light pollution or light dome is in the shot. The longer the exposure, the more impact light pollution has and the fewer faint meteors you catch. Try to follow the rule of thirds, and frame an interesting object in the field of view. Like a windmill, or tree or something interesting.

From my shooting location, for the Geminids I will point south over the lake with my D810a, 14-24 f/2.8 lens at 14mm and f/2.8 and ISO 3200. I will shoot all night and make a number of composites. I'll do a star trails + meteor composite, plus a time-lapse movie.

It's nice to be able to point south for this meteor shower because the ecliptic will be almost in the centre of the frame, and all of the major constellations will be in the field of view especially Gemini.

Pointing north east or west are all equally viable. Early in the evening, you will get all the grazing meteors which create long bright dramatic trails, and you will capture meteors all night.

As the evening progresses, and Earth turns towards the East, if you pointed South the radiant comes into the field of view. This is nice to have and to plan for, but is not a requirement to capture meteors. Use the best available part of the sky where you are shooting is the key.

Towards the morning, the meteors tend to come faster and more directly towards you and clearly from the radiant, with fewer long grazers.

Longer focal length lenses:

With a lens in the 35-50mm range, you might try mounting your camera on a tracking mount. Using the same settings as above, frame your shot to include Gemini in one corner all the way over to Orion. With your mount polar aligned, and tracking at sidereal rate, the field of view will not change as you shoot. Because you are tracking, you do not have to follow the 500 rule. I would shoot 30 seconds at ISO 3200 and f/2.0 or f/2.8 continuously for as long as you can. Your stars will be sharp if you are polar aligned

properly, and tracking at the right speed. Your longer exposures will capture more meteors on each frame. And pointing higher in the sky should lift you above more of the light pollution on the horizon. Layering the meteors later in Photoshop to get a single image with many meteors will be easy as all the shots should be closely aligned.

Processing:

There are many tools to use to process your images, both commercial and freeware, including Lightroom, Photoshop and LRTimelapse.

* focal lengths listed are for full frame cameras – if you're using a cropped sensor camera (APS-C) divide the listed focal length by the sensor crop factor for your camera (generally 1.5 for Nikon and 1.6 for Canon.)