

# Shooting the Milky Way

**By Dark Arts Astrophotography**

Nikon D750

ISO 3200

f/2.8

13mm lens

17 second exposure

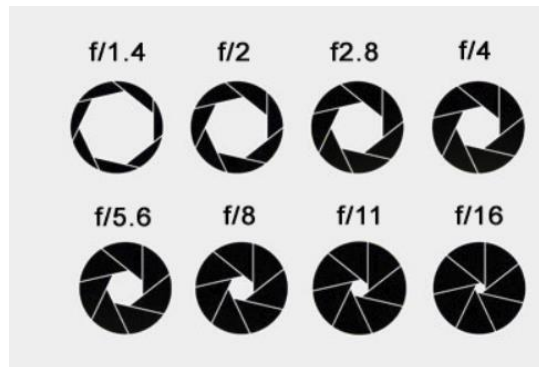
<http://darkartsastro.ca>



# Shooting the Milky Way

## EQUIPMENT

- DSLR with manual settings
- Wide angle lens (<50mm). Avoid using a zoom if you can.
- Fast lens (aperture 3.5 or faster). Smaller the number the faster the lens.
- Tripod – Need a very sturdy tripod. A heavy weight (bean bag) you can hang from tripod helps too.
- Intervalometer – Allows longer exposures than camera firmware may have and can be set to repeat for a fixed number of shots.
- Focusing aid - The automatic focusing in your camera will not work at night on the dark sky.
- Batteries – Extra batteries as long multiple shots drain batteries quickly.



# Camera Setting

- Set camera to manual mode, usually the “bulb” setting.
- Set ISO as high as you can go to a point where camera noise starts to saturate the image. Then back off one setting. Most cameras (>3 yrs old) will be 800-1600 iso. New cameras may allow even 3200-6400 or more. Experiment with you iso setting prior to going out to see what you can do.
- Shoot in RAW format and not jpeg. RAW is uncompressed and you can subtract noise easier when you process image. RAW is also 12-14 bit data where jpeg is 8 bit.
- Decide if you want to turn on in camera long exposure noise reduction. If you turn it on the camera will do it’s own “dark subtraction” for each frame. Down side is it doubles the amount of time it takes to take on picture. You can turn it off and do your own dark subs later. Don’t forget to get dark frames while at your shoot.
- Set autofocus to manual.
- Set aperture on lowest (smallest) number, largest opening.

# What's my max exposure time?

- Due to rotation of earth you have a max time you can exposure without getting star trails.
- Basic rule of thumb is: max exposure in seconds =  $400/\text{focal length of lens (mm)}$ . I suggest  $500/\text{focal length}$ .
- *50mm lens = 8 s*
- *25mm lens = 16 s*
- *14 mm lens = 28 s*
- Make sure to check your test shot to see if you get trails. If so you need to reduce exposure time
- Sometimes you are better off upping the iso and shortening the time even if you get more noise to eliminate star trails. Software is avail to help reduce noise.

# How do I focus the camera at night?

- At night most cameras will not autofocus or will try to refocus with each shot.
- You can
  - Take your equipment out during the day and focus on a far away object to find out where infinity is on your lens. Mark location on the lens with tape of such and you can use that at night. Note that the infinity symbol on your lens is not always correct.
  - Take your best guess at night and check a test print. Good luck very tough to do.
  - Buy or make a focus aid such as a Bahtinov mask. Then at night focus on bright star. Lock in focus with tape or rubber band. Remove mask.
  - If you have a brighter object in the sky such as the moon you can try to use autofocus.
- Remember to check focus over time. Temperature changes the focus of a lens and a lot of zoom lens have focus creep.



# Picking your subject

- You can look at star maps and determine which have interesting objects. Sagittarius for example is a great area.
- If you will photograph the Milky Way near the horizon try to get an interesting subject in the frame. Water, lakes, ponds, old building, single trees, even a distance city skyline.
- You can do a mosaic but will need software to stitch it together. Free software like Hugin
- By Dark Arts Astro
- Nikon D750
- ISO 6400
- f/2.8
- 13mm lens
- 15 sec exposures



# How do they get those really cool shots?

- Most really great shots are done by:
  - Areas of really dark skies and high end cameras with low noise. Using high ISO >6400
  - Using multiple shots of the milky way and stacking. Fancy camera isn't needed for this
  - Realize the sky moves so in short order your frame of interest is gone.
  - Place camera on guided mount and track the stars to keep the same frame of interest. Take lots of longer exposure photos and stack the photos. Just like deep sky objects are done.
  - Great shots of the Milky Way and a landscape is done via photoshop. Photographer will place camera on guided mount and take a series of photos of the Milky Way realizing the earth portion of the shot will be blurry. They then take one shot of the landscape on a fixed mount or tripod and then combined the stacked Milky Way with the fixed landscape shot.
  - Some will also use a flood light to light up the landscape for 10 to 15 seconds and combine that with the Milky Way. It's a little smoke and mirrors but they do look very nice.



# Mounts and Guiding

- Options for guiding include:
  - Using your telescope mount if you have one.
  - Buying a small guider made just for DSLR's. They are kind of expensive, \$400 or more
  - Building your own guider. This is known as a barn door tracker.
  - The Barn Doors can be manual or motorized. The manual one has a hand screw you turn once a minute and on wide angle shots (<50mm) you will not notice any stair trails.
  - Internet is full of plans on how to build. Just search barn door tracker or Haig/Scotch mount.

